# Striatal H3K27 Acetylation Linked to Glutamatergic Gene Dysregulation in Human Heroin Abusers Holds Promise as Therapeutic Target

## *Supplement 1*

## Supplemental Methods

*Rodent heroin self-administration.* Adult male Long-Evans rats were maintained on reversed 12 hr dark/light cycle and underwent jugular vein catheterization. They were subsequently food-restricted and trained to self-administer heroin via the jugular catheter. Animals were placed in an operant chamber (29.5cm x 32.5cm x 23.5cm) housed in sound-attenuating boxes (MED Associates Inc., St. Albans, VT) with two levers; depression of one (designated the active lever) resulted in the delivery of 30 μg/kg heroin under a fixed-ratio 1 (FR1) schedule of reinforcement, whereas depression of the other (designated the inactive lever) had no programmed consequences. Each self-administration session was 3hrs. Following 7 FR1 sessions, animals underwent 4 additional FR5 sessions and were fed ad libitum for the remainder of the study. For the JQ1 experiments, only rats that differentiated between active and inactive levers and showed an escalation of correct responses under FR5 schedule were selected for study. Two guide cannulae (C317G-SPC, cut 4 mm below pedestal), one into each hemisphere, were inserted into the rostral part of the dorsal striatum (at a 10° angle from midline relative to bregma: AP+1.7mm, ML+3.5mm; DV-2.0mm; **Supplemental Figure S2**). After establishing a post-surgery baseline (average of two days), 2 μl of 20 μmol/l JQ1 was injected in awake animals 5 minutes before heroin self-administration testing on two consecutive days. To test for potential protracted effects of JQ1, animals underwent 3 additional heroin self-administration sessions 24 hours, 48 hours, and 96 hours after the last JQ1 delivery. To test JQ1's effect on drug-seeking behavior, the last heroin self-administration was followed by a 96 hours abstinent

period, then animals were injected with JQ1 and underwent a non-reinforced cue-induced drug-seeking reinstatement session. The reinstatement session was 1hr long. All testing was carried out using a counter-balanced experimental design and conducted at a similar time of the day.

*Microarray.* Messenger RNA (mRNA) microarray was previously conducted (1) on total RNA isolated from the NAc of a subset of of heroin ($n$ = 22; 19 male and 3 female subjects) and control ($n$ = 27; 22 male and 5 female subjects) subjects (**Supplemental Tables S1 and S2** for demographic information). Expression data were collected using HG-U133A Affymetrix Chips (Affymetrix, Santa Clara, California) at the Purdue Pharma, L.P. (Cranbury, New Jersey). Raw data were normalized using the Robust Multichip Average from the Affymetrix Expression Console. To control for RNA quality, actin 3'/5' ratios of less than 3 and percent present calls of 50% or greater were used. To identify differentially expressed genes (DEGs), two-tailed $t$ tests were performed with a multiple testing correction ($p < .05$). Hierarchical clustering was performed on log2 expression levels of DEGs with Euclidian distance and average linkage for constructing dendograms. For the weighted gene coexpression network analysis, Supplemental Figure S7 shows module correlations, Supplemental Table S6 shows significance levels, and Supplemental Table S7 shows module memberships.

*NanoString.* 20 μm-thick ventral striatal sections were taken from 20 human heroin abusers and 16 matching controls, and submitted for NanoString analysis (NanoString, Seattle, WA, USA) in Ambion lysis buffer (Ambion, Austin, TX, USA). A custom codeset was designed for genes related to glutamatergic neurotransmission (*AKAP6, DLG1, DLG4, DLGAP2, DNM3, ERBB4, GLS, GRIA1, GRIA2, GRM3, GRM5, HOMER1, HOMER3, NRXN3, PICK1*), as well as a panel of chromatin remodeling enzymes (*AURKB, CHD9, HDAC5, JMJD1C, KAT5, KAT6B, NCOA1, NCOA3, SATB1, SETD2, SMYD2, SETD4, SETDB1, SUV39H1, SUV420H1, UBE2B*). Raw

counts for each gene were subjected to a technical normalization based on the counts for positive control probesets, followed by biological normalization using *GAPDH* as housekeeping gene. All normalization steps were carried out with the nSolver software (NanoString).

*Real-time quantitative polymerase chain reaction (qPCR).* mRNA was extracted from approximately 10 mg of pulverized putamen tissue using the RNAqueous Micro Kit (Ambion) and following the manufacturer's protocol. First-strand cDNA was synthesized using qScript cDNA SuperMix (Quanta Biosciences, Gaithersburg, MD, USA) and subjected to qPCR analysis using Taqman-based probes. Primers and probes against *GRIA1* (Hs00181348_m1), *GRM5* (Hs00168275_m1), *HOMER1* (Hs00188676_m1), *DLG1* (Hs00938204_m1), *DLG4* (Hs00176354_m1), *NCOA1* (Hs00186661_m1), *HDAC5* (Hs00608366_m1), *SUV39H1* (Hs00957892_m1) and JMJD1C (Hs00405469_m1) were obtained from Applied Biosystems (Life Technologies, Carlsbad, CA, USA). Eukaryotic 18S rRNA (Applied Biosystems, product # 4319413E) was included in each multiplex PCR as an internal control. Real-time PCR and subsequent analysis were performed with a Roche LightCycler 480 Real-Time PCR system (LightCycler 480 software; Roche, Basel, Switzerland). Quantification of target gene expression in all samples, performed in triplicate, was normalized to 18S rRNA by the equation $C_{T(\text{target})} - C_{T\ (18S)} = \Delta C_T$, where $C_T$ is the threshold cycle number. Differences between control and heroin subjects, including individual variation, were calculated by the equation $\Delta C_{T\ (\text{individual subject})} - \Delta C_{T\ (\text{mean control})} = \Delta\Delta C_T$. Changes in target gene expression (*n*-fold) in each sample were calculated by $2^{-(\Delta\Delta C_T)}$ from which the means and standard errors of the mean (SEM) were derived.

*Western blot.* Approximately 15 mg of pulverized dorsal striatum (putamen) punches per subject were used to generate histone extracts using 100μl 0.2N HCl containing protease (cOmplete Mini, EDTA-free protease inhibitor cocktail, Roche) and phosphatase inhibitors (Halt phosphatase inhibitor cocktail, Thermo Scientific, Rockford, IL, USA) and 5mmol/L Na-butyrate.

The protein was diluted in Laemmli buffer, denatured (for 5 min at 95°C), subjected to electrophoresis, and transferred onto nitrocellulose membranes. The membranes were blocked in Odyssey blocking buffer (LI-COR, Lincoln, NE, USA) and incubated at 4°C overnight with primary antibodies. Rabbit polyclonal antibodies were used against acetyl-histone H3 (pan-AcH3, 1:5000, Millipore, Billerica, MA, USA), acetyl K9-histone H3 (H3K9ac, 1:500 Abcam, Cambridge, MA, USA), acetyl K14-histone H3 (H3K14ac, 1:2000, Active Motif, Carlsbad, CA, USA), acetyl K18-histone H3 (H3K18Ac, 1:6000, Abcam), acetyl K23-histone H3 (H3K23ac, 1:5000, Active Motif), acetyl K27-histone H3 (H3K27ac, 1:1000, Millipore), acetyl K36-histone H3 (H3K36ac, 1:5000, Millipore), acetyl K56-histone H3 (H3K56ac, 1:400, Millipore) trimethyl K9-histone H3 (H3K9me3, 1:1000, Abcam), trimethyl K4-histone H3 (H3K4me3, 1:2000, Millipore), trimethyl K27-histone H3 (H3K17me3, 1:3000, Millipore), and histone H4 (H4, 1;10000, Millipore). Mouse monoclonal antibodies were used against dimethyl K9-histone H3 (H3K9me2, 1:1000, Abcam), and histone H4 (H4, 1:10000, Abcam). Membranes were subsequently incubated with goat anti-rabbit or goat anti-mouse IRDye 680 or IRDye 800 secondary antibodies (LI-COR) at room temperature for 1h. Membranes were developed with the LI-COR infrared imaging system (LI-COR) and images quantified using average integrated density values. Total histone H4 levels were used to control for total protein content.

*Chromatin immunoprecipitation (ChIP).* ChIP was carried out as previously described (1). Briefly, 15 mg pulverized putamen tissue (human or rat) was fixed with 1% formaldehyde. Samples were sonicated with Bioruptor (Diagenode, Liege, Belgium) in buffer containing 50 mmol/L Hepes pH 7.9, 140 mmol/L NaCl, 1 mmol/L EDTA, 1% Triton X-100, 0.1% Na-deoxycholate, and 0.1% SDS. 25 μg chromatin (measured as DNA at an optical density of 260 nm with NanoDrop ND-1000 Spectrophotometer from Thermo Scientific) was immunoprecipitated with 4 μl anti-acetyl histone H3 antibody (Millipore) or 4 μg anti-acetyl

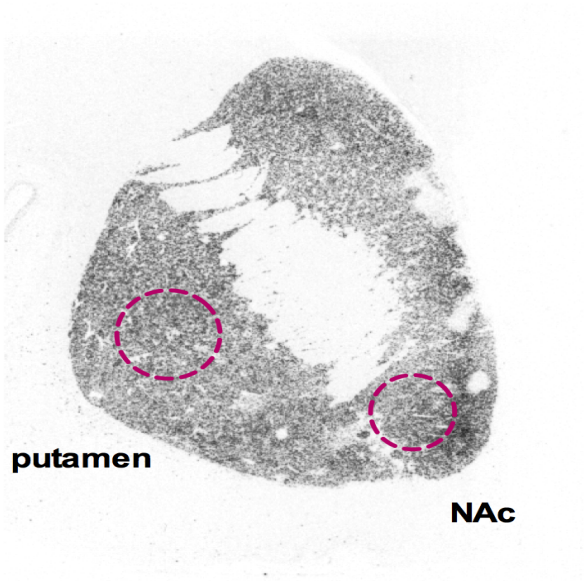
lysine-27 histone H3 antibody (Millipore) and nonspecific rabbit IgG (Santa Cruz Biotechnology, Santa Cruz, CA, USA). Immunocomplexes were collected with protein G Dynabeads (Invitrogen, Carlsbad, CA, USA), beads washed, bound fraction eluted, extracted with phenol-chloroform, ethanol-precipitated, and resuspended in Tris-EDTA buffer. ChIP material was analyzed by real-time PCR using SYBR green master mix (Roche) in a LightCycler 480 instrument (Roche) and the default SYBR green PCR program. PCR reactions were carried out in triplicates. Crossing point values from each PCR were obtained with the second derivative maximum method (Roche). The enrichment of a given target sequence precipitated by the antibody was determined as the difference between the amount of target sequence in the immunoprecipitated fraction and the amount of target sequence in the input DNA. Relative quantification and analysis of heroin effects were performed with a modified version of the ΔΔCt method. The background immunoprecipitation of chromatin with nonspecific rabbit IgG was determined for both groups.

*Fluorescence assisted cell sorting (FACS) of neuronal and non-neuronal nuclei*. 50mg of frozen postmortem brain tissue was homogenized in cold lysis buffer (0.32M Sucrose, 5 mM $CaCl_2$, 3 mM $Mg(Ace)_2$, 0.1 mM, EDTA, 10mM Tris-HCl, pH8, 1 mM DTT, 0.1% Triton X-100) and filtered through a 40µm cell strainer. The flow-through was underlaid with sucrose solution (1.8 M Sucrose, 3 mM $Mg(Ace)_2$, 1 mM DTT, 10 mM Tris-HCl, pH8) and subjected to ultracentrifugation at 24,000 rpm for 1 hour at 4°C. Pellets were thoroughly resuspended in 500µl DPBS and incubated in BSA (final concentration 0.1%) and anti-NeuN antibody (1:1000, Alexa488 conjugated, Millipore) under rotation for 1 hour, at 4°C, in the dark. Prior to FANS sorting, DAPI (Thermoscientific) was added to a final concentration of 1µg/ml. DAPI positive neuronal (NeuN+) and non-neuronal (NeuN-) nuclei were sorted using a FACSAria flow cytometer (BD Biosciences).

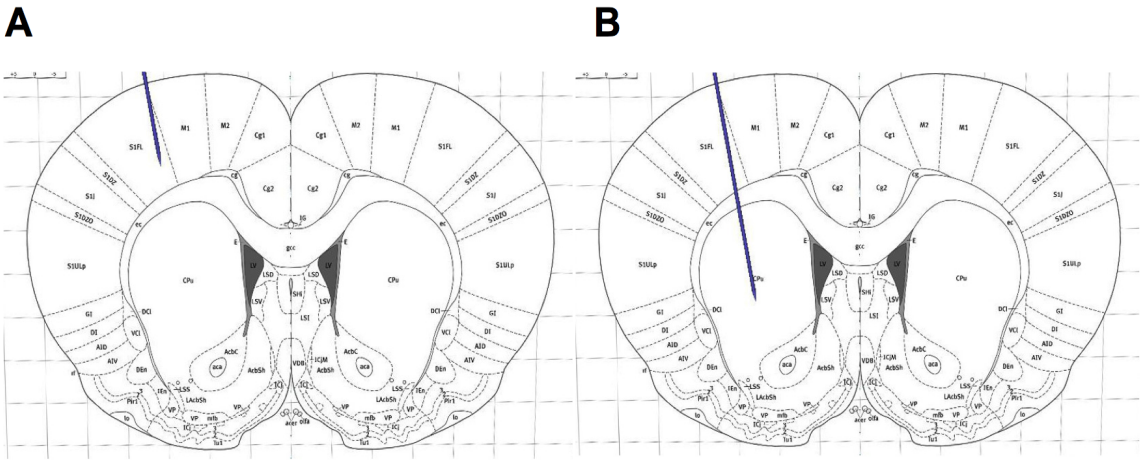
*Generation of ATAC-seq libraries*. ATAC-seq (assay for transposase accessible chromatin) reactions were performed using an established protocol (2) (Illumina Cat #FC-121-1030) and the resulting libraries amplified using the Nextera index kit (Illumina Cat #FC-121-1011). Optimal library amplification was determined by visualization with Bioanalyzer High Sensitivity DNA Chips (Agilent technologies Cat#5067-4626). Libraries were amplified for a total of 12–17 cycles and were quantified by Qubit HS DNA kit (Life technologies) and by quantitiative PCR (KAPA Biosystems Cat#KK4873) prior to sequencing. Finally, ATACseq libraries were sequenced on Hi-Seq2500 (Illumina) obtaining 2x50 paired-end reads.

*Statistical analysis.* Statistical evaluation was carried out using JMP (SAS Institute, Cary, NC, USA). Data were tested for normality and normalized by natural log transformation, if not normally distributed. Univariate statistical analyses were used to study the effect of each independent demographic variable (e.g. age, gender, postmortem interval, brain pH, RIN, years of heroin use, former overdose) and toxicology data (e.g. blood and urine alcohol, morphine, 6-mono-acetyl-morphine, codeine levels) on mRNA expression or protein levels. Variables with a p value of less than 0.1 were included in the final multiple regression model. If there were no such variables, group differences were determined by one-way analysis of variance. Correlational analyses were carried out according to Pearson.

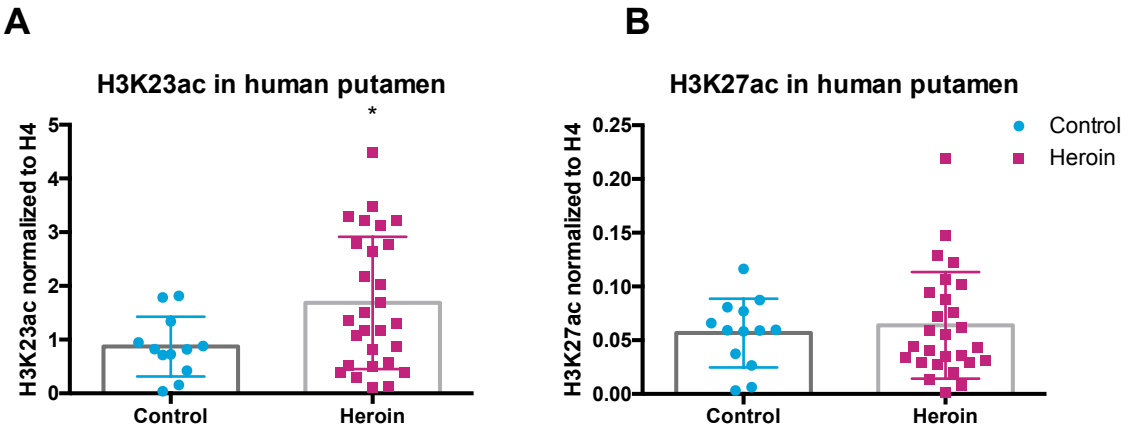
## Supplemental Figures



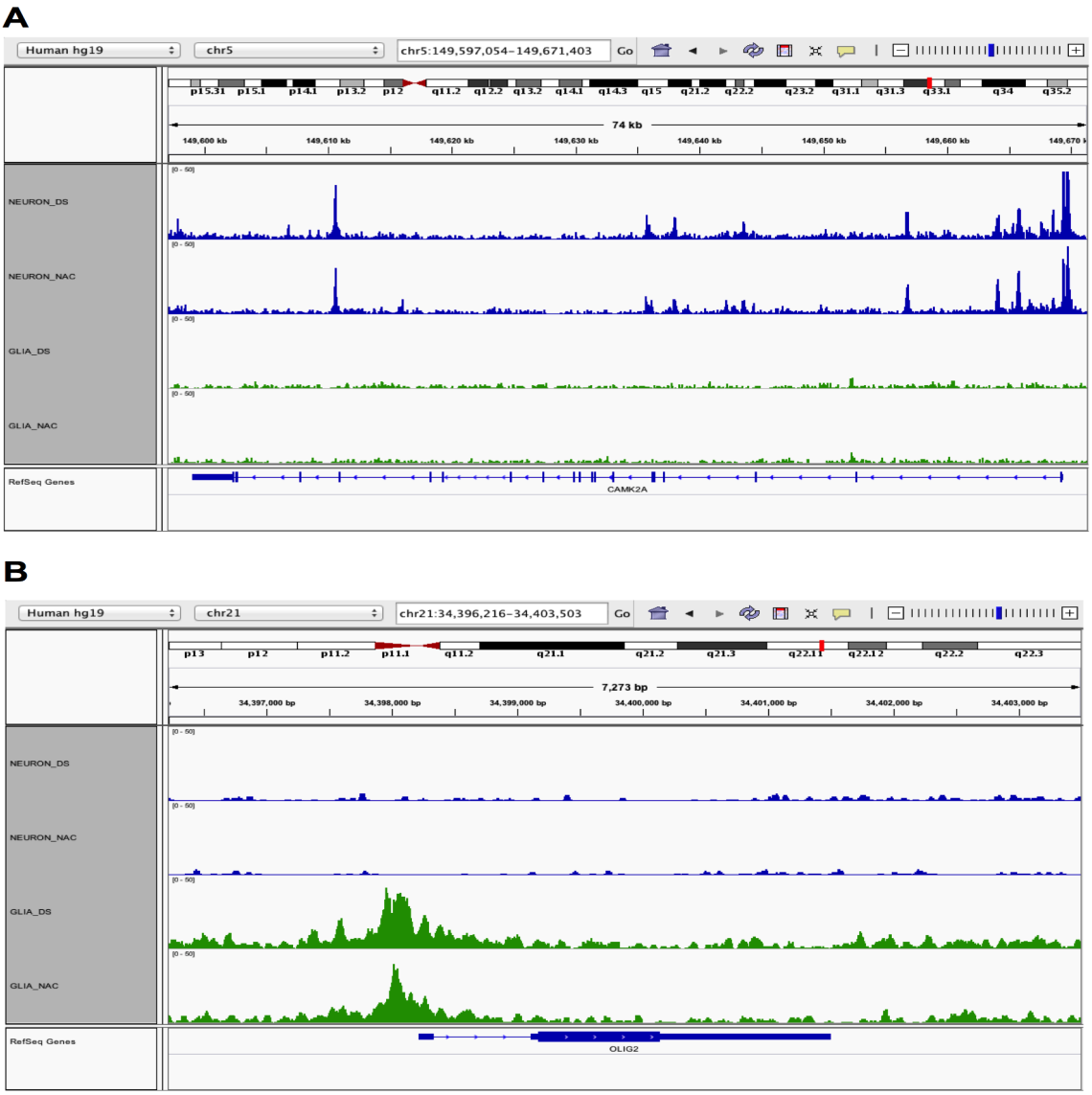

**Supplemental Figure S1.** Human striatum tissue was obtained from the ventral and dorsal striatum (putamen) at the level of the nucleus accumbens (NAc).



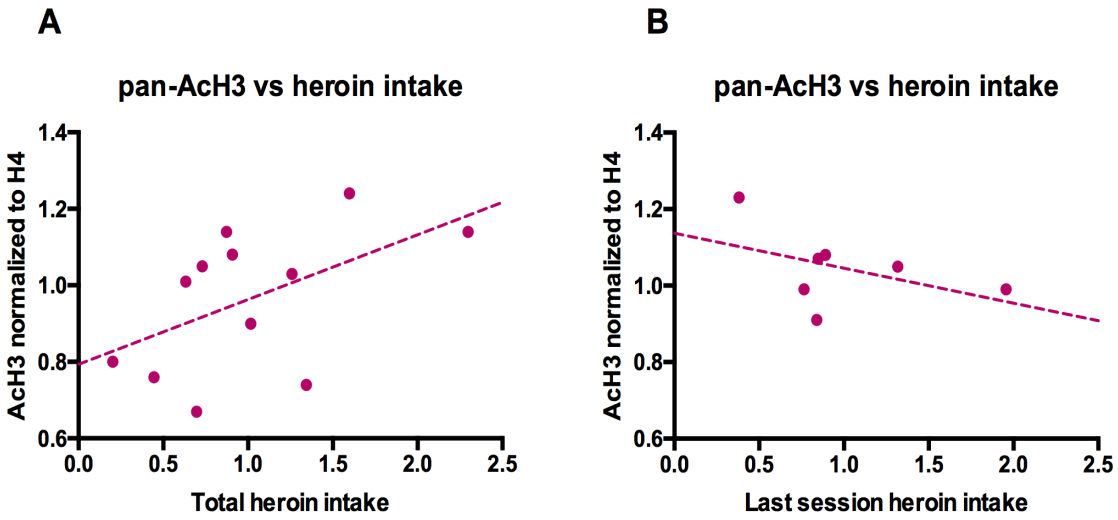

**Supplemental Figure S2.** Stereotaxic surgeries. (A) Guide cannulae were implanted at a 10° angle at AP+1.7mm, ML+3.5mm and DV+2mm from bregma. (B) For JQ1 injections, 28 gauge needles were lowered through the guide cannulae to AP+17mm, ML+3.5mm and DV+5.2mm from bregma. 2 l of 20 M JQ1 was injected over 1 minute in both hemispheres.



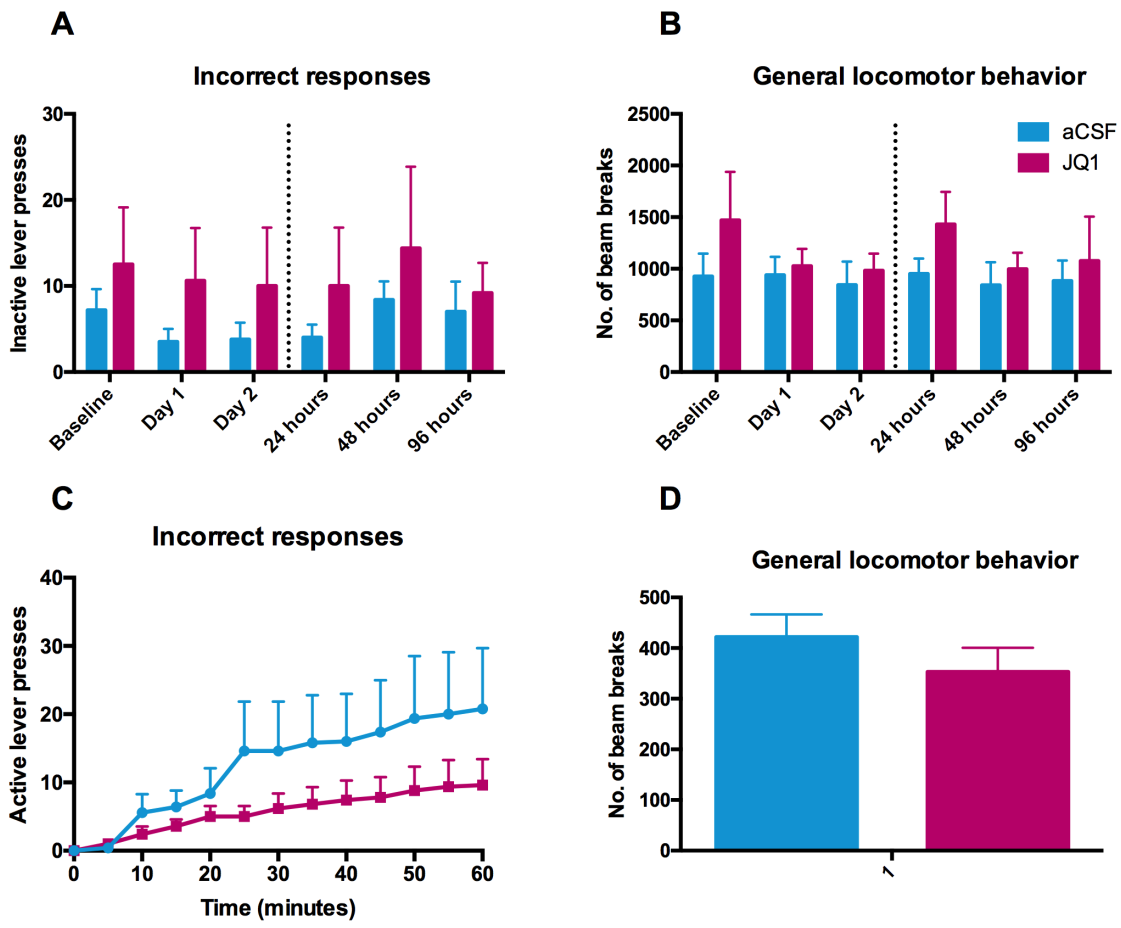

**Supplemental Figure S3.** Heroin-related acetylation impairments of specific histone H3 lysine residues in the post-mortem human brain. Western blot experiments showing (A) H3K23 acetylation, n=12 (controls) and n=28 (heroin users) and (B) H3K27 acetylation, n=13 (controls) and n=27 (heroin users) in the dorsal striatum. Data is represented as mean ± s.e.m. Independent Student's t-tests, *P < 0.05.



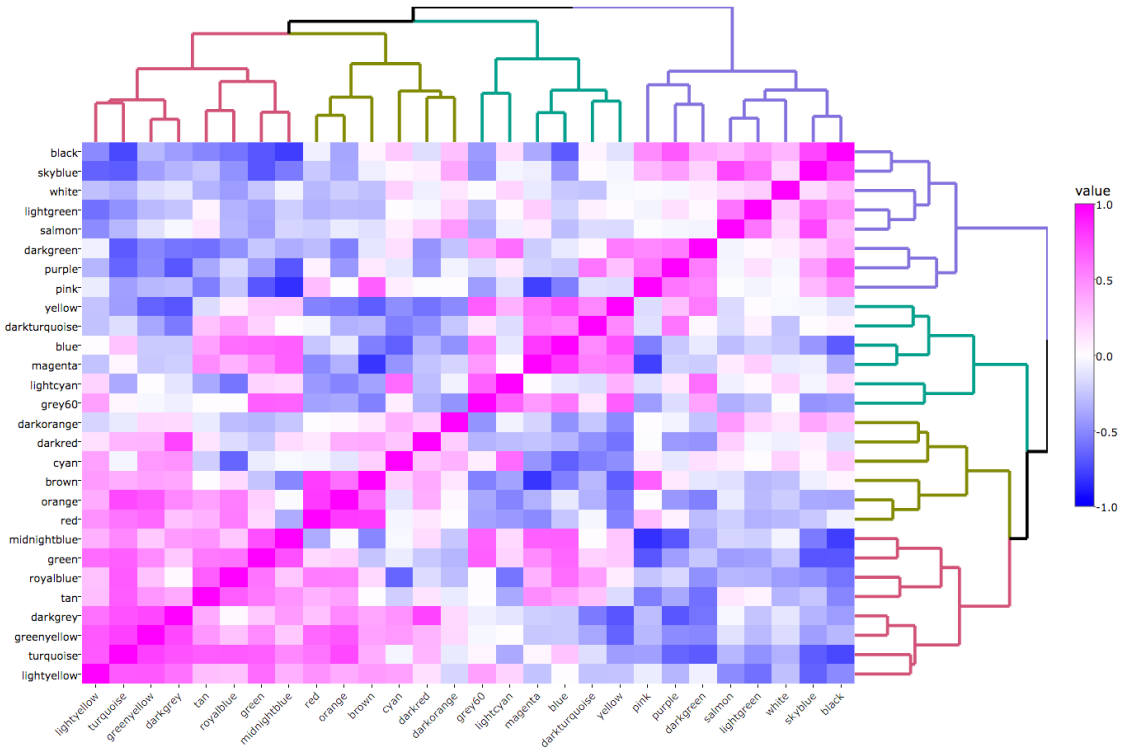

**Supplemental Figure S4.** Assay for transposase accessible chromatin (ATAC) coupled to fluorescence assisted cell sorting (FACS) reliably identifies open chromatin regions in a cell type-specific manner. (A) CAMK2A accessibility in neuronal (blue) and glial (green) tracks from human dorsal striatum (top panel) and nucleus accumbens (bottom panel) tissue. (B) OLIG2 accessibility in neuronal (blue) and glial (green) tracks from human dorsal striatum (top panel) and nucleus accumbens (bottom panel) tissue.




**Supplemental Figure S5.** Rat heroin-self administration is associated with changes in histone H3 acetylation similar to that in human heroin users (A,B) Pearson correlations between pan-AcH3 and (A) total heroin intake at 24 hours after the last self-administration session, r=0.52, p=0.0847, n=12, and (B) last session heroin intake 1 hour after the last self-administration session, r=-0.46, p=0.3013, n=7.




**Supplemental Figure S6.** JQ1 treatment does not affect inactive lever pressing and general locomotor behavior. (A) Inactive lever presses and (B) beam breaks during 3 hours long heroin self-administration session in JQ1 (n=6) and aCSF (n=5) treated Long-Evans rats. Dashed line represents day of last JQ1 delivery. Bar graphs represent mean ± s.e.m. (c) Inactive lever presses and (d) beam breaks during a 1 hour non-reinforced cue-induced drug-seeking session in JQ1 (n=6) and aCSF (n=5) treated Long-Evans rats. Data is represented as mean ± s.e.m.




**Supplemental Figure S7.** WGCNA analysis. Heatmap plot showing Pearson's correlation of module eigengenes.

## Supplemental Tables

**Supplemental Table S1.** Demographic information (group, gender, age), cause of death (determined by forensic pathologist) brain pH, blood ethanol levels at autopsy for the post-mortem human population. For each subject, the molecular assays performed are indicated separately.

| ID | Group | Gender | Age | Cause of death | pH | Blood EtOH | WB, PCR, ChIP | Micro-array | Nanostring | ATAC-seq | RNA-seq |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 245 | Control | f | 15 | sudden, natural (AMI) | | 0 | | x | | | |
| 257 | Control | m | 46 | sudden, natural (AMI) | 6.84 | 0 | | x | | | |
| 263 | Control | m | 39 | sudden, natural (AMI) | | 4 | | x | | | |
| 275 | Control | m | 46 | sudden, natural (AMI) | | 0 | | x | | | |
| 285 | Control | m | 44 | sudden, natural (AMI) | 6.92 | 0 | | x | x | | |
| 288 | Control | m | 49 | sudden, natural (AMI) | 6.59 | 0 | | x | x | | |
| 307 | Control | m | 43 | sudden, natural (pulmonary embolism) | 6.68 | 0 | x | x | x | | |
| 317 | Control | m | 50 | sudden, natural (AMI) | 6.54 | 0 | x | | x | | |
| 332 | Control | m | 48 | sudden, natural (AMI) | 6.79 | 0 | x | x | x | | |
| 338 | Control | m | 58 | sudden, natural (pneumonia) | 6.15 | 0 | | x | x | | |
| 342 | Control | m | 29 | sudden, natural (AMI) | 6.92 | 0 | x | | x | | x |
| 344 | Control | m | 25 | food asphyxiation | 6.76 | 0 | x | x | | | x |
| 351 | Control | f | 19 | sudden, natural (AHF) | 6.76 | 0 | | x | | | |
| 352 | Control | m | 44 | sudden, natural (AMI) | 6.87 | 1.19 | | x | x | | |
| 365 | Control | m | 20 | sudden, natural (AHF) | 6.59 | 2.14 | | x | | | |
| 372 | Control | m | 22 | sudden, natural (AMI) | 6.79 | 0 | x | | x | | x |
| 376 | Control | m | 30 | sudden, natural (AMI) | 6.33 | 0 | x | x | x | | |

| ID | Group | Gender | Age | Cause of death | pH | Blood EtOH | WB, PCR, ChIP | Micro-array | Nanostring | ATAC-seq | RNA-seq |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 387 | Control | f | 36 | sudden, natural (AMI) | 6.82 | 0 | x | x | x | | |
| 395 | Control | m | 43 | sudden, natural (pulmonary embolism) | 6.40 | 0 | | x | | | |
| 398 | Control | m | 15 | sudden, natural (undetermined) | 6.81 | 0 | | x | x | | |
| 405 | Control | f | 31 | sudden, natural (AHF) | 6.98 | 0 | x | x | x | | x |
| 406 | Control | m | 19 | electric shock | 6.82 | 0 | x | x | | | x |
| 407 | Control | f | 27 | sudden, natural (pneumonia) | 6.75 | 1.26 | x | x | x | | |
| 412 | Control | m | 23 | electric shock | 6.76 | 0 | x | x | x | | |
| 416 | Control | m | 37 | sudden, natural (AMI) | 6.81 | 0 | x | x | x | | |
| 427 | Control | m | 38 | sudden, natural (pneumonia) | 6.52 | 0 | | x | | | |
| 430 | Control | m | 26 | sudden, natural (pneumonia) | 6.96 | 0 | | x | | x | x |
| 431 | Control | m | 25 | electric shock | 6.79 | 0 | | | | x | x |
| 437 | Control | m | 20 | sudden, natural (undetermined) | 6.37 | 0 | | x | | | |
| 440 | Control | m | 28 | sudden, natural (AMI) | 6.70 | 0 | | x | | x | x |
| 444 | Control | m | 24 | sudden, natural (AHF) | 6.75 | 0 | | | | x | x |
| 446 | Control | f | 22 | sudden, natural (AMI) | | 0 | | | | x | x |
| 448 | Control | m | 31 | electric shock | 6.98 | 0 | | | | x | x |
| 456 | Control | m | 20 | sudden, natural (hypothermia) | | 0 | | | | x | x |
| 457 | Control | m | 27 | electric shock | | 0 | | | | x | |
| 499 | Control | f | 27 | sudden, natural (pulmonary embolism) | 6.08 | 0 | | | | x | x |
| 504 | Control | m | 22 | sudden, natural (pneumonia) | | 0 | | | | x | x |

| ID | Group | Gender | Age | Cause of death | pH | Blood EtOH | WB, PCR, ChIP | Micro-array | Nanostring | ATAC-seq | RNA-seq |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 225 | Heroin | m | 39 | heroin overdose | 6.85 | 2 | | | x | | |
| 255 | Heroin | f | 32 | heroin overdose | 6.48 | 0 | | | x | | |
| 256 | Heroin | m | | heroin overdose | | | | x | | | |
| 302 | Heroin | m | 26 | heroin overdose | 6.48 | 0 | x | x | x | | |
| 309 | Heroin | m | 25 | heroin overdose | 6.74 | 0 | x | | x | | |
| 310 | Heroin | m | 26 | heroin overdose | 6.57 | 0 | x | x | | | |
| 312 | Heroin | m | 21 | heroin overdose | 6.66 | 0 | | x | | | |
| 316 | Heroin | m | 22 | heroin overdose | 6.75 | 0 | x | x | x | | |
| 318 | Heroin | m | 28 | heroin overdose | 6.8 | 0 | x | x | x | | x |
| 322 | Heroin | m | 25 | heroin overdose | 6.13 | 0 | x | | | | |
| 325 | Heroin | m | 22 | heroin overdose | 6.2 | 0 | x | x | | | x |
| 328 | Heroin | m | 23 | heroin overdose | 6.56 | 0 | | x | | | |
| 333 | Heroin | m | 23 | heroin overdose | 6.66 | 0 | x | x | x | | x |
| 336 | Heroin | m | 25 | heroin overdose | 6.64 | 0 | x | | | | |
| 339 | Heroin | m | 27 | heroin overdose | 6.66 | 0 | x | x | x | | |
| 340 | Heroin | m | 46 | heroin overdose | 6.47 | 1.31 | x | | | | |
| 341 | Heroin | m | 23 | heroin overdose | 6.41 | 0 | x | x | x | | x |
| 343 | Heroin | f | 19 | heroin overdose | 6.71 | 0 | | | | x | x |
| 345 | Heroin | f | 29 | heroin overdose | 6.61 | 0 | x | x | | | |
| 349 | Heroin | f | 24 | heroin overdose | 6.36 | 0 | x | | | | |
| 354 | Heroin | m | 24 | heroin overdose | 6.55 | 0 | x | | | | |
| 357 | Heroin | m | 25 | heroin overdose | 6.75 | 0 | x | x | | | x |

| ID | Group | Gender | Age | Cause of death | pH | Blood EtOH | WB, PCR, ChIP | Micro-array | Nanostring | ATAC-seq | RNA-seq |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 361 | Heroin | m | 23 | heroin overdose | 6.69 | 0 | | x | | | |
| 364 | Heroin | m | 25 | heroin overdose | 6.74 | 0 | x | | x | | |
| 366 | Heroin | f | 26 | heroin overdose | 6.75 | 1.12 | x | x | | | |
| 367 | Heroin | m | 31 | heroin overdose | 6.6 | 0 | x | x | x | | x |
| 368 | Heroin | m | 20 | heroin overdose | 6.52 | 0 | x | | x | | |
| 370 | Heroin | m | 28 | heroin overdose | 6.85 | 1.39 | x | | x | | |
| 371 | Heroin | f | 21 | heroin overdose | 6.76 | 0 | | x | | x | x |
| 375 | Heroin | m | 25 | heroin overdose | 6.56 | 0 | x | | x | | |
| 377 | Heroin | m | 21 | heroin overdose | 6.82 | 0 | x | x | x | | |
| 382 | Heroin | m | 24 | heroin overdose | 6.47 | 0.52 | | | x | | |
| 383 | Heroin | m | 23 | heroin overdose | 6.68 | 0 | x | | | | |
| 385 | Heroin | f | 25 | heroin overdose | 6.42 | 0 | x | | | | |
| 388 | Heroin | m | 29 | heroin overdose | 6.79 | 0 | x | | x | | |
| 389 | Heroin | m | 27 | heroin overdose | 6.47 | 0 | x | | x | | |
| 397 | Heroin | m | 26 | heroin overdose | 6.5 | 0 | x | x | x | | |
| 401 | Heroin | m | 26 | heroin overdose | 6.28 | 0 | x | x | x | | |
| 408 | Heroin | m | 36 | heroin overdose | 6.38 | 0 | x | x | | | |
| 429 | Heroin | m | 30 | heroin overdose | 6.61 | 0.34 | | x | | | |
| 439 | Heroin | m | 27 | heroin overdose | | 0 | | | | x | x |
| 468 | Heroin | f | 22 | heroin overdose | | 0 | | | | x | x |
| 477 | Heroin | m | 28 | heroin overdose | | 2.9 | | | | x | x |
| 481 | Heroin | m | 27 | heroin overdose | 6.22 | 2.54 | | | | x | x |

| ID | Group | Gender | Age | Cause of death | pH | Blood EtOH | WB, PCR, ChIP | Micro-array | Nanostring | ATAC-seq | RNA-seq |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 484 | Heroin | m | 28 | heroin overdose | 6.14 | 0 | | | | x | x |
| 487 | Heroin | m | 26 | heroin overdose | | 0 | | | | x | x |
| 488 | Heroin | m | 26 | heroin overdose | 6.52 | 0 | | | | x | x |
| 497 | Heroin | m | 27 | heroin overdose | 7.16 | 0 | | | | x | x |

m: male, f: female, AMI: acute myocardial infarct, AHF: acute heart failure.

**Supplemental Table S2.** Summary demographic information for heroin and control groups.

A. Complete population

| | Control | Heroin |
|---|---|---|
| Number | n=37 | n=48 |
| Age | 31.57 ± 1.86 | 26.19 ± 0.70 |
| Race | Caucasian | Caucasian |
| Gender | m=30, f=7 | m=40, f=8 |
| PMI | < 24 hours | < 24 hours |
| brain pH | 6.69 ± 0.04 | 6.58 ± 0.03 |
| Ethanol toxicology | n=3 | n=8 |
| Blood ethanol | 0.23 ± 0.13 | 0.13 ± 0.10 |

PMI: post-mortem interval, m: male, f: female

B. Microarray population

| | Control | Heroin |
|---|---|---|
| Number | n=26 | n=22 |
| Age | 33.42 ± 2.36 | 25.49 ± 0.84 |
| Race | Caucasian | Caucasian |
| Gender | m=21, f=5 | m=19, f=3 |
| PMI | < 24 hours | < 24 hours |
| brain pH | 6.69 ± 0.05 | 6.60 ± 0.04 |
| Ethanol toxicology | n=4 | n=2 |
| Blood ethanol | 0.33 ± 0.18 | 0.07 ± 0.05 |

PMI: post-mortem interval, m: male, f: female

C. Nanostring population

| | Control | Heroin |
|---|---|---|
| Number | n=16 | n=20 |
| Age | 36.63 ± 3 | 26.35 ± 0.96 |
| Race | Caucasian | Caucasian |
| Gender | m=13, f=3 | m=19, f=1 |
| PMI | < 24 hours | < 24 hours |
| brain pH | 6.74 ± 0.05 | 6.59 ± 0.04 |
| Ethanol toxicology | n=2 | n=2 |
| Blood ethanol | 0.15 ± 0.1 | 0.20 ± 0.04 |

PMI: post-mortem interval, m: male, f: female

D. ATAC-seq population

| | Control | Heroin |
|---|---|---|
| Number | n=10 | n=10 |
| Age | 25.2 ± 1.04 | 25.1 ± 0.12 |
| Race | Caucasian | Caucasian |
| Gender | m=8, f=2 | m=7, f=3 |
| PMI | < 24 hours | < 24 hours |
| brain pH | 6.71 ± 0.1 | 6.59 ± 0.36 |
| Ethanol toxicology | n=0 | n=2 |
| Blood ethanol | 0 ±0 | 0.54 ± 0.36 |

PMI: post-mortem interval, m: male, f: female, ATAC: assay for transposase accessible chromatin

E. RNA-seq population

| | Control | Heroin |
|---|---|---|
| Number | n=14 | n=16 |
| Age | 25.07 ± 1.02 | 25.19 ± 0.07 |
| Race | Caucasian | Caucasian |
| Gender | m=11, f=3 | m=13, f=3 |
| PMI | < 24 hours | < 24 hours |
| brain pH | 6.78 ± 0.07 | 6.58 ± 0.26 |
| Ethanol toxicology | n=0 | n=2 |
| Blood ethanol | 0 ± 0 | 2 ± 0.23 |

PMI: post-mortem interval, m: male, f: female

F. Western blot/PCR/ChIP population

| | Control | Heroin |
|---|---|---|
| Number | n=13 | n=30 |
| Age | 32.3 ± 2.75 | 26.3 ± 0.89 |
| Race | Caucasian | Caucasian |
| Gender | m=10, f=3 | m=26, f=4 |
| PMI | < 24 hours | < 24 hours |
| brain pH | 6.75 ± 0.05 | 6.57 ± 0.03 |
| Ethanol toxicology | n=1 | n=3 |
| Blood ethanol | 0.097 ± 0.09 | 0.13 ± 0.07 |

PMI: post-mortem interval, m: male, f: female, ChIP: chromatin immunoprecipitation

**Supplemental Table S3.** Differentially expressed genes in the ventral striatum of post-mortem human heroin users *vs* matched controls. Gene symbol, Affymetrix HG-U133A Probeset ID, corrected p value, mean and standard deviations are shown.

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| 39699 | 208657_s_at | 0.0098204 | 76.97037037 | 40.5900406 | 47.60909091 | 37.27964987 |
| 39699 | 41220_at | 0.00625494 | 1277.774074 | 536.9535258 | 812.8090909 | 565.548616 |
| 39701 | 214293_at | 0.0128889 | 767.4814815 | 227.9126453 | 877.1681818 | 227.3715428 |
| A2bp1 | 221217_s_at | 0.00827879 | 2176.681481 | 841.7187919 | 2565.222727 | 607.8510696 |
| AAGAB | 202852_s_at | 0.0133912 | 183.6592593 | 48.4191178 | 124.3681818 | 71.23290696 |
| aak1 | 214956_at | 0.00537049 | 229.8222222 | 60.05757067 | 311.4318182 | 98.70200648 |
| AASDHPPT | 202169_s_at | 0.000718164 | 973.6296296 | 265.6558036 | 1409.595455 | 503.0061596 |
| AATF | 209165_at | 0.00612689 | 300.9962963 | 84.51665508 | 236.2272727 | 70.71805981 |
| Abcb9 | 214209_s_at | 0.0196707 | 243.1481481 | 73.94385277 | 185.05 | 69.90739282 |
| ABCF1 | 200045_at | 0.0083311 | 592.0481481 | 98.97782724 | 487.0454545 | 101.0169421 |
| Abi1 | 209028_s_at | 0.0222653 | 321.0814815 | 70.84770251 | 413.0818182 | 142.4906835 |
| ABI2 | 216113_at | 0.00839789 | 22.22592593 | 20.76514448 | 50.09545455 | 30.72522583 |
| Acaa1 | 214274_s_at | 0.00765388 | 480.4666667 | 158.7324067 | 390.4545455 | 104.4826152 |
| ACACA | 214358_at | 0.0105959 | 22.31851852 | 13.3348888 | 17.10454545 | 8.072261574 |
| ACAN | 205679_x_at | 0.0100878 | 199.937037 | 53.67270577 | 177.9136364 | 36.37706362 |
| ACAP1 | 205213_at | 0.000410074 | 10.48518519 | 2.860702402 | 15.9 | 6.537875001 |
| ACAP2 | 212476_at | 0.0121774 | 176.3148148 | 56.85723487 | 239.6045455 | 67.59411412 |
| ACBD3 | 202324_s_at | 0.00524004 | 330.2592593 | 103.8120612 | 381.7136364 | 90.48643832 |
| ACE2 | 219962_at | 0.00588039 | 18.86666667 | 11.34894099 | 11.63181818 | 13.42536286 |
| ACOT8 | 204212_at | 0.000538501 | 303.5703704 | 56.6771207 | 245.8681818 | 40.88689843 |
| ACSL3 | 201661_s_at | 0.0254128 | 421.5518519 | 193.5693681 | 479.9363636 | 149.6552659 |
| Acsl4 | 202422_s_at | 0.00700271 | 67.67777778 | 22.45861721 | 99.64545455 | 39.59804862 |
| ACSS3 | 219616_at | 0.0197582 | 103.0888889 | 39.43121892 | 92.51363636 | 39.2985556 |
| Actc1 | 205132_at | 0.0208932 | 106.7037037 | 31.65142458 | 143.0272727 | 53.7617423 |
| ACTL8 | 214957_at | 0.026493 | 18.46666667 | 8.108210464 | 15.83636364 | 5.901617652 |
| ACTN2 | 203863_at | 0.00163974 | 311.5185185 | 110.9611714 | 434.4454545 | 168.0426724 |
| ACTR1A | 200721_s_at | 0.0158801 | 896.6259259 | 192.8927294 | 762.8136364 | 178.2622554 |
| ACTR1A | 200720_s_at | 0.0239931 | 498.1444444 | 211.456099 | 369.2772727 | 105.520158 |
| Actr2 | 200728_at | 0.00681404 | 833.6555556 | 374.0571535 | 1277.345455 | 624.1760853 |
| ACTR3B | 218868_at | 0.00545367 | 744.462963 | 215.6732485 | 864.6 | 195.9800087 |
| ACY1 | 202740_at | 0.0185989 | 143.5518519 | 40.18635791 | 120.7 | 46.70350247 |
| ADAM10 | 202603_at | 0.00320339 | 678.4037037 | 151.8828255 | 830.8454545 | 158.6053525 |
| Adam21 | 207665_at | 0.0171353 | 94.51111111 | 32.90782387 | 110.7909091 | 51.6354521 |
| ADAM23 | 206046_at | 0.00855038 | 386.9592593 | 80.03395077 | 455.5090909 | 97.89022963 |
| ADAM23 | 213808_at | 0.00936896 | 237.3222222 | 57.87511976 | 295.4954545 | 83.93784252 |
| Adamts3 | 214913_at | 0.000987591 | 154.2481481 | 54.71904021 | 230.4136364 | 95.4427093 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| ADAP1 | 90265_at | 0.0265107 | 2037.403704 | 779.0969247 | 1477.477273 | 470.830569 |
| ADCK2 | 221894_at | 0.0193359 | 72.8 | 41.19792751 | 46.45454545 | 28.7802632 |
| ADCY1 | 213245_at | 0.00647316 | 342.5555556 | 164.6505725 | 431.4181818 | 202.4880164 |
| Add1 | 208030_s_at | 0.0119818 | 646.5444444 | 136.3450384 | 554.6727273 | 76.83158565 |
| Add1 | 214736_s_at | 0.00660595 | 1136.2 | 351.1515123 | 943.9681818 | 230.1652582 |
| adh7 | 210505_at | 0.00230021 | 94.84444444 | 27.0696869 | 73.29545455 | 30.35435918 |
| Adm2 | 220538_at | 0.0225742 | 111.5444444 | 50.67496221 | 146.5090909 | 49.97715582 |
| ADRB2 | 206170_at | 0.032755 | 115.2740741 | 35.04223378 | 95.08181818 | 37.69628801 |
| Adrb3 | 217303_s_at | 0.0092999 | 8.425925926 | 3.877210793 | 6.709090909 | 2.000216439 |
| Adrm1 | 201281_at | 0.0143724 | 558.2962963 | 168.0627595 | 432.4909091 | 136.7030285 |
| AFTPH | 217939_s_at | 0.0226363 | 586.2925926 | 88.94354703 | 666.0409091 | 119.7455821 |
| AGFG1 | 218091_at | 0.0294635 | 319.462963 | 58.46384911 | 370.7045455 | 91.91578691 |
| AGFG2 | 222362_at | 0.0208884 | 167.1925926 | 52.04733737 | 127.5045455 | 49.62113103 |
| AGGF1 | 218534_s_at | 0.00362017 | 246.1962963 | 71.53226535 | 306.2818182 | 73.16418351 |
| agl | 203566_s_at | 0.0232807 | 292.8666667 | 63.17982882 | 377.9454545 | 117.3932655 |
| Agtr1 | 208016_s_at | 0.0288473 | 43.81481481 | 19.81277179 | 34.78181818 | 28.93828633 |
| agxt | 206957_at | 0.0283739 | 23.38148148 | 17.81693311 | 16.57272727 | 25.74015173 |
| Ahi1 | 221569_at | 0.00942664 | 584.9 | 264.6521287 | 630.8272727 | 204.8276841 |
| Aif1 | 209901_x_at | 0.0294497 | 81.65185185 | 95.99057394 | 31.54545455 | 12.44445668 |
| AIFM1 | 216758_at | 0.00100645 | 6.325925926 | 5.06599467 | 14.10454545 | 10.01895714 |
| AIG1 | 216179_x_at | 0.0282664 | 18.7037037 | 15.56903933 | 32.84545455 | 26.46927648 |
| Aim1l | 220289_s_at | 0.02178 | 7.277777778 | 4.187557883 | 5.427272727 | 2.284144483 |
| aip | 201782_s_at | 0.0179095 | 1143.340741 | 332.1915681 | 1013.286364 | 324.3592795 |
| AJAP1 | 215790_at | 0.0258743 | 13.86666667 | 13.84135387 | 8.109090909 | 4.108053541 |
| Ak2 | 212174_at | 0.00334254 | 183.3555556 | 43.13427455 | 147.7318182 | 35.9476125 |
| Ak2 | 205996_s_at | 0.0206205 | 68.48148148 | 27.81008446 | 51.41818182 | 21.91072006 |
| AKAP11 | 203156_at | 0.00802416 | 1784.325926 | 963.579209 | 2603.290909 | 1025.678004 |
| AKAP5 | 207800_at | 0.00834291 | 71.33703704 | 33.64175688 | 108.3045455 | 36.06439317 |
| AKAP6 | 205359_at | 0.030036 | 223.2592593 | 52.67517485 | 271.4590909 | 68.04787292 |
| AKAP7 | 205771_s_at | 0.0116225 | 193.6333333 | 55.17256843 | 242.4454545 | 46.28622882 |
| Akap9 | 210962_s_at | 0.00119377 | 269.7666667 | 98.92497546 | 364.8318182 | 101.4909632 |
| AKR1A1 | 201900_s_at | 0.0194148 | 598.7888889 | 182.6639545 | 462.9318182 | 106.2885309 |
| alb | 214837_at | 0.00925396 | 19.68888889 | 10.96586779 | 33.16363636 | 15.60203117 |
| ALDH1L1 | 205208_at | 0.000438783 | 504.8 | 123.203562 | 363.2136364 | 161.389034 |
| ALDH5A1 | 203608_at | 0.0236067 | 698.9185185 | 194.116238 | 885.0954545 | 290.6107878 |
| ALDOA | 214687_x_at | 0.0308059 | 8182.7 | 2548.366237 | 6642.095455 | 2301.879684 |
| ALG13 | 205583_s_at | 0.0096368 | 287.5037037 | 152.0832982 | 332.5818182 | 120.1728978 |
| ALOX5AP | 204174_at | 0.00181516 | 161.2296296 | 95.47325366 | 109.8409091 | 34.8525692 |
| Amh | 206516_at | 0.0301558 | 10.75555556 | 6.109534373 | 20.5 | 19.35402013 |
| AMIGO2 | 222108_at | 0.0191198 | 205.137037 | 54.36026651 | 262.8727273 | 80.34227483 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| ANGEL2 | 217630_at | 0.0037796 | 36.68518519 | 26.33908625 | 49.33636364 | 24.91730218 |
| ANK3 | 206385_s_at | 0.00844574 | 1257.337037 | 481.7824319 | 1512.431818 | 420.6970728 |
| ANKRD10 | 218093_s_at | 0.0115983 | 189.5111111 | 66.91465479 | 256.7363636 | 55.7515624 |
| ANKRD26 | 205706_s_at | 0.0122539 | 20.91111111 | 13.83105017 | 35.13181818 | 20.79451362 |
| ANKRD28 | 213035_at | 0.0149073 | 524.362963 | 151.3778338 | 614.7363636 | 156.7045736 |
| Ano3 | 215241_at | 0.0101579 | 4011.174074 | 1303.537752 | 5168.627273 | 1570.26974 |
| ANP32A | 201038_s_at | 0.00568007 | 382.4777778 | 81.02069694 | 461.3545455 | 117.8044131 |
| ANP32E | 221505_at | 0.00416273 | 685.7259259 | 171.0308915 | 931.8136364 | 236.3921929 |
| ANXA1 | 201012_at | 0.00625609 | 73.2 | 20.34421105 | 98.05454545 | 34.77530223 |
| ANXA2 | 210427_x_at | 0.00557745 | 384.5407407 | 91.82146665 | 325.8090909 | 82.6545704 |
| ANXA9 | 211712_s_at | 0.0013566 | 48.65555556 | 17.5445002 | 36.06363636 | 17.7431555 |
| Aoah | 205639_at | 0.0309401 | 179.9666667 | 64.41060591 | 141.3727273 | 61.84853374 |
| AP1AR | 219023_at | 0.0100726 | 141.8925926 | 48.62836246 | 208.9090909 | 91.54548653 |
| AP1B1 | 205423_at | 0.0181803 | 295.4777778 | 64.16953707 | 229.7590909 | 68.21797458 |
| AP3M2 | 203410_at | 0.0329233 | 892.237037 | 134.02282 | 940.5181818 | 189.741914 |
| ap3s1 | 202442_at | 2.40375E-05 | 1358.692593 | 212.255827 | 1813.590909 | 315.1389488 |
| ap3s2 | 202399_s_at | 0.00915175 | 888.9777778 | 132.6809398 | 780.9272727 | 144.4804656 |
| APBA2 | 209870_s_at | 0.0138837 | 413.6851852 | 106.8192424 | 347.0409091 | 91.28240147 |
| APC | 203525_s_at | 0.0151348 | 345.5777778 | 114.3215786 | 492.0954545 | 166.0987987 |
| APC | 203527_s_at | 0.00115616 | 76.28518519 | 57.38371321 | 146.7181818 | 68.08134236 |
| APIP | 218698_at | 0.0113254 | 121.3148148 | 46.75797508 | 163.5090909 | 50.50107881 |
| APOBEC3B | 206632_s_at | 0.00299078 | 30.87037037 | 16.0162133 | 21.8 | 11.38825627 |
| Apol2 | 221653_x_at | 0.00761506 | 91.6962963 | 66.54060924 | 56.20909091 | 32.75398789 |
| Aprt | 203219_s_at | 0.0158415 | 140.8 | 37.60098198 | 103.75 | 51.61076623 |
| Aprt | 213892_s_at | 0.0129539 | 278.0555556 | 77.1929866 | 211.0363636 | 59.56778888 |
| aqp1 | 209047_at | 0.00288949 | 618.2444444 | 316.1591704 | 441.4681818 | 318.1595128 |
| AQP3 | 39249_at | 0.0225456 | 43.97407407 | 31.23977485 | 31.52272727 | 17.95647998 |
| ARFGAP2 | 211975_at | 0.00410958 | 1028.074074 | 230.9647635 | 776.7272727 | 250.0656622 |
| arglu1 | 218067_s_at | 0.0226956 | 538.9444444 | 197.0533242 | 637.5363636 | 144.6950506 |
| ARHGAP15 | 218870_at | 0.0159411 | 35.64444444 | 22.33350938 | 19.48636364 | 18.1471576 |
| arhgap26 | 215955_x_at | 0.0165522 | 10.25925926 | 7.59191165 | 20.25454545 | 22.66534437 |
| ARHGAP29 | 203910_at | 0.0136757 | 164.8 | 39.58028841 | 224.7227273 | 87.17425861 |
| ARHGEF12 | 201335_s_at | 0.000949912 | 79.52592593 | 25.76611658 | 110.8272727 | 34.84560752 |
| ARHGEF15 | 205507_at | 0.0112811 | 137.5592593 | 47.27281915 | 116.4 | 46.73224644 |
| ARHGEF9 | 203264_s_at | 0.00835846 | 971.6185185 | 354.3302187 | 1193.381818 | 404.4248375 |
| ARID4A | 205062_x_at | 0.00226732 | 166.8111111 | 59.13183662 | 263.9590909 | 97.5561165 |
| arl5a | 218150_at | 0.00761818 | 572.0888889 | 143.2742591 | 683.6227273 | 133.128459 |
| ARL6IP4 | 218216_x_at | 0.00451299 | 1092.933333 | 236.0070664 | 851.9318182 | 241.9821646 |
| armc8 | 203487_s_at | 0.00220405 | 151.637037 | 42.93192418 | 179.5181818 | 24.20691826 |
| armc8 | 203486_s_at | 0.0198533 | 190.6592593 | 37.08254057 | 224.8954545 | 45.51160477 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| ARPC1B | 201954_at | 0.0045194 | 230.5259259 | 83.35223034 | 167.15 | 55.70409705 |
| ARPP19 | 221483_s_at | 0.0334285 | 2182.218519 | 644.2223398 | 2696.327273 | 714.3672426 |
| ARRB1 | 218832_x_at | 0.0191867 | 29.3962963 | 18.28270476 | 21.62272727 | 15.3990393 |
| Arvcf | 217516_x_at | 0.0306106 | 266.2444444 | 83.38694942 | 217.9454545 | 74.32303833 |
| asap1 | 215435_at | 0.0101077 | 64.77777778 | 16.85588994 | 85.72727273 | 22.82352967 |
| Asap2 | 206414_s_at | 0.000294277 | 449.3851852 | 88.85017079 | 576 | 144.6894968 |
| ASB13 | 218862_at | 0.0220581 | 334.8814815 | 76.057883 | 268.3818182 | 82.99643501 |
| Asip | 214498_at | 0.0315331 | 43.52222222 | 34.26497801 | 27.44090909 | 22.59358651 |
| asl | 204608_at | 0.0095052 | 163 | 35.87120122 | 126.3318182 | 41.68657871 |
| ASMTL | 209394_at | 0.0193937 | 486.4185185 | 162.4417482 | 355.5363636 | 146.2834286 |
| ASMTL | 36553_at | 0.0259557 | 904.1925926 | 325.9177066 | 678.9954545 | 216.1932149 |
| ASPHD1 | 214993_at | 0.0238751 | 237.937037 | 85.10101757 | 172.5909091 | 68.63673117 |
| aspscr1 | 218908_at | 0.00612327 | 179.0296296 | 68.33789812 | 119.4727273 | 55.31602869 |
| Astn1 | 213197_at | 0.000589914 | 588.7 | 229.3332241 | 820.0545455 | 251.4969217 |
| ATAD2 | 218782_s_at | 0.0279012 | 26.9037037 | 16.16543039 | 36.33636364 | 21.03209668 |
| Atf2 | 212984_at | 0.0240962 | 202.8407407 | 65.31350584 | 275.1772727 | 82.13026779 |
| Atg12 | 213026_at | 0.00570835 | 306.4444444 | 83.82656699 | 381.5045455 | 89.12584723 |
| ATG4B | 204903_x_at | 0.00250364 | 354.4259259 | 62.06556454 | 278.9090909 | 73.28371422 |
| ATM | 212672_at | 0.0119408 | 77.82962963 | 28.277428 | 121.6 | 54.9203059 |
| ATMIN | 201855_s_at | 0.0284297 | 275.5518519 | 78.6596924 | 343.0454545 | 95.81364714 |
| ATP10D | 213238_at | 0.0193044 | 90.01851852 | 25.20576914 | 118.1090909 | 38.80301791 |
| ATP13A1 | 218052_s_at | 0.0291956 | 301.6111111 | 52.21676958 | 261.2 | 49.05715811 |
| ATP13A3 | 212297_at | 0.016875 | 148.3074074 | 58.24140033 | 185.9772727 | 58.72058073 |
| ATP2B1 | 209281_s_at | 0.00412123 | 1873.833333 | 716.4445311 | 2934.122727 | 1554.842791 |
| ATP2B1 | 212930_at | 0.00377209 | 891.9111111 | 358.6014987 | 1305.095455 | 499.26094 |
| Atp2b3 | 215911_x_at | 0.0131194 | 21.88518519 | 12.25280827 | 34.25909091 | 16.26988627 |
| ATP2C2 | 214798_at | 0.0132659 | 84.92592593 | 36.66489195 | 100.1863636 | 33.00592004 |
| Atp5d | 213041_s_at | 0.0120456 | 1512.866667 | 456.9721781 | 1069.786364 | 376.6600682 |
| atp5l | 208745_at | 0.0287218 | 737.6814815 | 274.1351773 | 801.15 | 229.411522 |
| ATP5SL | 218038_at | 0.0209351 | 100.2740741 | 68.69182905 | 66.45 | 32.21696906 |
| ATP6AP2 | 201443_s_at | 0.0162499 | 1895.3 | 454.5000135 | 2128.990909 | 651.1351604 |
| ATP6V0E1 | 200096_s_at | 0.00469009 | 474.0555556 | 188.4604413 | 393.7590909 | 101.5515288 |
| ATP6V0E1 | 201172_x_at | 0.0297406 | 985.8518519 | 336.0799428 | 889.7545455 | 259.2810347 |
| ATP6V0E1 | 214150_x_at | 0.0327756 | 1285.325926 | 345.6512244 | 1112.340909 | 365.5441158 |
| ATP6V1C1 | 202873_at | 0.0131093 | 84.05185185 | 35.03035355 | 114.6136364 | 31.5785083 |
| ATP9A | 216129_at | 0.0033092 | 100.3740741 | 56.66140046 | 152.1818182 | 65.16740082 |
| ATR | 209903_s_at | 0.0228993 | 312.2777778 | 89.71300537 | 354.0636364 | 88.59125263 |
| ATRNL1 | 213744_at | 0.000929803 | 237.8814815 | 66.91143421 | 309.4454545 | 78.74617286 |
| Atrx | 208860_s_at | 0.000611538 | 129.7037037 | 62.18999723 | 206.7636364 | 72.86992681 |
| Atrx | 208861_s_at | 0.000108576 | 851.5740741 | 182.8958733 | 1147.727273 | 243.9179354 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| ATXN1 | 203231_s_at | 0.0058867 | 375.6518519 | 148.3508533 | 511.8363636 | 167.2630393 |
| ATXN1 | 203232_s_at | 0.00275788 | 778.137037 | 249.0361684 | 1080.986364 | 365.8092533 |
| ATXN7 | 204516_at | 0.0044524 | 106.337037 | 38.59443113 | 153.7045455 | 47.21331004 |
| AURKB | 209464_at | 0.0135334 | 39.52592593 | 18.44829766 | 24.84545455 | 17.41618643 |
| AVL9 | 212474_at | 0.0113665 | 323.1481481 | 73.41961261 | 416.5 | 115.9581164 |
| AZGP1 | 217014_s_at | 0.00700729 | 102.1333333 | 38.58280805 | 146.7227273 | 62.23581064 |
| Azi1 | 214742_at | 0.00673079 | 76.84814815 | 37.78638715 | 43.31363636 | 21.78237154 |
| AZIN1 | 212461_at | 0.0304909 | 497.3111111 | 156.6378561 | 606.65 | 143.5014775 |
| B3galt2 | 210121_at | 0.0240599 | 37.98888889 | 17.85786475 | 47.05454545 | 14.75997572 |
| B4galt5 | 221484_at | 0.0245141 | 387.7814815 | 82.72352952 | 428.4409091 | 91.98145599 |
| B4GALT6 | 206233_at | 0.0217535 | 80.23333333 | 35.44710035 | 115.2409091 | 53.16152081 |
| Bach2 | 221234_s_at | 0.01295 | 106.7925926 | 31.82802256 | 136.5545455 | 33.18062727 |
| Bad | 1861_at | 0.00533561 | 208.2518519 | 55.36136789 | 183.7590909 | 53.76105564 |
| bag1 | 202387_at | 0.0173618 | 1004.033333 | 297.7551614 | 726.3636364 | 281.2695615 |
| BAMBI | 203304_at | 0.0250112 | 195.5592593 | 48.53414547 | 167.0318182 | 39.59798439 |
| Basp1 | 202391_at | 0.000221077 | 3192.311111 | 732.5212627 | 4016.431818 | 857.0831817 |
| Bat2l2 | 211946_s_at | 0.0114734 | 614.9740741 | 220.4530991 | 775 | 239.4706742 |
| BAZ1A | 217986_s_at | 0.00503112 | 38.40740741 | 20.86881969 | 60.68181818 | 22.08329764 |
| Bbs1 | 218471_s_at | 0.00677573 | 446.4814815 | 86.13769405 | 571.2272727 | 170.9387615 |
| BCAP31 | 200837_at | 0.000388379 | 1447.025926 | 439.7327848 | 952.2545455 | 312.0836926 |
| BCAT1 | 214390_s_at | 0.0204726 | 20.02222222 | 11.27322674 | 15.73181818 | 7.205314597 |
| BCL11A | 219497_s_at | 0.00527691 | 158.4925926 | 58.5683291 | 251.6772727 | 106.5867674 |
| BCL11B | 219528_s_at | 0.000584346 | 567.0185185 | 173.9695907 | 827.2727273 | 230.8168851 |
| BCL2 | 207004_at | 0.0184761 | 84.47407407 | 39.56214773 | 61.82727273 | 24.74495007 |
| BCL2L13 | 217955_at | 0.00020339 | 212.4444444 | 60.53181194 | 172.1636364 | 44.08422183 |
| Bcl2l2 | 209311_at | 0.00329226 | 682.9185185 | 185.5338411 | 770.75 | 147.400164 |
| Bcl7c | 219072_at | 0.0243902 | 270.2444444 | 89.9288622 | 206.6636364 | 102.8049774 |
| BCLAF1 | 201084_s_at | 0.00731043 | 951.0185185 | 358.0234673 | 1217.604545 | 299.5221186 |
| BECN1 | 208946_s_at | 0.0267819 | 443.6592593 | 146.2201482 | 498.4181818 | 148.7075386 |
| BEST1 | 207671_s_at | 0.00118619 | 98.84074074 | 48.51951439 | 65.51363636 | 29.89668393 |
| BEX4 | 215440_s_at | 0.0171207 | 834.2888889 | 356.0711471 | 1129.581818 | 442.7883958 |
| BGLAP | 206956_at | 0.00880026 | 171.0555556 | 44.13831698 | 133.3590909 | 39.0549876 |
| BGLAP | 202337_at | 0.02758 | 231.0296296 | 52.20550969 | 197.0954545 | 33.80837424 |
| bin1 | 210202_s_at | 0.0276929 | 648.4814815 | 257.9645131 | 463.9636364 | 193.1039507 |
| BIRC5 | 202095_s_at | 0.00618169 | 17.82962963 | 13.72490198 | 11.52272727 | 7.293240956 |
| bloc1s1 | 202592_at | 0.0330582 | 789.4814815 | 163.6114958 | 703.0772727 | 227.2270816 |
| Bnc1 | 206581_at | 0.00284651 | 43.01851852 | 26.42369329 | 57.04090909 | 25.63885925 |
| BPTF | 209271_at | 0.00155921 | 201.6740741 | 77.22565632 | 297.2409091 | 90.43529473 |
| BRF2 | 218955_at | 0.00619441 | 449.937037 | 88.5458384 | 374.6409091 | 63.59073502 |
| BRS3 | 207369_at | 0.00785558 | 97.19259259 | 28.59421574 | 140.2318182 | 57.92058098 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| bsg | 208677_s_at | 0.0331665 | 484.4037037 | 367.9778656 | 367.9909091 | 218.339541 |
| BSPRY | 218792_s_at | 0.0177795 | 501.4740741 | 216.5777505 | 359.8409091 | 68.13443056 |
| Btaf1 | 209430_at | 0.00551146 | 159.5888889 | 49.3782834 | 214.0363636 | 74.43838964 |
| C10orf26 | 202808_at | 0.00813047 | 845.0333333 | 286.0008593 | 689.3272727 | 198.9040093 |
| C11orf24 | 218299_at | 0.0241979 | 133.0962963 | 42.96037961 | 99.54545455 | 58.74409172 |
| c11orf48 | 221637_s_at | 0.00661766 | 320.9148148 | 75.77563391 | 243.3727273 | 71.14917382 |
| c11orf51 | 204218_at | 0.0130199 | 665.0259259 | 152.7002131 | 533.9681818 | 129.3298639 |
| C11orf67 | 221599_at | 0.000525529 | 202.7962963 | 78.51363665 | 148.5409091 | 54.25240534 |
| c12orf11 | 221652_s_at | 0.00955319 | 96.63703704 | 26.22233558 | 124.5545455 | 28.60277588 |
| C12orf44 | 218214_at | 0.00342569 | 413.2962963 | 92.11040817 | 302.7818182 | 73.70681713 |
| c12orf51 | 211034_s_at | 0.0143115 | 734.2222222 | 159.3186196 | 865.6727273 | 164.6803952 |
| C14orf101 | 219757_s_at | 0.0194429 | 230.5703704 | 61.16546169 | 289.2227273 | 76.99617141 |
| C14orf139 | 219563_at | 0.00500022 | 186.9555556 | 82.85234472 | 135.1545455 | 41.25663845 |
| c14orf147 | 213508_at | 0.000912207 | 342.8407407 | 86.18555233 | 413.6227273 | 74.072043 |
| C14orf169 | 219526_at | 0.02542 | 343.4925926 | 66.84530319 | 301.3909091 | 54.11894228 |
| C14orf79 | 213512_at | 0.0185621 | 123.6555556 | 26.10723939 | 93.05909091 | 35.80824139 |
| c15orf29 | 218791_s_at | 0.0281078 | 240.5444444 | 71.1994454 | 286.4772727 | 52.79585059 |
| C16orf72 | 217682_at | 0.0198536 | 70.80740741 | 31.82112175 | 57.05454545 | 23.37894305 |
| C17orf101 | 53071_s_at | 0.00140108 | 180.3407407 | 58.69780666 | 122.0227273 | 42.70479991 |
| C17orf62 | 218130_at | 0.00926469 | 212.9851852 | 79.58323028 | 154.7772727 | 35.31937188 |
| C17orf90 | 221797_at | 0.00187369 | 85.86296296 | 36.34621077 | 42.08636364 | 37.11733385 |
| C19orf24 | 221587_s_at | 0.00257555 | 231.4296296 | 72.92771877 | 168.1727273 | 52.05907982 |
| C19orf36 | 214296_x_at | 0.00220411 | 59.93333333 | 35.0122506 | 39.94545455 | 17.49363768 |
| C19orf42 | 221988_at | 0.0291746 | 274.6925926 | 56.92125415 | 300.0818182 | 74.55984261 |
| C19orf60 | 51200_at | 0.0331344 | 1254.707407 | 559.5680738 | 937.6954545 | 353.0816316 |
| C19orf73 | 220151_at | 0.0087221 | 46.45185185 | 28.49816958 | 35.57727273 | 23.22024839 |
| C1orf103 | 220235_s_at | 0.0281337 | 101.5407407 | 37.87775133 | 138.5772727 | 58.72832473 |
| C1orf123 | 203197_s_at | 0.0209398 | 333.9333333 | 72.74004293 | 282.8454545 | 80.40689219 |
| c1orf144 | 212003_at | 0.0114146 | 27.21111111 | 25.51300322 | 13.71818182 | 3.361354087 |
| C1orf21 | 221272_s_at | 0.000177305 | 170.9888889 | 50.25561073 | 228.4136364 | 38.99464304 |
| C1orf63 | 209007_s_at | 0.0150186 | 735.7148148 | 289.3989457 | 889.4772727 | 307.0847889 |
| C1qa | 218232_at | 0.00751993 | 183.9333333 | 112.6269267 | 123.2545455 | 64.9461002 |
| C1QB | 202953_at | 0.0118693 | 264.062963 | 174.0394499 | 158.2727273 | 76.87668036 |
| C1r | 212067_s_at | 0.0066273 | 158.1444444 | 68.36432005 | 104.8136364 | 44.19607067 |
| C20orf117 | 207711_at | 0.00158624 | 120.9222222 | 53.04209746 | 80.93181818 | 29.647844 |
| c20orf43 | 217737_x_at | 0.0175586 | 551.7888889 | 136.1627853 | 465.6954545 | 130.8911634 |
| C22orf9 | 217118_s_at | 0.0213785 | 1504.703704 | 752.6185373 | 989.2454545 | 428.5919357 |
| C2orf24 | 200070_at | 0.00290731 | 407.7259259 | 99.93300676 | 305.4909091 | 82.61166128 |
| C3 | 217767_at | 0.0134353 | 586.0740741 | 397.4010855 | 303.7045455 | 191.166797 |
| C3orf63 | 209285_s_at | 0.0136555 | 242.962963 | 119.8963243 | 305.0954545 | 95.28044559 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| c4orf23 | 220891_at | 0.000469084 | 22.82962963 | 15.07235918 | 40.92272727 | 19.39636519 |
| C4orf6 | 207241_at | 0.0281776 | 33.99259259 | 23.04193378 | 24.70909091 | 16.13148088 |
| c5orf42 | 219381_at | 0.0276866 | 74.73333333 | 35.53310482 | 97.07272727 | 44.50301415 |
| C6orf120 | 221786_at | 0.0145427 | 254.7259259 | 75.55524007 | 295.9090909 | 53.28969264 |
| C6orf120 | 221787_at | 0.018916 | 111.0185185 | 36.53525207 | 147.0318182 | 40.59078463 |
| C6orf162 | 213312_at | 0.00649727 | 149.8185185 | 80.55444903 | 255.2772727 | 118.7519862 |
| C6orf208 | 220904_at | 0.0200321 | 68.77037037 | 49.45286656 | 81.49090909 | 25.18385554 |
| c6orf211 | 218195_at | 0.00789992 | 106.0296296 | 51.29591988 | 153.8318182 | 58.78880187 |
| C6orf48 | 220755_s_at | 0.0266329 | 903.6555556 | 204.0097741 | 1031.945455 | 255.2913904 |
| C7orf49 | 220949_s_at | 0.0116563 | 180.2851852 | 35.76537543 | 161.5272727 | 46.04836155 |
| C8orf84 | 214725_at | 0.00976615 | 17.36666667 | 14.57207551 | 12.96818182 | 8.303951232 |
| C9orf78 | 218116_at | 0.00525692 | 255.7592593 | 81.7614883 | 325.5909091 | 95.61344252 |
| CA4 | 206208_at | 0.00897037 | 87.72962963 | 27.42434088 | 59.77727273 | 35.41075881 |
| cab39 | 217873_at | 0.00555533 | 539.1037037 | 198.8509018 | 623.4318182 | 209.7860052 |
| Cacna1d | 210108_at | 0.0179174 | 77.28518519 | 29.43860239 | 109.8227273 | 36.94201289 |
| CACNA1G | 211314_at | 0.023876 | 7.244444444 | 4.469669867 | 5.290909091 | 1.885510943 |
| CACNB1 | 210967_x_at | 0.0119178 | 112.6444444 | 51.48191866 | 81.13181818 | 40.43505535 |
| CACYBP | 211761_s_at | 0.0147856 | 1382.677778 | 339.1182938 | 1693.995455 | 424.912888 |
| CALB1 | 205625_s_at | 0.0197569 | 1764.948148 | 803.4484577 | 2351.213636 | 841.0123442 |
| CALM3 | 211984_at | 0.0128056 | 6565.425926 | 1642.405138 | 7975.986364 | 2144.486578 |
| camk4 | 210349_at | 0.013204 | 142.1925926 | 46.79556131 | 187.6454545 | 51.15052229 |
| CAMSAP1 | 212710_at | 0.000151359 | 453.2148148 | 83.12388671 | 561.8772727 | 98.85524257 |
| CAMSAP1 | 212711_at | 0.00172382 | 344.8777778 | 81.24148397 | 428.8636364 | 103.6889926 |
| camsap1l1 | 212765_at | 0.000341215 | 1499.962963 | 290.8216466 | 1993.422727 | 469.8836988 |
| camsap1l1 | 217196_s_at | 0.0150688 | 222.062963 | 77.04060442 | 276.9090909 | 109.2001261 |
| CAMTA1 | 213268_at | 0.000428021 | 632.8851852 | 205.5554047 | 855.3045455 | 263.2998535 |
| Canx | 200068_s_at | 0.0122401 | 2168.555556 | 305.5716778 | 2466.659091 | 431.8118987 |
| CAPRIN2 | 218456_at | 0.0176216 | 594.6074074 | 194.5214699 | 731.3454545 | 177.4371592 |
| Casc3 | 207842_s_at | 0.0025155 | 556.4777778 | 104.4983781 | 456.8136364 | 112.3632303 |
| casp10 | 210708_x_at | 0.0130554 | 82.40740741 | 30.49683371 | 115.8 | 59.65587825 |
| Cbr3 | 205379_at | 0.00674431 | 370.9 | 130.399065 | 271.1636364 | 107.8287423 |
| ccdc101 | 48117_at | 0.0276796 | 192.6518519 | 47.43617875 | 165.4363636 | 70.98001426 |
| CCDC28A | 209479_at | 0.00535081 | 526.3 | 144.9004911 | 666.0681818 | 214.0564442 |
| Ccdc47 | 217814_at | 0.0313124 | 409.0592593 | 146.6571571 | 506.9727273 | 146.4910015 |
| CCDC85B | 204610_s_at | 0.0208359 | 2708.633333 | 917.6267986 | 1744.381818 | 1003.522228 |
| CCDC90B | 218288_s_at | 0.0129516 | 477.0407407 | 141.4968748 | 557.4045455 | 129.2542879 |
| Ccl27 | 207955_at | 0.0307038 | 36.15925926 | 20.88649286 | 25.45 | 20.46094421 |
| CCND3 | 201700_at | 0.00341562 | 753.6259259 | 145.666425 | 633.6590909 | 109.0682078 |
| CCNF | 204826_at | 0.0104375 | 95.86666667 | 47.90720196 | 62.36818182 | 36.45072847 |
| ccno | 210021_s_at | 0.0236863 | 309.2925926 | 75.14202412 | 250.8318182 | 87.13419528 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| CCNT2 | 213743_at | 0.0155604 | 137.7962963 | 53.89737743 | 165.9090909 | 47.85814265 |
| CCR5 | 206991_s_at | 0.0226545 | 53.57777778 | 44.56756611 | 32.74545455 | 16.26912727 |
| CCRL2 | 211434_s_at | 0.0104154 | 45.54444444 | 28.25578679 | 28.5 | 15.70040946 |
| CCT2 | 201947_s_at | 0.0223158 | 1063.4 | 257.9663559 | 1181.2 | 262.0044838 |
| CD2BP2 | 202257_s_at | 0.00493193 | 239.2 | 62.27305257 | 153.0818182 | 85.96337889 |
| CD300A | 217072_at | 0.0305683 | 28.54444444 | 18.66026905 | 18.48181818 | 11.4084612 |
| CD302 | 203799_at | 0.0153714 | 104.3259259 | 35.95877546 | 144.5909091 | 45.02649917 |
| CD40 | 35150_at | 0.0221499 | 325.3962963 | 65.86943076 | 296.9045455 | 84.83407602 |
| CD47 | 213055_at | 0.0277624 | 204.462963 | 91.47103849 | 324.4227273 | 175.0018964 |
| Cd53 | 203416_at | 0.0308855 | 312.5407407 | 96.02406853 | 267.3636364 | 75.15115274 |
| Cd55 | 201926_s_at | 0.0197871 | 75.98148148 | 52.17598945 | 46.00909091 | 30.05659597 |
| CD58 | 216942_s_at | 0.0131889 | 29.52592593 | 23.89611479 | 17.74090909 | 15.68923377 |
| Cd6 | 208602_x_at | 0.0251122 | 17.88518519 | 8.642146444 | 15.85454545 | 6.186908396 |
| CD63 | 200663_at | 0.0027743 | 2111.744444 | 457.4110728 | 1674.459091 | 444.8527361 |
| CD81 | 200675_at | 0.00112672 | 2828.514815 | 592.2170884 | 2504.740909 | 528.0457778 |
| Cd8a | 205758_at | 0.0330249 | 217.7518519 | 74.18045757 | 288.5909091 | 81.3824066 |
| Cdc123 | 201725_at | 0.0321556 | 559.0740741 | 122.4908963 | 625.85 | 140.6294244 |
| CDC16 | 209659_s_at | 0.028426 | 554.6407407 | 111.6967745 | 630.8363636 | 116.4968651 |
| CDC37L1 | 219343_at | 0.022472 | 135 | 29.66262865 | 157.1409091 | 43.01944919 |
| Cdc40 | 203376_at | 0.0198276 | 609.1962963 | 179.9910008 | 766.7454545 | 183.7192883 |
| Cdc42ep2 | 209850_s_at | 0.00698405 | 148.5925926 | 82.36325696 | 81.76818182 | 61.95562457 |
| CDC42EP3 | 209288_s_at | 0.0223403 | 68.18148148 | 20.1712102 | 88.20909091 | 22.2321498 |
| CDC7 | 204510_at | 0.00414524 | 165.1925926 | 42.75327181 | 215.3454545 | 54.42180697 |
| CDH11 | 207173_x_at | 0.0161202 | 409.6222222 | 156.8933355 | 549.5545455 | 177.7201243 |
| Cdh12 | 207149_at | 0.00107432 | 116.2037037 | 40.57541394 | 164.4681818 | 45.17033778 |
| CDH13 | 204726_at | 0.0322162 | 27.2037037 | 16.51932392 | 16.65 | 11.32522469 |
| Cdh15 | 206328_at | 0.032816 | 11.21481481 | 7.598466632 | 16.61363636 | 19.42063938 |
| CDH8 | 210518_at | 0.0325232 | 300.3222222 | 78.09266356 | 327.1318182 | 55.12756105 |
| Cdh9 | 207729_at | 0.0251329 | 69.58148148 | 20.27319255 | 88.98636364 | 35.2244003 |
| Cdk1 | 210559_s_at | 0.0137982 | 32.61111111 | 20.96194965 | 26.28181818 | 21.26169452 |
| CDK13 | 207318_s_at | 0.00101006 | 305.3037037 | 82.00572908 | 432.3409091 | 125.336407 |
| Cdk17 | 221918_at | 0.0168531 | 1317.511111 | 475.5486462 | 1785.495455 | 734.2324457 |
| CDKN2A | 207039_at | 0.0132818 | 50.38518519 | 28.53616738 | 35.34545455 | 16.91558108 |
| CDKN3 | 209714_s_at | 0.00367168 | 106.0925926 | 23.62780184 | 132.7772727 | 44.13283986 |
| CDO1 | 204154_at | 0.00508682 | 519.7666667 | 229.2330457 | 720.5045455 | 272.2494138 |
| CEACAM7 | 211848_s_at | 0.011682 | 9.137037037 | 6.450828697 | 6.868181818 | 2.499216327 |
| CELF2 | 202156_s_at | 0.00790149 | 370.5888889 | 188.7388129 | 575.7772727 | 184.2583691 |
| CELF2 | 202157_s_at | 0.00449247 | 1671.396296 | 704.2852102 | 2499.304545 | 827.7051502 |
| CELF2 | 214405_at | 0.00361492 | 49.43333333 | 32.03794625 | 100.2363636 | 60.65440388 |
| CEND1 | 219591_at | 0.00923391 | 801.4037037 | 212.0917027 | 647.2681818 | 151.5446198 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| CENPC1 | 204739_at | 0.00495314 | 65.55185185 | 23.63955893 | 85.82727273 | 19.73725464 |
| CEP170 | 207719_x_at | 0.00783428 | 582.8777778 | 132.5396032 | 732.55 | 174.5015452 |
| Cep68 | 212677_s_at | 0.0165303 | 508.037037 | 137.82432 | 539.3954545 | 101.9517135 |
| CEP76 | 52285_f_at | 0.0307523 | 37.92222222 | 14.46856894 | 48.67727273 | 22.1812433 |
| CFH | 213800_at | 0.0253538 | 39.81111111 | 29.94569872 | 23.44090909 | 16.5877654 |
| CHAF1A | 203975_s_at | 0.00103658 | 90.56296296 | 42.14596566 | 50.76818182 | 26.50479537 |
| chat | 221197_s_at | 0.0234125 | 44.08888889 | 20.92115847 | 38.06363636 | 27.08395317 |
| CHCHD3 | 217972_at | 0.0322109 | 283.8851852 | 49.94103218 | 324.5136364 | 59.24605911 |
| CHD1 | 204258_at | 0.00340645 | 84.99259259 | 40.30560112 | 150.6954545 | 68.85782092 |
| CHD9 | 212616_at | 0.000321711 | 269.3518519 | 103.655956 | 472.1681818 | 180.5165878 |
| CHL1 | 204591_at | 0.0118573 | 587.8814815 | 203.7315523 | 795.8590909 | 275.8811194 |
| CHMP1B | 218177_at | 0.0305521 | 167.4703704 | 81.6521789 | 136.7590909 | 57.80468476 |
| CHMP2A | 202121_s_at | 0.00403976 | 1143.87037 | 207.5094174 | 836.9136364 | 282.148332 |
| CHMP4A | 218571_s_at | 0.0178954 | 840.1518519 | 289.9113145 | 593.9272727 | 191.1003705 |
| CHMP6 | 218743_at | 0.0210188 | 197.4555556 | 45.24360842 | 155.3363636 | 48.65666445 |
| Chn2 | 213385_at | 0.0221647 | 493.0296296 | 146.4184068 | 599.8909091 | 189.2833223 |
| CHORDC1 | 218566_s_at | 0.00573407 | 201.9259259 | 85.71778647 | 286.1863636 | 87.90733918 |
| CHRD | 211248_s_at | 0.00991167 | 103 | 39.43936924 | 81.17727273 | 46.55714289 |
| CHRM3 | 214596_at | 0.0240509 | 147.4074074 | 119.351607 | 196.3409091 | 112.5886726 |
| CHRNA6 | 207568_at | 0.00450729 | 119.7407407 | 41.70717757 | 143.5681818 | 55.30061901 |
| CHRNA9 | 221107_at | 0.00615913 | 85.97407407 | 36.49150157 | 115.7954545 | 56.11520868 |
| Chrnb4 | 207516_at | 0.0309191 | 33.38148148 | 18.24451524 | 21.05909091 | 19.4485563 |
| CIAPIN1 | 208968_s_at | 0.0245953 | 487.2962963 | 124.1237022 | 412.0363636 | 73.4115376 |
| CIB1 | 201953_at | 0.000667348 | 419.3 | 79.74697486 | 354.4772727 | 101.859478 |
| CINP | 217598_at | 0.00871995 | 67.6037037 | 27.75669679 | 46.35909091 | 28.46295268 |
| Cirbp | 200811_at | 0.00691398 | 1760.762963 | 510.0851604 | 1455.622727 | 349.1984031 |
| Ciz1 | 211358_s_at | 0.00616193 | 173.5444444 | 44.8641825 | 135.7272727 | 42.910862 |
| Ckap2 | 218252_at | 0.0226637 | 177.4222222 | 47.99943376 | 233.9863636 | 80.27783478 |
| CKB | 200884_at | 0.0115203 | 5215.8 | 1076.764488 | 4019.609091 | 1054.028231 |
| ckmt2 | 205295_at | 0.0148102 | 131.4777778 | 31.60858371 | 111.9818182 | 21.24074334 |
| CLCA2 | 206166_s_at | 0.0163929 | 50.68888889 | 22.25439167 | 42.00909091 | 35.07227787 |
| Clcn3 | 201733_at | 0.00735751 | 215.6074074 | 98.05216008 | 288.8045455 | 115.6923444 |
| Clcn3 | 201734_at | 0.00185912 | 1004.292593 | 276.8798711 | 1399.068182 | 405.4753875 |
| Clcn3 | 201735_s_at | 0.0276323 | 347.237037 | 107.1679672 | 422.3772727 | 124.1342704 |
| CLCN7 | 38069_at | 0.00415731 | 497.5666667 | 155.5779671 | 416.6863636 | 62.57600556 |
| CLDN5 | 204482_at | 0.0110054 | 577.4296296 | 242.4794215 | 413.4545455 | 237.1992607 |
| CLEC5A | 219890_at | 0.0182993 | 63.62592593 | 26.95696845 | 56.90909091 | 31.53046764 |
| CLIC1 | 208659_at | 0.00350071 | 198.0592593 | 67.36602236 | 132.5 | 56.91978483 |
| clint1 | 201769_at | 0.0042545 | 298.1148148 | 81.38560024 | 415.95 | 138.6178053 |
| clu | 208791_at | 0.0166753 | 6950.288889 | 2190.52863 | 6267.890909 | 2442.857094 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| clu | 208792_s_at | 0.00278639 | 6507.522222 | 1465.645808 | 5412.027273 | 1852.823151 |
| cndp2 | 217752_s_at | 0.0285243 | 1516.362963 | 345.0616379 | 1181.522727 | 378.8517714 |
| CNOT4 | 203291_at | 0.00415125 | 230.9296296 | 58.98273421 | 284.0590909 | 52.65766945 |
| cnot8 | 202162_s_at | 0.023614 | 81.84074074 | 43.951409 | 67.65909091 | 35.94364185 |
| CNTNAP2 | 219301_s_at | 0.00242499 | 277.9703704 | 136.423393 | 330.4772727 | 128.1226307 |
| CNTNAP2 | 219302_s_at | 0.00659163 | 48.76296296 | 15.86379885 | 61.95 | 24.63904663 |
| Cobll1 | 203642_s_at | 0.0171337 | 79.74074074 | 33.13718872 | 115.8090909 | 69.54175799 |
| Cobll1 | 211032_at | 0.00934245 | 6.781481481 | 10.04604924 | 3.354545455 | 4.433823167 |
| COG2 | 203073_at | 0.0123443 | 344.8333333 | 70.84897263 | 307.1363636 | 82.68790172 |
| Cog4 | 212189_s_at | 0.0024709 | 293.2037037 | 82.92975935 | 218.3909091 | 68.4115829 |
| COL1A1 | 217430_x_at | 0.00239059 | 188.6555556 | 64.32104174 | 140.4681818 | 44.07861361 |
| COL6A1 | 212091_s_at | 0.00773355 | 17.20740741 | 7.942772521 | 12.98636364 | 6.934131968 |
| COL6A1 | 212938_at | 0.0154192 | 51.28888889 | 24.64352518 | 42.76363636 | 43.09266367 |
| COL6A1 | 212939_at | 0.00523132 | 10.06296296 | 5.659787176 | 7.622727273 | 2.228801048 |
| Col6a3 | 201438_at | 0.0224092 | 20.3037037 | 13.70725472 | 10.82727273 | 5.985711703 |
| Commd3 | 218048_at | 0.0270139 | 749.9925926 | 317.5337667 | 588 | 135.286289 |
| COMMD4 | 206441_s_at | 0.000492255 | 184.4592593 | 52.33568616 | 123.5818182 | 69.33180151 |
| COMMD4 | 209132_s_at | 0.0119644 | 255.0555556 | 60.72711556 | 187.4818182 | 62.99389718 |
| COMT | 213981_at | 0.00974655 | 78.6962963 | 20.93380559 | 59.52727273 | 25.13195996 |
| copA | 214337_at | 0.0109424 | 20.30740741 | 17.65942603 | 17.23181818 | 9.277540025 |
| COPG2IT1 | 213486_at | 0.020686 | 834.1814815 | 422.5273665 | 1144.718182 | 441.9597974 |
| Cops6 | 201405_s_at | 0.0118693 | 1262.877778 | 345.7266921 | 1036.936364 | 235.1817181 |
| COQ3 | 221227_x_at | 0.00633625 | 239.0037037 | 41.80522126 | 258.2590909 | 32.11412179 |
| Coro1a | 209083_at | 0.0142618 | 243.9148148 | 99.27826745 | 175.0954545 | 73.22425748 |
| COX4I1 | 200086_s_at | 0.00291187 | 4979.314815 | 911.1425058 | 3773.763636 | 981.3293974 |
| COX4I1 | 202698_x_at | 0.0137224 | 8512.981481 | 1462.942645 | 6723.245455 | 1814.918893 |
| Cps1 | 217564_s_at | 0.0153135 | 31.55925926 | 22.54754394 | 21.56818182 | 19.90231828 |
| CREB1 | 204314_s_at | 0.0292732 | 80.84444444 | 26.04505465 | 96.81818182 | 26.6863196 |
| creb3 | 209432_s_at | 0.00340287 | 791.2888889 | 265.8211217 | 610.4090909 | 152.2678621 |
| Crebzf | 202979_s_at | 0.000647846 | 40.62962963 | 12.81005659 | 59 | 18.95184373 |
| Crem | 209967_s_at | 0.0183847 | 194.5740741 | 80.74654835 | 284.6454545 | 128.6447775 |
| crh | 205630_at | 0.0318601 | 168.2407407 | 79.01463477 | 223.1 | 109.9356955 |
| CRHR1 | 214619_at | 0.0218602 | 99.46666667 | 36.43881067 | 78.97727273 | 33.53866187 |
| CRISP2 | 210262_at | 0.000348697 | 15.51111111 | 12.96881862 | 27.44545455 | 20.64820359 |
| crk | 202225_at | 0.0282138 | 203.362963 | 62.76536985 | 253.7727273 | 66.23469945 |
| Crocc | 216419_at | 0.0108525 | 58.24814815 | 31.42567997 | 47.25909091 | 30.24493124 |
| CROCCL2 | 219139_s_at | 0.0300732 | 44.7 | 26.77911069 | 63.47272727 | 35.30777847 |
| CRYBA2 | 220136_s_at | 0.00222998 | 7.766666667 | 5.720543277 | 3.859090909 | 1.348247219 |
| csnk1a1 | 208866_at | 0.00548661 | 85.62592593 | 27.28695931 | 110.2090909 | 24.0533318 |
| Csnk1g3 | 220768_s_at | 0.00792403 | 145.6814815 | 35.93259755 | 192.5 | 63.84654967 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| cspg4 | 214297_at | 0.0222258 | 74.88888889 | 63.1009529 | 45.7 | 33.46164827 |
| CSRNP3 | 220462_at | 0.000485314 | 565.3074074 | 178.367945 | 768.4727273 | 203.4341971 |
| CSRP1 | 200621_at | 0.0115499 | 2898.544444 | 1265.110694 | 2293.318182 | 1080.282882 |
| cstA | 204971_at | 0.0309136 | 39.31111111 | 30.22932012 | 31.29545455 | 15.88291917 |
| CTAG1B | 217339_x_at | 0.00242374 | 21.82222222 | 18.08629599 | 13.51363636 | 7.448444737 |
| Ctbp1 | 213980_s_at | 0.00120032 | 1422.888889 | 457.6670408 | 1077.636364 | 307.128288 |
| Ctdsp1 | 217844_at | 0.0114472 | 357.9703704 | 99.37735702 | 288.8454545 | 102.1483036 |
| Ctnna2 | 205373_at | 0.000872418 | 493.037037 | 145.9123476 | 624.7090909 | 165.9222908 |
| CTNNBL1 | 221021_s_at | 0.00972852 | 245.7259259 | 43.65611767 | 205.1818182 | 30.27629336 |
| ctps2 | 219080_s_at | 0.0330733 | 62.43333333 | 27.62167488 | 54.22727273 | 23.93031912 |
| CUEDC2 | 218097_s_at | 0.0215896 | 1489.025926 | 370.3637532 | 1216.813636 | 285.9543442 |
| CUL4B | 202214_s_at | 0.00598407 | 481 | 148.340816 | 664.6954545 | 228.8104029 |
| CUL5 | 203531_at | 0.0113953 | 567.2481481 | 168.3920663 | 683.3909091 | 171.0561671 |
| CXorf1 | 206711_at | 0.00320971 | 156.5222222 | 62.97238304 | 209.1090909 | 53.40660659 |
| CYB561 | 217200_x_at | 0.0224056 | 500.9074074 | 78.77295966 | 456.8954545 | 100.6122187 |
| CYB561D2 | 209665_at | 0.0234692 | 241.2074074 | 49.66840759 | 186.5636364 | 65.44957743 |
| CYB5R1 | 202263_at | 0.0216668 | 545.9777778 | 137.6170029 | 469.5636364 | 94.62376398 |
| CYBB | 203922_s_at | 0.0133038 | 98.39259259 | 34.70470957 | 87.44090909 | 35.34008461 |
| CYCS | 208905_at | 0.0182437 | 2991.485185 | 833.6032513 | 3378.431818 | 775.8767289 |
| CYFIP2 | 220999_s_at | 0.007586 | 607.1111111 | 194.3445955 | 767.1636364 | 225.7618774 |
| CYLD | 213295_at | 0.000180164 | 552.3333333 | 160.1866844 | 756.2136364 | 172.3949267 |
| CYLD | 39582_at | 0.000137557 | 277.9296296 | 76.6117425 | 376.6272727 | 89.88178576 |
| CYP1B1 | 202436_s_at | 0.00605441 | 195.6740741 | 76.58083006 | 241.3818182 | 71.40106466 |
| cyp20a1 | 219565_at | 0.0203232 | 3.492592593 | 1.214313965 | 4.972727273 | 2.382112272 |
| cyp2j2 | 205073_at | 0.0255498 | 191.8666667 | 78.11200538 | 168.2681818 | 60.73667901 |
| cyr61 | 201289_at | 0.0223627 | 125.2185185 | 72.2990586 | 186.9681818 | 78.90582323 |
| Cyth3 | 206523_at | 0.0152714 | 9.544444444 | 11.08111121 | 5.895454545 | 2.746162218 |
| Dach1 | 205471_s_at | 0.0170013 | 229.5111111 | 72.63745237 | 289.1363636 | 105.9534064 |
| DAPK1 | 203139_at | 0.0251031 | 814.5666667 | 208.433522 | 928.2045455 | 217.7226206 |
| DAPK2 | 206324_s_at | 0.0255508 | 59.32962963 | 34.73664453 | 39.98636364 | 31.63386214 |
| DAXX | 216038_x_at | 0.00579885 | 122.7444444 | 45.92483268 | 95.84545455 | 36.28475644 |
| dcaf11 | 201886_at | 0.00739632 | 438.2740741 | 104.2767715 | 336.7590909 | 93.03010603 |
| DCAF6 | 217908_s_at | 0.00944723 | 263.0703704 | 63.45770739 | 293.3136364 | 70.91459179 |
| DCLK1 | 205399_at | 0.00450278 | 1751.048148 | 694.8817217 | 1999.027273 | 600.5437696 |
| DCLK1 | 215303_at | 0.000259968 | 330.4407407 | 121.113044 | 479.0772727 | 189.4774266 |
| dcp2 | 212919_at | 0.00302426 | 320.2666667 | 80.54461258 | 419.5909091 | 91.40505826 |
| dct | 216512_s_at | 0.0275573 | 64.54814815 | 29.62303379 | 88.77727273 | 38.93285957 |
| Dctn5 | 209232_s_at | 0.0213724 | 274.4962963 | 79.92151189 | 201.5045455 | 70.03562683 |
| dcun1d4 | 212855_at | 0.00414563 | 133.4259259 | 45.3706665 | 189.5636364 | 65.21146222 |
| dcun1d4 | 212851_at | 0.0222436 | 149.2481481 | 38.98863119 | 181.4863636 | 41.42955347 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| DCX | 204850_s_at | 0.00417904 | 283.8777778 | 151.1781764 | 352.75 | 97.55621944 |
| DCX | 204851_s_at | 0.000535947 | 135.2740741 | 59.47982588 | 204.8454545 | 72.20195702 |
| DCXR | 217973_at | 0.0205112 | 1014.255556 | 394.1864361 | 790.5136364 | 346.0840227 |
| DDHD2 | 212690_at | 0.00112408 | 765.5777778 | 189.7512305 | 956.2409091 | 266.5604258 |
| DDOST | 208675_s_at | 0.000933848 | 730.5666667 | 256.4379712 | 571.8181818 | 137.4967035 |
| DDOST | 208674_x_at | 0.030759 | 546.3444444 | 141.8354717 | 453.6272727 | 75.47715632 |
| ddt | 202929_s_at | 0.0218053 | 272.1703704 | 98.34015071 | 214.1727273 | 79.00531737 |
| ddx10 | 204977_at | 0.0154772 | 316.5444444 | 51.20865562 | 365.1227273 | 48.20565993 |
| DDX18 | 208896_at | 0.0160477 | 108.4592593 | 39.92224423 | 151.8545455 | 46.60946897 |
| DDX3X | 201211_s_at | 0.0132246 | 44.5 | 28.88588956 | 29.80909091 | 22.58326201 |
| ddx56 | 217754_at | 0.0251116 | 362.1148148 | 74.24183821 | 315.6727273 | 64.98169106 |
| dedD | 215158_s_at | 0.0218535 | 362.9259259 | 111.2268389 | 309.8636364 | 68.63140018 |
| DEFA1 | 205033_s_at | 0.0170927 | 90.43703704 | 35.19665793 | 82.15454545 | 36.72908186 |
| dennd1a | 219763_at | 0.00452222 | 87.61111111 | 39.21056896 | 75.00909091 | 40.81226367 |
| DENND2A | 53991_at | 0.0120325 | 189.5703704 | 80.45654735 | 146.6090909 | 35.82875819 |
| DENND5B | 215058_at | 0.00884385 | 43.9037037 | 18.97325003 | 64.81818182 | 31.14604059 |
| Dgcr14 | 204383_at | 0.0137431 | 165.5407407 | 39.67882849 | 145.0909091 | 36.09991306 |
| Dgcr14 | 216145_at | 0.0213303 | 18.28518519 | 12.60737585 | 41.15454545 | 35.82225601 |
| DGKI | 206806_at | 0.0132298 | 167.7740741 | 60.69101183 | 235.3681818 | 86.59569651 |
| dhodh | 213632_at | 0.0183378 | 85.21481481 | 37.96538609 | 75.51363636 | 31.19786768 |
| dhps | 207831_x_at | 0.0266291 | 382.9074074 | 184.7353199 | 268.1636364 | 112.7423255 |
| Dhrs4 | 218021_at | 0.00613482 | 242.6666667 | 50.69998483 | 203.1636364 | 43.8054633 |
| dhrs9 | 219799_s_at | 0.0119369 | 212.1185185 | 75.98432549 | 166.0409091 | 68.93139902 |
| DHX8 | 203334_at | 0.0254719 | 29.05925926 | 23.38647307 | 15.65454545 | 5.851473341 |
| DIAPH2 | 205726_at | 0.000160629 | 475.6814815 | 145.2197778 | 673.3454545 | 141.8377266 |
| DICER1 | 212888_at | 0.0254795 | 344.4666667 | 95.59832635 | 451.9727273 | 133.2726785 |
| Dimt1l | 217106_x_at | 0.0190926 | 393.2814815 | 79.49027535 | 510.1363636 | 164.9459523 |
| Dimt1l | 210801_at | 0.027608 | 30.95925926 | 11.765571 | 33.18181818 | 11.33492859 |
| DIRAS2 | 219619_at | 0.0234353 | 550.2185185 | 230.7467594 | 639.3727273 | 232.7333548 |
| DKFZP586K1520 | 217220_at | 0.00875638 | 21.86296296 | 14.42012878 | 32.91363636 | 16.1205369 |
| dlaT | 213149_at | 0.00869479 | 225.0111111 | 60.60744644 | 257.4227273 | 70.09155191 |
| DLEU2L | 216870_x_at | 0.00326565 | 82.92222222 | 28.48102382 | 126.6 | 48.9037344 |
| DLG1 | 202515_at | 0.0149317 | 1497.533333 | 339.3344685 | 1718.390909 | 316.3590033 |
| DLGAP2 | 210227_at | 0.00260781 | 454.6814815 | 146.9539568 | 609.1272727 | 160.6297938 |
| DLGAP2 | 216916_s_at | 0.00179491 | 13.94814815 | 4.070755966 | 18.14090909 | 6.284497865 |
| Dlx2 | 215685_s_at | 0.00867228 | 103.0148148 | 33.79980318 | 79.76818182 | 26.4138922 |
| dmd | 203881_s_at | 0.00754232 | 207.0037037 | 56.45638535 | 289.7818182 | 105.7903346 |
| Dmp1 | 217067_s_at | 0.0299297 | 19.58888889 | 16.14690571 | 14.89545455 | 14.23049968 |
| Dmtf1 | 203301_s_at | 0.00253554 | 316.1074074 | 68.67527786 | 390.5909091 | 79.52337128 |
| DMXL2 | 212820_at | 0.000347694 | 480.4074074 | 130.712088 | 620.5681818 | 138.1358351 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| Dnajb14 | 219237_s_at | 0.00410038 | 278.3037037 | 84.72711618 | 399.3545455 | 151.1367458 |
| dnajc12 | 218976_at | 0.000209824 | 804.8148148 | 142.0135386 | 987.7045455 | 201.4433619 |
| DNAJC13 | 212467_at | 0.00867015 | 121.8037037 | 46.11235844 | 152.8409091 | 42.67371957 |
| DNAJC17 | 219861_at | 0.0268246 | 74.33703704 | 20.71408195 | 54.2 | 23.49569363 |
| DNAJC8 | 205545_x_at | 0.00914947 | 569.037037 | 93.68043531 | 501.7954545 | 70.07114396 |
| dnajc9 | 213088_s_at | 0.0264428 | 261.0888889 | 72.54140639 | 314.5863636 | 57.41227093 |
| DNM3 | 209839_at | 0.00136204 | 710.3 | 237.6885211 | 1027.745455 | 382.5702546 |
| Dok1 | 216835_s_at | 0.0206372 | 125.6592593 | 46.54648842 | 110.0545455 | 37.24755955 |
| Dok4 | 209691_s_at | 0.02796 | 59.61111111 | 25.16078043 | 46.71363636 | 30.17118296 |
| dopey1 | 213271_s_at | 0.00213821 | 398.6925926 | 80.94393086 | 517.4363636 | 120.6668556 |
| DPH5 | 222360_at | 0.0228205 | 91.91481481 | 27.585332 | 111.9863636 | 28.73755292 |
| dpm3 | 219373_at | 0.0133535 | 374.1074074 | 125.2251355 | 271.1318182 | 117.4152354 |
| DPP4 | 211478_s_at | 0.0326563 | 12.33703704 | 13.55618361 | 24.17727273 | 20.31197001 |
| Dpp6 | 207789_s_at | 0.0157817 | 672.1296296 | 161.1946191 | 751.4090909 | 211.739559 |
| Dpp8 | 220939_s_at | 0.0121261 | 263.4259259 | 74.57067681 | 324.2818182 | 77.1784243 |
| DPY19L1 | 215433_at | 0.0268262 | 36.84814815 | 15.96998074 | 52.24090909 | 24.21118709 |
| DPY19L2P2 | 215143_at | 0.00623286 | 342.0851852 | 101.6818254 | 423.4818182 | 141.1379387 |
| DPYS | 206065_s_at | 0.0310846 | 40.31481481 | 22.46329833 | 60.69545455 | 25.30182522 |
| DST | 204455_at | 0.0102862 | 22.41851852 | 21.21440072 | 33.42272727 | 20.40377957 |
| DSTYK | 211515_s_at | 0.0260074 | 100.0555556 | 31.64388789 | 129.1363636 | 49.33530124 |
| DTNB | 214253_s_at | 0.00436252 | 184.1259259 | 50.15948099 | 135.7954545 | 47.87066382 |
| DUX1 | 208176_at | 0.00612909 | 17.94074074 | 9.801148255 | 14.4 | 6.100273218 |
| DYNC2H1 | 219469_at | 0.0198221 | 124.4037037 | 44.67621533 | 158.2454545 | 38.40002142 |
| DYNC2LI1 | 203762_s_at | 0.0109485 | 124.8666667 | 48.33697422 | 157.6681818 | 29.569247 |
| DYNLT3 | 203303_at | 0.00219189 | 1371.018519 | 386.3192373 | 1707.913636 | 431.5752898 |
| dyrk2 | 202971_s_at | 0.00603668 | 32.92962963 | 19.61543377 | 59.42727273 | 37.78504594 |
| Dyrk4 | 212954_at | 0.0216518 | 247.162963 | 56.53725217 | 190.5954545 | 72.20002953 |
| DZIP1 | 204556_s_at | 0.0149864 | 237.2259259 | 61.08722385 | 305.9045455 | 76.6617585 |
| DZIP1 | 204557_s_at | 0.000397671 | 140.4259259 | 52.5816405 | 227.3272727 | 72.29983983 |
| DZIP3 | 207231_at | 0.00912662 | 101.1037037 | 53.92706957 | 155.4772727 | 67.84355205 |
| E2F3 | 203692_s_at | 0.0087639 | 140.7333333 | 47.42778316 | 174.1090909 | 62.03753019 |
| E4F1 | 218524_at | 0.0285037 | 151.7666667 | 49.44393873 | 116.8409091 | 44.85284574 |
| Echs1 | 201135_at | 0.0234513 | 1864.159259 | 338.009256 | 1440.677273 | 415.1562035 |
| Ecsit | 218225_at | 0.0147098 | 494.4296296 | 152.8105836 | 344.7409091 | 137.1355175 |
| eda | 206217_at | 0.00427247 | 164.3592593 | 50.09150288 | 136.1818182 | 40.26706839 |
| EDNRA | 204463_s_at | 0.00637917 | 17.94814815 | 13.75640747 | 36.34090909 | 27.84555464 |
| EEF1A1 | 213614_x_at | 0.019564 | 13009.12593 | 2577.413309 | 11626.14545 | 2616.396777 |
| EEF1D | 203113_s_at | 0.00302121 | 1661.174074 | 525.05518 | 1117.140909 | 430.5480712 |
| EEF1D | 214394_x_at | 0.00748064 | 2842.581481 | 1561.203968 | 1787.845455 | 849.5056824 |
| EFEMP2 | 206580_s_at | 0.000659537 | 453.4407407 | 145.911167 | 348.45 | 81.50538253 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| EFEMP2 | 209356_x_at | 0.00760661 | 201.937037 | 40.26716689 | 177.5 | 54.00534365 |
| EFR3A | 212149_at | 0.00262335 | 402.9777778 | 80.32616363 | 525.0909091 | 117.5439286 |
| EFR3A | 212150_at | 0.00103081 | 298.6148148 | 83.74746703 | 381.6227273 | 100.3343882 |
| Egr1 | 201693_s_at | 0.0212444 | 181.262963 | 64.79154235 | 258.5590909 | 146.1781974 |
| EHBP1 | 212653_s_at | 0.00132959 | 556.3555556 | 192.0173897 | 741.25 | 202.1905248 |
| EHD1 | 209037_s_at | 0.0145814 | 43.71851852 | 22.17703311 | 30.26363636 | 20.35484137 |
| Ehd2 | 221870_at | 0.00934328 | 36.85925926 | 20.11633969 | 28.21818182 | 19.36903853 |
| EIF1AX | 201017_at | 0.00910618 | 172.0925926 | 97.78613999 | 294.0863636 | 185.3343113 |
| EIF2AK2 | 213294_at | 0.000288753 | 358.7296296 | 102.73167 | 528.0909091 | 132.2995947 |
| EIF3B | 203462_x_at | 0.00909066 | 922.2037037 | 195.6532814 | 709.1772727 | 192.4695818 |
| EIF3B | 211501_s_at | 0.00929453 | 280.2518519 | 54.03182374 | 218.0272727 | 66.43850133 |
| Eif3e | 208697_s_at | 0.00212201 | 1359.233333 | 330.194763 | 1681.677273 | 417.4736877 |
| Eif3f | 200023_s_at | 0.0298279 | 1568.366667 | 546.9504217 | 1288.577273 | 297.5904727 |
| eif3g | 208887_at | 0.00686957 | 814.7 | 280.0454963 | 580.3409091 | 177.4840963 |
| EIF3J | 208985_s_at | 0.0196975 | 347.9555556 | 94.75048339 | 411.8727273 | 73.13137677 |
| EIF3K | 210501_x_at | 0.00754329 | 1980.422222 | 603.4051282 | 1500.463636 | 373.3456149 |
| EIF3K | 212716_s_at | 0.00226817 | 2000.440741 | 456.011498 | 1470.772727 | 350.7147439 |
| EIF3K | 221494_x_at | 0.00565705 | 2077.462963 | 472.8894448 | 1609.622727 | 339.2080636 |
| EIF4E2 | 209393_s_at | 0.0085636 | 100.8037037 | 37.22602978 | 78.46363636 | 34.39415157 |
| Eif4ebp2 | 208770_s_at | 0.00145664 | 242.2481481 | 54.63098142 | 190.8454545 | 39.87646074 |
| Eif4g1 | 208625_s_at | 0.0163341 | 346.7851852 | 83.99747571 | 319.8954545 | 69.40822291 |
| eIF6 | 210213_s_at | 0.00875552 | 498.1925926 | 168.2824776 | 376.3681818 | 84.51294849 |
| ELAVL3 | 206338_at | 0.0138038 | 96.61111111 | 92.50999253 | 60.93181818 | 41.78728887 |
| elf3 | 201510_at | 0.0192834 | 42.9 | 29.06036158 | 57.62272727 | 32.29220652 |
| ELOVL4 | 219532_at | 0.000655297 | 256.2037037 | 88.28832784 | 306.2954545 | 92.87821251 |
| ELTD1 | 219134_at | 0.00453092 | 43.81111111 | 23.88854462 | 28.72272727 | 12.1099696 |
| emd | 209477_at | 0.0303914 | 244.0444444 | 50.00087948 | 215.9136364 | 59.85249564 |
| EMG1 | 209233_at | 0.0049765 | 319.9703704 | 99.28109207 | 247.2772727 | 77.4246788 |
| EML1 | 204797_s_at | 0.00505682 | 339.3666667 | 73.61241012 | 383.7727273 | 75.07328598 |
| Enc1 | 201340_s_at | 0.0234613 | 1108.222222 | 350.5681853 | 1366.095455 | 484.9265791 |
| ENG | 201809_s_at | 0.00668957 | 184.2444444 | 47.52215947 | 136.8136364 | 50.19975617 |
| ENO3 | 204483_at | 0.0108298 | 57.05925926 | 27.18676515 | 38.95454545 | 19.8471475 |
| entpd4 | 204076_at | 0.00293187 | 454.1777778 | 171.8540108 | 582.8818182 | 240.1080246 |
| EPHA4 | 206114_at | 0.00723632 | 325.4259259 | 105.695148 | 400.7772727 | 128.4256944 |
| EPM2AIP1 | 202909_at | 0.00709135 | 423.9518519 | 124.4766965 | 533.0363636 | 126.9186186 |
| EPS15 | 217886_at | 0.0258423 | 592 | 196.4175869 | 657.7681818 | 142.3690522 |
| EPS15L2 | 207750_at | 0.0169562 | 4.837037037 | 8.230251335 | 1.818181818 | 0.928201725 |
| EPX | 214627_at | 0.0326953 | 89.53333333 | 63.05731825 | 128.7590909 | 76.97113658 |
| Erbb4 | 214053_at | 0.00128884 | 764.862963 | 233.065077 | 1041.3 | 338.9480463 |
| ERC2 | 213938_at | 0.00295353 | 254.0259259 | 73.21731927 | 356.6772727 | 116.4739617 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| Ercc1 | 203719_at | 0.0294221 | 393.4666667 | 153.8637334 | 274.7590909 | 90.88621174 |
| ergic2 | 218135_at | 0.0119027 | 156.5777778 | 55.15260182 | 213.1272727 | 74.9126487 |
| ERP29 | 201216_at | 0.00478144 | 837.6037037 | 226.155594 | 608.75 | 210.396566 |
| ESPL1 | 204817_at | 0.0144137 | 79.22592593 | 45.49203305 | 55.78636364 | 36.75123964 |
| Esr1 | 211235_s_at | 0.0266146 | 24.67777778 | 18.8959567 | 36.52272727 | 22.12664698 |
| etf1 | 201573_s_at | 0.017433 | 328.5814815 | 78.11305435 | 278.4272727 | 31.81440497 |
| etf1 | 201574_at | 0.0100477 | 529.8148148 | 125.3502653 | 584.0909091 | 116.6775814 |
| etv1 | 221911_at | 0.00291689 | 247.4518519 | 80.91065048 | 331.6727273 | 102.4763442 |
| ETV6 | 205585_at | 0.0317399 | 28.86666667 | 12.27602416 | 36.26363636 | 14.67617264 |
| Evi2a | 204774_at | 0.0154904 | 921.637037 | 571.5519535 | 525.5363636 | 300.4724178 |
| EXOC3 | 212630_at | 0.0046795 | 323.6518519 | 125.4665735 | 178.0818182 | 118.5120152 |
| Exosc4 | 218695_at | 0.0146836 | 283.6740741 | 141.8114826 | 169.75 | 109.004752 |
| Exosc4 | 58696_at | 0.00401899 | 520.8740741 | 170.3735502 | 380.8863636 | 107.7551426 |
| Exosc4 | 91684_g_at | 0.00364589 | 193.4925926 | 76.15539238 | 150.7727273 | 43.14778791 |
| EXPH5 | 213929_at | 0.0128687 | 53.57037037 | 20.25103634 | 74.18636364 | 38.65949394 |
| EXTL1 | 206329_at | 0.0076416 | 72.11851852 | 27.137301 | 46.83181818 | 25.31802269 |
| EZH1 | 211310_at | 0.0165112 | 10.83333333 | 8.672680359 | 20.71363636 | 18.14988641 |
| EZH1 | 32259_at | 0.0250566 | 632.3111111 | 148.7603114 | 530.0590909 | 129.9248342 |
| EZR | 217230_at | 0.0253632 | 10.2962963 | 3.648127178 | 9.363636364 | 3.405114564 |
| F13A1 | 203305_at | 0.0219525 | 152.8555556 | 30.76544432 | 132.5772727 | 53.52409277 |
| FAF1 | 218080_x_at | 0.0216413 | 263.9666667 | 55.51414234 | 233.2272727 | 32.96659466 |
| FAH | 202862_at | 0.0191857 | 154.1148148 | 38.06081878 | 133.4636364 | 47.52745117 |
| Fahd2a | 218504_at | 0.00240421 | 344.1518519 | 96.27436503 | 285.7590909 | 66.30361377 |
| Fam105a | 214947_at | 0.0263884 | 43.11111111 | 25.69753555 | 67.95 | 49.19661961 |
| fam107a | 207547_s_at | 0.00589963 | 1994.866667 | 701.66607 | 1754.7 | 633.8392638 |
| fam107a | 209074_s_at | 0.0201538 | 3593.622222 | 1095.497013 | 3075.845455 | 1068.533205 |
| FAM120A | 200774_at | 0.0181777 | 414.2740741 | 183.3823089 | 565.0227273 | 189.1067069 |
| FAM13B | 218518_at | 0.0186659 | 518.3407407 | 171.264845 | 619.4681818 | 225.1980512 |
| FAM153B | 214945_at | 0.0130756 | 350.1407407 | 219.8357871 | 494.6727273 | 214.8922503 |
| FAM169A | 213954_at | 0.0100069 | 198.2962963 | 63.43811934 | 287.4045455 | 121.6001663 |
| fam171a1 | 212771_at | 0.0271603 | 2077.044444 | 444.5020527 | 2311.018182 | 495.6533126 |
| Fam175b | 212835_at | 0.0310072 | 107.3 | 32.72852202 | 130.0454545 | 34.60961506 |
| Fam175b | 212837_at | 0.0236696 | 283.5814815 | 88.40525148 | 322.2 | 63.89548013 |
| FAM179B | 213304_at | 0.00608161 | 448.4814815 | 150.2270744 | 599.6545455 | 181.3407756 |
| fam188a | 218297_at | 0.00307495 | 143.3851852 | 71.73237497 | 266.55 | 165.7024377 |
| fam18b | 218446_s_at | 0.00300709 | 92.2037037 | 29.9468437 | 134.2363636 | 47.73171598 |
| FAM3A | 38043_at | 0.0242565 | 304.0407407 | 91.06270984 | 224.6909091 | 77.91446414 |
| FAM3C | 201889_at | 0.00811247 | 550.7 | 215.2742991 | 766.7136364 | 279.8984311 |
| FAM46C | 220306_at | 0.00973611 | 42.9037037 | 29.43795929 | 26.53181818 | 10.91994184 |
| Fam50a | 203262_s_at | 0.0290633 | 516.937037 | 192.2779982 | 375.4318182 | 146.310467 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| FAM65B | 209829_at | 0.00449419 | 213.6888889 | 89.00550257 | 327.4636364 | 100.3291181 |
| FAM8A1 | 203420_at | 0.00130835 | 614.4481481 | 169.087816 | 814.1545455 | 181.1323056 |
| FARP1 | 201910_at | 0.00386942 | 245.5111111 | 78.48165064 | 189.5318182 | 81.25057296 |
| farsa | 202159_at | 0.00663783 | 473.0296296 | 153.2609836 | 338.6636364 | 109.2166503 |
| FASTK | 202676_x_at | 0.0141332 | 276.4111111 | 99.49436526 | 174.3909091 | 102.4436008 |
| FASTKD2 | 205976_at | 0.0308079 | 40.79259259 | 16.76039117 | 50.74090909 | 23.15596517 |
| FBL | 211623_s_at | 0.00421735 | 957.1777778 | 229.0671758 | 728.1090909 | 156.2867783 |
| Fbn1 | 202766_s_at | 0.0164261 | 97.78518519 | 34.75956652 | 132.8954545 | 49.07601953 |
| Fbxl15 | 218938_at | 0.0133249 | 576.5259259 | 191.2382075 | 406.6409091 | 137.3611772 |
| Fbxl2 | 214436_at | 0.00351436 | 411.9481481 | 63.27382112 | 492.6590909 | 89.42112065 |
| fbxo11 | 222119_s_at | 0.00497762 | 274.8925926 | 72.41651918 | 349.2090909 | 92.1459035 |
| Fbxo28 | 202271_at | 0.0231605 | 423.037037 | 78.56870168 | 458.7227273 | 64.08307058 |
| Fbxo5 | 218875_s_at | 0.0302891 | 24.3037037 | 12.55282627 | 31.13181818 | 9.517672103 |
| Fbxw11 | 209455_at | 0.00695191 | 755.1222222 | 225.1963064 | 895.6136364 | 242.1863023 |
| FBXW2 | 209630_s_at | 0.00990606 | 160.9185185 | 57.13036399 | 200.3181818 | 52.21734465 |
| FEN1 | 204768_s_at | 0.0169795 | 118.337037 | 23.95184509 | 98.43181818 | 26.88232534 |
| fgf12 | 214589_at | 0.0328656 | 49.44074074 | 27.85341105 | 69.85 | 37.51113803 |
| FGF17 | 221376_at | 0.0153604 | 44.83703704 | 24.24117838 | 59.82272727 | 26.8158967 |
| FGFR2 | 208225_at | 0.00717526 | 7.025925926 | 5.788157179 | 4.990909091 | 2.400180368 |
| FIBP | 202041_s_at | 0.00449846 | 931.0444444 | 267.2403101 | 701.6090909 | 172.6779549 |
| FIS1 | 218034_at | 0.0268972 | 1848.159259 | 599.1713266 | 1393.795455 | 508.7450812 |
| fkbp4 | 200894_s_at | 0.0244804 | 166.737037 | 80.94186018 | 128.0954545 | 58.62696826 |
| FKBP5 | 204560_at | 0.00891496 | 5.281481481 | 4.504018465 | 4.059090909 | 1.446394233 |
| FKBPL | 219187_at | 0.0176012 | 112.6222222 | 38.83927763 | 73.52272727 | 34.22818293 |
| FKTN | 205283_at | 0.0104667 | 183 | 47.35609781 | 228.6727273 | 54.35855548 |
| FLOT2 | 201350_at | 0.0214147 | 648.4333333 | 160.0987412 | 564.6863636 | 136.847142 |
| FLRT2 | 204359_at | 0.00228885 | 588.0222222 | 150.22941 | 885.8272727 | 316.4497044 |
| Flrt3 | 219250_s_at | 0.00186647 | 168.4481481 | 57.32339682 | 223.2045455 | 68.93246161 |
| FMR1 | 203689_s_at | 0.0209624 | 213.9481481 | 73.1284874 | 281.6272727 | 77.0622765 |
| FN3KRP | 218210_at | 0.0241293 | 501.4740741 | 92.97637662 | 440.6 | 88.11995072 |
| FNBP4 | 212232_at | 0.0125505 | 187.6555556 | 66.97713923 | 256.4227273 | 77.19329438 |
| FNDC3A | 202304_at | 0.0198576 | 320.8888889 | 123.8847148 | 460.5818182 | 185.9926871 |
| FNDC3B | 218618_s_at | 0.00399871 | 109.8296296 | 28.19960195 | 145.1863636 | 29.97764716 |
| FOLH1 | 217487_x_at | 0.0213181 | 191.0962963 | 81.4674474 | 134.8272727 | 60.54290239 |
| FOLR2 | 204829_s_at | 0.0159409 | 130.4814815 | 51.83868497 | 98.60454545 | 49.56821636 |
| foxg1 | 206018_at | 0.00656791 | 1346.174074 | 329.7486591 | 1633.204545 | 338.2430212 |
| FOXP3 | 221333_at | 0.0262893 | 15.08148148 | 12.43874335 | 10.60909091 | 7.716396216 |
| FPGS | 202945_at | 0.0293079 | 214.9333333 | 54.46833237 | 172.8636364 | 60.60735886 |
| Frmpd4 | 215052_at | 0.0046885 | 135.7925926 | 57.24031612 | 177.5636364 | 58.09182834 |
| ftsj1 | 213937_s_at | 0.0323011 | 159.3074074 | 43.21742816 | 136.5954545 | 26.10089357 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| FUBP1 | 212847_at | 0.00105625 | 123.2814815 | 42.33178509 | 174.8090909 | 41.91708265 |
| fus | 200959_at | 0.0052072 | 833.9666667 | 172.3392116 | 688.7 | 167.4928797 |
| FUT4 | 209893_s_at | 0.0119054 | 33.64814815 | 17.61907555 | 24.45909091 | 22.17782374 |
| FUT6 | 210398_x_at | 0.0212524 | 3.962962963 | 2.091953108 | 3.381818182 | 1.306626468 |
| fut9 | 207696_at | 0.0177933 | 4.481481481 | 4.486821475 | 12.85909091 | 11.71298259 |
| fut9 | 214046_at | 0.0041967 | 748.5518519 | 280.9466831 | 1062.927273 | 281.7116783 |
| FXYD5 | 218084_x_at | 0.00211653 | 258.1555556 | 73.62599005 | 222.6727273 | 77.44280336 |
| FZD7 | 203706_s_at | 0.00469514 | 123.6222222 | 34.40709155 | 180.5954545 | 84.2814247 |
| G6pc3 | 44654_at | 0.0217418 | 611.2185185 | 158.5212823 | 517.2 | 141.1779492 |
| GAA | 202812_at | 0.0142527 | 347.7185185 | 83.41817288 | 288.7454545 | 69.1794542 |
| GABARAPL1 | 211457_at | 0.00888353 | 43.75555556 | 27.90314751 | 62.18636364 | 39.36490213 |
| Gabbr2 | 209990_s_at | 0.00249864 | 310.1259259 | 80.50679184 | 391.3681818 | 86.03893021 |
| Gabra2 | 207014_at | 0.000627091 | 680.8333333 | 323.0403964 | 1133.459091 | 512.4050023 |
| GABRA4 | 208463_at | 0.021021 | 296.6259259 | 103.9962854 | 370.5318182 | 71.23807427 |
| GABRB1 | 207010_at | 0.0176662 | 2574.340741 | 1196.623135 | 3518.677273 | 733.4017394 |
| Gad1 | 205278_at | 0.00221925 | 2835.492593 | 613.5768511 | 3351.445455 | 1060.592985 |
| gal3st4 | 219815_at | 0.0107936 | 196.0407407 | 51.96020118 | 164.4090909 | 83.10605908 |
| GALC | 204417_at | 0.0144828 | 376.4962963 | 90.2503334 | 443.3909091 | 80.00918941 |
| GALNT1 | 201724_s_at | 0.00334571 | 190.2333333 | 71.14336014 | 223.6818182 | 57.59117522 |
| GALNT10 | 207357_s_at | 0.0318228 | 70.37037037 | 44.81308887 | 49.7 | 24.03497452 |
| Galnt7 | 218313_s_at | 0.0091284 | 145.3222222 | 47.17330025 | 184.6318182 | 55.33908794 |
| GALR1 | 220821_at | 0.0286052 | 12.93703704 | 14.15010596 | 7.386363636 | 8.044181302 |
| Gamt | 205354_at | 0.000159712 | 252.4407407 | 82.18527034 | 177.5772727 | 53.16704074 |
| Gas2 | 205848_at | 0.0125069 | 50.72592593 | 21.52001917 | 65.99090909 | 23.2539379 |
| GATA3 | 209603_at | 0.0308835 | 11.3037037 | 9.449724517 | 20.35 | 21.63026429 |
| GBA | 210589_s_at | 0.00952336 | 429.1666667 | 186.0868201 | 256.7363636 | 127.5619608 |
| gcat | 205164_at | 0.00500687 | 122.1259259 | 71.07497446 | 54.10454545 | 34.40090637 |
| GCC2 | 202832_at | 0.000124452 | 606.2888889 | 145.3026691 | 803.0454545 | 134.8680051 |
| gcdH | 203500_at | 0.00281397 | 249.8666667 | 59.55697337 | 196.5818182 | 83.01201081 |
| gcdH | 208369_s_at | 0.00509274 | 238.9444444 | 56.53841671 | 198.7045455 | 50.99949092 |
| GCH1 | 204224_s_at | 0.00339458 | 132.4592593 | 45.7567251 | 188.6954545 | 53.48556082 |
| GDF1 | 206397_x_at | 0.0121789 | 3239.111111 | 1553.920841 | 2176.018182 | 1108.941723 |
| GDI1 | 201864_at | 0.0093167 | 6545.237037 | 2005.216722 | 5135.540909 | 1889.992316 |
| GDI2 | 200009_at | 0.0264151 | 1751.885185 | 494.5504833 | 1453.977273 | 309.9033243 |
| GFAP | 203540_at | 0.00349542 | 5976.17037 | 2636.191613 | 4014.195455 | 1862.719416 |
| GFM1 | 220903_at | 0.00479821 | 16.54074074 | 11.6789508 | 29.38636364 | 17.38045688 |
| GFPT1 | 202722_s_at | 0.00794445 | 118.0481481 | 29.54499008 | 139.9863636 | 35.95165134 |
| Ggct | 215380_s_at | 0.0206484 | 450.5814815 | 165.485219 | 507.9818182 | 140.6409702 |
| GGNBP2 | 218079_s_at | 0.0208108 | 548.5962963 | 170.0819994 | 682.8863636 | 151.7741659 |
| GGT5 | 205582_s_at | 0.0280582 | 67.52962963 | 37.70120193 | 45.19090909 | 26.32246748 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| GHR | 205498_at | 0.0127568 | 51.21111111 | 18.83442702 | 69.15454545 | 20.10952694 |
| GIMAP5 | 218805_at | 0.00337524 | 200.8592593 | 69.03954975 | 152.7363636 | 43.0540142 |
| GIMAP5 | 64064_at | 0.000501391 | 298.5074074 | 70.90142087 | 251.7772727 | 76.99774846 |
| GIMAP6 | 219777_at | 0.0115532 | 58.88148148 | 26.20242263 | 41.69090909 | 23.2202069 |
| GIPC1 | 207525_s_at | 0.017336 | 555.1925926 | 136.6009768 | 453.0272727 | 151.0874587 |
| GIT1 | 218030_at | 0.032881 | 417.2851852 | 165.2709493 | 340.7590909 | 131.7192673 |
| GIT2 | 209876_at | 0.0028877 | 28.61481481 | 31.99599378 | 78.06818182 | 58.03008568 |
| GK3P | 217167_x_at | 0.00840891 | 17.22222222 | 11.15607228 | 32.47727273 | 20.07737252 |
| Glb1 | 201576_s_at | 0.0138995 | 289.7666667 | 86.18179801 | 259.3727273 | 38.59746083 |
| GLB1L2 | 213713_s_at | 0.0139944 | 206.6111111 | 72.81805743 | 166.25 | 39.23415361 |
| GLRB | 205280_at | 0.0321947 | 339.7740741 | 120.5282112 | 421.1 | 163.6348636 |
| glrx3 | 207506_at | 0.0104842 | 84.52222222 | 33.99842002 | 67.24090909 | 25.93650964 |
| GLS | 203159_at | 0.00265337 | 1492.885185 | 447.4839307 | 1842.818182 | 442.3200809 |
| GLS | 203157_s_at | 0.0236182 | 260.6814815 | 130.0900192 | 355.55 | 139.4312862 |
| GLT8D2 | 221447_s_at | 0.0193948 | 107.7259259 | 31.13708638 | 123.2227273 | 24.5884009 |
| gm2a | 35820_at | 0.0260851 | 194.7 | 83.02576523 | 130.9136364 | 73.35386052 |
| gmfb | 202544_at | 0.00703704 | 1291.311111 | 287.2368954 | 1583.936364 | 365.9732836 |
| gmpr | 204187_at | 0.00416322 | 165.8888889 | 81.21433339 | 122.5 | 49.06162306 |
| GNAO1 | 204762_s_at | 0.0137807 | 1091.655556 | 295.5865204 | 1411.909091 | 501.2483596 |
| GOLGA6L5 | 213212_x_at | 0.0119061 | 97.46296296 | 34.50770425 | 135.8772727 | 50.22007692 |
| GOLGA8A | 208798_x_at | 0.00211953 | 445.6111111 | 226.4980002 | 677.4454545 | 268.0214361 |
| GOSR2 | 210009_s_at | 0.0272651 | 91.8 | 45.32367356 | 61.56363636 | 31.42620298 |
| GPER | 222227_at | 0.00526218 | 21.89259259 | 13.10824538 | 35.37727273 | 18.96791606 |
| GPHN | 215578_at | 0.01361 | 44.57407407 | 24.02613309 | 65.46818182 | 21.51790808 |
| Gpld1 | 215554_at | 0.0119185 | 22.65185185 | 15.33320606 | 38.75 | 17.45562401 |
| GPR135 | 211659_at | 0.0284498 | 12.98148148 | 9.654494252 | 9.540909091 | 5.21304765 |
| GPR161 | 206972_s_at | 0.0312942 | 11.76296296 | 13.21462326 | 22.25 | 19.75157016 |
| GPR161 | 214104_at | 0.0278322 | 94.01481481 | 54.49361786 | 80.58181818 | 44.42373493 |
| GPR172A | 222155_s_at | 0.0267674 | 56.05555556 | 34.85288128 | 35.14545455 | 32.19103287 |
| GPR32 | 221469_at | 0.000210545 | 39.12962963 | 23.46960088 | 65.49090909 | 41.26623097 |
| GPR44 | 206361_at | 0.00636689 | 131.0111111 | 44.78645342 | 96.93636364 | 24.51109652 |
| GPR88 | 220313_at | 0.019194 | 2165.559259 | 1161.468295 | 2746.504545 | 1172.884193 |
| GPRASP1 | 204793_at | 0.00206305 | 1427.088889 | 342.7734252 | 1703.663636 | 343.5487677 |
| Gprc5a | 203108_at | 0.027323 | 10.1037037 | 3.775577539 | 13.45 | 7.508772647 |
| GPS1 | 217782_s_at | 0.00326112 | 304.262963 | 101.6761834 | 238.9045455 | 56.74334429 |
| GPX1 | 200736_s_at | 0.000737143 | 1135.981481 | 440.7706678 | 785.8590909 | 258.6469641 |
| GPX4 | 201106_at | 0.014395 | 3233.688889 | 1194.703523 | 2623.027273 | 718.1097729 |
| Grb14 | 206204_at | 0.0316425 | 38.01111111 | 20.14895174 | 32.85 | 15.62070512 |
| grem2 | 220794_at | 0.0269003 | 150.237037 | 53.08230292 | 177.6090909 | 49.80238959 |
| GRIA1 | 209793_at | 0.0159211 | 475.462963 | 121.8759494 | 568.4681818 | 171.8538454 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| GRIA2 | 205358_at | 0.000990271 | 2855.959259 | 1135.297169 | 4014.290909 | 1071.269333 |
| GRM3 | 205814_at | 0.0129243 | 1286.711111 | 429.3276222 | 1487.495455 | 371.292428 |
| Grm5 | 214217_at | 0.000219711 | 418.5740741 | 146.6915959 | 670.9727273 | 246.8708071 |
| grn | 211284_s_at | 0.0119632 | 152.1851852 | 40.56364139 | 112.2272727 | 46.6151537 |
| GRPEL1 | 212432_at | 0.0160403 | 231.662963 | 59.31869694 | 187.4863636 | 61.25002076 |
| Grsf1 | 221917_s_at | 0.0310719 | 89.62962963 | 20.50628074 | 106.0363636 | 31.83067621 |
| GSDMB | 219233_s_at | 0.0281452 | 76.78148148 | 58.65218887 | 113.9590909 | 46.10685993 |
| GSTM5 | 205752_s_at | 0.0131218 | 513.8148148 | 250.251968 | 423.5636364 | 172.9668687 |
| GSTO1 | 201470_at | 0.00897318 | 3017.677778 | 849.0169679 | 2229.081818 | 560.5820272 |
| GSTP1 | 200824_at | 0.0163644 | 675.3592593 | 157.4980446 | 579.0545455 | 145.4657339 |
| GTF2F1 | 202355_s_at | 0.0297691 | 347.1592593 | 64.95807085 | 273.8454545 | 88.94638689 |
| gtf2h2 | 215470_at | 0.00626298 | 40.84074074 | 26.72842421 | 54.86363636 | 21.29013958 |
| GTF3C1 | 202320_at | 0.0204332 | 537.8407407 | 151.2685265 | 461.4681818 | 103.9080609 |
| GTPBP1 | 205274_at | 0.0315531 | 17.05925926 | 9.154496972 | 14.27272727 | 7.72264338 |
| GUK1 | 200075_s_at | 0.0191364 | 1651.57037 | 465.3758364 | 1406.318182 | 387.2253468 |
| GYG1 | 211275_s_at | 0.00354765 | 1038.9 | 242.6478582 | 805.4045455 | 142.5499694 |
| GYPB | 216833_x_at | 0.0028565 | 91.04074074 | 35.46016464 | 77.80909091 | 24.88380443 |
| GYPB | 216398_at | 0.0270289 | 127.9888889 | 39.04628746 | 171.1636364 | 83.09550183 |
| H2afx | 205436_s_at | 0.0248925 | 690.0074074 | 147.8270245 | 593.6954545 | 116.3641758 |
| H2AFY | 220375_s_at | 0.0183627 | 180.4 | 58.97047501 | 202.5681818 | 69.11108647 |
| h3f3a | 209069_s_at | 0.02523 | 1815.8 | 597.2497757 | 1566.236364 | 467.0539456 |
| H3f3b | 211997_x_at | 0.0186929 | 3480.848148 | 1220.016587 | 2975.840909 | 808.8116066 |
| HADHA | 208630_at | 0.00605163 | 431.3259259 | 93.21266253 | 342.5636364 | 99.46269722 |
| hbd | 206834_at | 0.0283952 | 98.26666667 | 60.99435661 | 82.55 | 41.46670207 |
| HBG1 | 204848_x_at | 0.0197624 | 75.47037037 | 100.1155518 | 56.70909091 | 83.44184122 |
| HDAC5 | 202455_at | 0.00291869 | 363.9814815 | 84.16721926 | 301.0045455 | 62.87764746 |
| HDGFRP3 | 209524_at | 0.00333559 | 473.2259259 | 94.10016591 | 619.6863636 | 170.7648182 |
| HDGFRP3 | 209526_s_at | 0.0100144 | 267.937037 | 108.512506 | 404.7818182 | 200.9089219 |
| HEATR6 | 65493_at | 0.0220293 | 139.9481481 | 45.17081572 | 115.3863636 | 24.34643409 |
| helz | 203674_at | 0.0275552 | 278.6296296 | 72.5336835 | 337.65 | 76.56288265 |
| hemK1 | 218620_s_at | 0.00778203 | 46.41851852 | 36.08610469 | 17.84545455 | 16.3471485 |
| HERC1 | 218306_s_at | 0.00361079 | 489.7666667 | 125.8405034 | 615.7 | 171.7740515 |
| HERC2 | 217902_s_at | 0.00244171 | 371.3185185 | 85.86702616 | 436.4727273 | 86.29856911 |
| HERPUD1 | 217168_s_at | 0.0189813 | 669.6666667 | 214.1755732 | 539.1727273 | 146.8349517 |
| hes1 | 203394_s_at | 0.0259964 | 84.9962963 | 21.64971987 | 123.0727273 | 58.23111737 |
| hexA | 201765_s_at | 0.00500222 | 339.0148148 | 105.4169951 | 237.1227273 | 97.91658711 |
| HFE | 211863_x_at | 0.011744 | 119.7333333 | 34.87866882 | 97.53181818 | 41.57750521 |
| HFE | 206086_x_at | 0.0277876 | 107.8444444 | 41.04264511 | 95.42727273 | 45.34461885 |
| hgd | 214307_at | 0.00273177 | 29.35925926 | 16.35364601 | 49.53181818 | 27.93547644 |
| HIRIP3 | 204504_s_at | 0.0203012 | 242.037037 | 67.16510168 | 184.4045455 | 65.60035915 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| HIST2H2AA3 | 214290_s_at | 0.0184996 | 232.1296296 | 74.36182755 | 179.8363636 | 66.21718627 |
| hivep2 | 212641_at | 0.0287601 | 324.4703704 | 130.8503544 | 376.0590909 | 122.8481395 |
| HLA-A | 213932_x_at | 0.00326315 | 3722.62963 | 1044.313932 | 2909.404545 | 961.9141321 |
| HLA-B | 209140_x_at | 0.00570526 | 1818.503704 | 789.7906064 | 1344.236364 | 412.2331801 |
| HLA-B | 216526_x_at | 0.00187327 | 2597.985185 | 883.7499123 | 1909.459091 | 629.9224666 |
| HLA-B | 208729_x_at | 0.0282133 | 585.0555556 | 328.4003108 | 456.1636364 | 144.6752901 |
| hla-drb1 | 204670_x_at | 0.0251224 | 549.8148148 | 234.4456386 | 459.5818182 | 155.455811 |
| HLA-DRB3 | 221491_x_at | 0.0224369 | 47.52962963 | 18.7035335 | 55.50909091 | 21.95111255 |
| HLA-DRB4 | 208306_x_at | 0.0101052 | 527.5259259 | 292.5040468 | 389.6636364 | 128.0666216 |
| HLA-DRB4 | 209312_x_at | 0.0102727 | 497.6592593 | 232.9229408 | 367.4590909 | 108.31935 |
| HLA-DRB6 | 217362_x_at | 0.0223799 | 204.5666667 | 54.10280812 | 180.9727273 | 86.00671171 |
| HLA-E | 200904_at | 0.000590518 | 303.7666667 | 84.25516191 | 220.5409091 | 86.06249479 |
| HLA-G | 211528_x_at | 0.0048467 | 966.6518519 | 248.3447238 | 845.5727273 | 230.9652482 |
| HLA-G | 211530_x_at | 0.00923944 | 230.3 | 122.532203 | 181.1727273 | 77.81568689 |
| HLF | 204753_s_at | 0.0118303 | 348.4296296 | 86.32828583 | 421.7363636 | 82.46024465 |
| HLF | 204754_at | 0.00319617 | 352.2333333 | 71.38232921 | 407.2227273 | 80.2555735 |
| hltf | 202983_at | 0.00948244 | 356.0518519 | 116.0353009 | 470.8545455 | 110.3889346 |
| HMGB1 | 216508_x_at | 0.0203591 | 550.6518519 | 300.7983446 | 409.0636364 | 126.7695417 |
| HMGB3 | 203744_at | 0.0220023 | 336.9148148 | 86.7688162 | 386.0363636 | 57.77630545 |
| hmgcL | 202772_at | 0.0171085 | 396.862963 | 78.75628008 | 330.7818182 | 94.02389583 |
| HMGCR | 202540_s_at | 0.0263613 | 430.9814815 | 133.310436 | 487.8727273 | 161.8147565 |
| HMGN1 | 200944_s_at | 0.0191426 | 724.2962963 | 269.8003243 | 906.9 | 320.130042 |
| HMGN2 | 208668_x_at | 0.0194 | 2889.748148 | 876.872624 | 2505.531818 | 569.8210834 |
| HMGN5 | 221238_at | 0.00847221 | 60.22592593 | 22.25515658 | 93.06363636 | 51.36538157 |
| HMGN5 | 221606_s_at | 0.0119107 | 41.41851852 | 20.00282744 | 58.05454545 | 19.57719099 |
| Hmox2 | 218120_s_at | 0.0304017 | 583.4444444 | 221.6052629 | 466.2090909 | 161.3320117 |
| HNRNPA1 | 221919_at | 0.0132352 | 77.21481481 | 37.91471912 | 113.9136364 | 40.77967859 |
| Hnrnpa3 | 211929_at | 0.00388334 | 881.6814815 | 318.0300482 | 1159.963636 | 427.7194269 |
| HNRNPD | 213359_at | 0.00658296 | 66.98518519 | 41.88843886 | 116.8181818 | 59.83028884 |
| HNRPDL | 212454_x_at | 0.00477907 | 812.4851852 | 297.9686918 | 1073.963636 | 255.8071512 |
| HOMER1 | 213793_s_at | 0.0210738 | 732.0481481 | 313.7184681 | 855.1818182 | 194.5966124 |
| HOMER3 | 204647_at | 0.0133867 | 226.4444444 | 111.27818 | 162.6 | 57.51185385 |
| HPRT1 | 202854_at | 0.0121996 | 884.9296296 | 331.2695647 | 1116.663636 | 390.2054752 |
| HS1BP3 | 219020_at | 0.00647765 | 263.0407407 | 51.95669987 | 218.1045455 | 45.41150974 |
| Hs2st1 | 203284_s_at | 0.00751992 | 314.6111111 | 75.48174172 | 395.3409091 | 82.97309753 |
| Hs2st1 | 203285_s_at | 0.0023462 | 182.4925926 | 50.08398275 | 231.6181818 | 55.08006844 |
| HSD17B10 | 202282_at | 0.000997461 | 665.8 | 167.6867111 | 507.3181818 | 140.5874161 |
| HSD17B8 | 213540_at | 0.0197403 | 258.7444444 | 68.40329127 | 206.5681818 | 39.63737277 |
| hsf1 | 202344_at | 0.000117778 | 151.0777778 | 45.16132053 | 104.4454545 | 41.49986491 |
| hsf2 | 211220_s_at | 0.0135346 | 22.9037037 | 12.2883147 | 31.2 | 13.46052429 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| HSPA4 | 208814_at | 0.0165234 | 266.662963 | 85.55640581 | 363.1590909 | 133.7098374 |
| HSPA4 | 211015_s_at | 0.00442018 | 82.73333333 | 28.66082827 | 64.23181818 | 27.00046536 |
| hspc159 | 219998_at | 0.0205364 | 82.3037037 | 62.43708514 | 56.99545455 | 38.85621207 |
| htatsf1 | 202602_s_at | 0.0145384 | 479.362963 | 164.7065576 | 571.5272727 | 181.9072505 |
| HTR1D | 207368_at | 0.0317143 | 28.61111111 | 24.57799725 | 20.36363636 | 14.35915323 |
| HUS1 | 204884_s_at | 0.0167035 | 22.52592593 | 12.01750622 | 32.60454545 | 23.21570645 |
| HYAL2 | 206855_s_at | 0.0274001 | 167.9444444 | 53.36484246 | 149.7318182 | 32.75416929 |
| icmt | 201611_s_at | 0.00313976 | 306.0296296 | 90.68471933 | 386.35 | 81.55472454 |
| ICOSLG | 213450_s_at | 0.0271457 | 151.262963 | 58.71829192 | 109.3727273 | 50.76023173 |
| IDI1 | 208881_x_at | 0.0263114 | 604.7555556 | 215.79624 | 696.5772727 | 283.222924 |
| ids | 202439_s_at | 0.028722 | 656.9888889 | 287.2501059 | 950.6772727 | 329.3883176 |
| Idua | 205059_s_at | 0.0249751 | 120.4074074 | 49.38202667 | 149.0681818 | 51.9758679 |
| Ifitm1 | 201601_x_at | 0.00875867 | 412.7555556 | 165.089473 | 326.1727273 | 89.77636332 |
| ifitm3 | 212203_x_at | 0.0103614 | 1159.085185 | 559.7684815 | 865.6272727 | 365.264309 |
| IFT74 | 61732_r_at | 0.0332683 | 11.82962963 | 7.672318615 | 14.97272727 | 8.296366492 |
| IGBP1 | 202105_at | 0.00368875 | 537.4296296 | 97.96637105 | 459.3545455 | 91.18195168 |
| Igf2r | 201393_s_at | 0.0291158 | 99.14074074 | 40.37580444 | 122.85 | 39.38558777 |
| IGFBP5 | 211958_at | 0.0233038 | 110.8148148 | 26.45625858 | 93.98181818 | 27.74002843 |
| IGFBP6 | 203851_at | 0.00101843 | 387.5259259 | 101.6680254 | 301.9318182 | 75.04867237 |
| IGHM | 217035_at | 0.00437539 | 94.92962963 | 72.21507841 | 55.51363636 | 40.59999174 |
| Igkc | 221671_x_at | 0.00619612 | 31.48888889 | 11.03791833 | 26.61363636 | 8.902770861 |
| IGLJ3 | 211881_x_at | 0.0271333 | 47.9 | 23.38924802 | 41.32272727 | 24.00698176 |
| igsf3 | 202421_at | 0.00795947 | 316.0185185 | 79.8389631 | 381.3954545 | 74.83960294 |
| IHH | 215420_at | 0.0210619 | 57.48518519 | 29.18583302 | 48.28636364 | 38.13731201 |
| IL13RA1 | 211612_s_at | 0.0257462 | 76.0962963 | 21.1014123 | 67.86818182 | 30.31011754 |
| IL16 | 209827_s_at | 0.0298089 | 148.9 | 35.70380286 | 137.1227273 | 66.46210472 |
| IL4 | 207538_at | 0.007542 | 24.46296296 | 18.81442058 | 18.22272727 | 17.91264336 |
| IL4 | 207539_s_at | 0.00682171 | 12.43333333 | 11.86235156 | 5.313636364 | 4.982378038 |
| ILVBL | 210624_s_at | 0.0189969 | 592.6703704 | 102.6506915 | 484.9590909 | 148.74491 |
| ILVBL | 216270_at | 0.0177559 | 7.459259259 | 4.386715896 | 5.722727273 | 2.042624786 |
| IMMP2L | 216564_at | 0.00304948 | 35.27037037 | 26.5023049 | 20.25909091 | 12.10181644 |
| IMP4 | 212411_at | 0.0261526 | 594.4518519 | 130.9656601 | 482.7045455 | 128.5527073 |
| impact | 218637_at | 0.0171807 | 126.8259259 | 43.69067488 | 167.8045455 | 53.01031775 |
| INADL | 214705_at | 0.0184184 | 8.274074074 | 9.129099399 | 17.04545455 | 12.34730459 |
| INPP4A | 204553_x_at | 0.0109584 | 77.27037037 | 49.025204 | 118.3954545 | 47.83795542 |
| INPP4A | 208363_s_at | 0.00648973 | 93.69259259 | 37.24080605 | 140.9909091 | 58.04279135 |
| INPP4A | 204552_at | 0.0271398 | 296.7666667 | 128.9235522 | 387.75 | 167.2932747 |
| Insig2 | 209566_at | 0.0040675 | 105.8074074 | 40.20373046 | 141.8227273 | 43.68887765 |
| INS-IGF2 | 202409_at | 0.0174263 | 139.3296296 | 45.80039314 | 165.3136364 | 53.49340231 |
| INS-IGF2 | 210881_s_at | 0.013571 | 9.47037037 | 3.061524861 | 12.75909091 | 6.184285699 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| INTS1 | 212212_s_at | 0.0150001 | 363.7222222 | 154.6810921 | 257.6363636 | 98.67386659 |
| IP6K1 | 212439_at | 0.0189474 | 712.0888889 | 212.7121825 | 592.8636364 | 108.0247659 |
| IPO5 | 211954_s_at | 0.0230818 | 388.7777778 | 67.5859358 | 324.8681818 | 68.33085747 |
| IPO7 | 200994_at | 0.000282877 | 429.3185185 | 91.52573844 | 615.1545455 | 168.1292069 |
| IPO7 | 200995_at | 0.00803399 | 342.137037 | 70.71272407 | 411.2227273 | 95.11991395 |
| Ipo9 | 213785_at | 0.00302291 | 163.6 | 76.26741415 | 209.9090909 | 59.07348055 |
| IQCB1 | 211707_s_at | 0.015329 | 119.6333333 | 32.65982006 | 153.5863636 | 44.96565139 |
| Iqcg | 221185_s_at | 0.0291493 | 106.5 | 26.23108843 | 128.9136364 | 37.25709003 |
| IRF8 | 204057_at | 0.0015438 | 130.037037 | 54.96593454 | 85.95909091 | 61.24000139 |
| irs2 | 209185_s_at | 0.00240925 | 1262.277778 | 335.4141875 | 1622.159091 | 435.9666159 |
| ISOC1 | 218170_at | 0.0159498 | 233.8222222 | 67.66758873 | 297.2363636 | 74.36035519 |
| isoc2 | 218893_at | 0.0327719 | 293.9703704 | 81.53457886 | 231.0909091 | 74.2787729 |
| ITGA3 | 201474_s_at | 0.0235581 | 99.72222222 | 35.38328955 | 70.34090909 | 36.63101287 |
| Itgav | 202351_at | 0.0240002 | 868.062963 | 251.4527974 | 1081.95 | 314.0590311 |
| ITGB1BP2 | 219829_at | 0.0286135 | 8.67037037 | 3.536275182 | 13.03636364 | 8.614580412 |
| ITGB2 | 202803_s_at | 0.0328581 | 173.237037 | 66.34696763 | 143.6 | 35.00391815 |
| itih5 | 219064_at | 0.0144518 | 261.1296296 | 72.89229048 | 197.1681818 | 58.62772289 |
| Itpkb | 203723_at | 0.0260256 | 673.8074074 | 321.7699978 | 549.2090909 | 225.2387832 |
| ITPR1 | 203710_at | 0.012853 | 910.5777778 | 326.6960118 | 1091.35 | 357.077969 |
| ITSN1 | 209297_at | 0.0186173 | 159.8259259 | 94.17645301 | 241.3772727 | 106.3338047 |
| IVNS1ABP | 201362_at | 0.0301801 | 476.9333333 | 222.656448 | 509.6727273 | 215.6995004 |
| Jak2 | 205842_s_at | 0.0224333 | 77.37777778 | 24.25146044 | 100.5772727 | 31.97801226 |
| JMJD1C | 221763_at | 0.0088146 | 124.9148148 | 52.92389822 | 200.8181818 | 95.26455712 |
| KAL1 | 205206_at | 0.0179746 | 507.9851852 | 179.0595533 | 858.4590909 | 485.8238704 |
| kat5 | 214258_x_at | 0.0277607 | 559.8851852 | 184.5461245 | 464.1681818 | 155.9860323 |
| KCNB1 | 211006_s_at | 0.0142768 | 405.9703704 | 129.4818277 | 505.7090909 | 132.2100598 |
| KCND2 | 207103_at | 0.00883437 | 252.4222222 | 80.94383776 | 312.05 | 115.4295776 |
| Kcnd3 | 213832_at | 0.00284012 | 534.7222222 | 183.9606215 | 749.9772727 | 204.9635599 |
| KCNE1L | 220010_at | 0.0122423 | 96.29259259 | 46.30122881 | 57.09090909 | 37.89560735 |
| KCNJ15 | 211806_s_at | 0.0256682 | 177.2 | 55.53763797 | 166.3181818 | 73.52385189 |
| KCNK1 | 204678_s_at | 0.0207278 | 320.4185185 | 84.83515707 | 366.7772727 | 132.51719 |
| KCNQ1 | 204486_at | 0.0306919 | 7.351851852 | 4.73346274 | 12.74090909 | 13.00365 |
| kctd12 | 212192_at | 0.0094585 | 815.7666667 | 282.3498852 | 1112.895455 | 292.6525446 |
| Khdrbs1 | 201488_x_at | 0.0150436 | 586.7518519 | 96.90777285 | 700.3863636 | 173.0497074 |
| Khk | 211028_s_at | 0.00379706 | 186.8259259 | 79.57809223 | 114.9727273 | 39.5974047 |
| kiaa0174 | 200851_s_at | 0.00387288 | 944.9851852 | 123.3952988 | 773.7636364 | 179.3613181 |
| kiaa0415 | 209913_x_at | 0.0292205 | 96.42962963 | 38.97766436 | 81.16363636 | 33.04378834 |
| KIAA0427 | 204303_s_at | 0.0303099 | 378.7222222 | 136.0939673 | 299.1318182 | 112.6080704 |
| KIAA0564 | 214231_s_at | 0.00558786 | 28.74814815 | 15.8142431 | 37.50454545 | 11.8404262 |
| KIAA0564 | 212946_at | 0.0230498 | 244.6925926 | 51.78072054 | 345.5409091 | 149.3799172 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| KIAA0652 | 203364_s_at | 0.0256416 | 525.6851852 | 133.6594458 | 452.9363636 | 71.8557586 |
| KIAA0753 | 204711_at | 0.0186358 | 252.6888889 | 93.02255861 | 319.4909091 | 61.46632767 |
| KIAA0754 | 215268_at | 0.00992789 | 30.84814815 | 26.23654777 | 53.62272727 | 26.04942065 |
| KIAA0776 | 212633_at | 0.0311625 | 207.3814815 | 54.40250303 | 268.6090909 | 82.94421481 |
| kiaa0907 | 202220_at | 0.00855608 | 446.2222222 | 91.64666821 | 550.5227273 | 96.34439184 |
| KIAA0913 | 214867_at | 0.00490353 | 46.34444444 | 20.57714067 | 81.76363636 | 40.75269837 |
| KIAA0947 | 209654_at | 0.0108901 | 336.2296296 | 85.7139869 | 392.6727273 | 78.57015174 |
| KIAA1012 | 207305_s_at | 0.00365688 | 734.0037037 | 133.7040316 | 900.5909091 | 205.4951996 |
| KIAA1109 | 212779_at | 0.0325398 | 483.5740741 | 132.566963 | 611.9272727 | 192.560299 |
| KIAA1467 | 213234_at | 0.0129327 | 514.162963 | 104.4933827 | 592.8727273 | 126.5726036 |
| KIDINS220 | 212163_at | 0.00101599 | 622.2111111 | 225.3427327 | 832.0227273 | 197.3869657 |
| KIF16B | 219570_at | 0.00322179 | 71.7962963 | 22.6637033 | 90.31818182 | 20.06483862 |
| KIF25 | 207682_s_at | 0.0167171 | 12.9 | 11.44700162 | 20.95 | 14.42497008 |
| Kif3a | 213623_at | 0.0260322 | 272.8777778 | 121.0776907 | 378.5181818 | 175.5841642 |
| KIF5C | 203129_s_at | 0.0119589 | 812.4740741 | 286.4850481 | 962.9772727 | 225.2714678 |
| KIF5C | 203130_s_at | 0.00158561 | 3611.025926 | 1495.561571 | 4342.5 | 1217.712756 |
| KIT | 205051_s_at | 0.00331124 | 264.5407407 | 107.8333624 | 371.7954545 | 131.059156 |
| klf8 | 219930_at | 0.0257631 | 17.7962963 | 15.19090015 | 11.68181818 | 6.628555568 |
| KLHL3 | 221221_s_at | 0.0093163 | 513.2481481 | 171.0079943 | 579.4181818 | 115.0681439 |
| Klhl35 | 214208_at | 0.0109369 | 14.97407407 | 6.991015806 | 24.38636364 | 18.68837926 |
| KLRD1 | 207795_s_at | 0.00796495 | 24.4037037 | 14.38921823 | 37.26818182 | 25.23203531 |
| kpna3 | 221502_at | 0.000634535 | 624.862963 | 126.4675731 | 833.1454545 | 197.8440818 |
| Kras | 204009_s_at | 3.55599E-05 | 556.6037037 | 159.5958923 | 755.5181818 | 162.5478146 |
| Kras | 214352_s_at | 0.00249354 | 901.5259259 | 299.0080737 | 1169.55 | 287.9096663 |
| KRR1 | 203202_at | 0.0267319 | 248.8481481 | 142.2642838 | 302.6363636 | 94.64657338 |
| krt24 | 220267_at | 0.0333049 | 40.65925926 | 16.26871134 | 37 | 24.10249938 |
| lamb2 | 216264_s_at | 0.0194587 | 211.5851852 | 49.87521123 | 169.3954545 | 45.51457618 |
| LAMC3 | 219407_s_at | 0.0305093 | 104.5851852 | 35.57520424 | 81.15454545 | 51.91058913 |
| lamp1 | 201553_s_at | 0.0324092 | 5897.374074 | 2892.819965 | 4138.259091 | 1621.14995 |
| LAPTM5 | 201721_s_at | 0.0119984 | 738.9 | 454.2946172 | 490.8954545 | 194.4140047 |
| LASS4 | 218922_s_at | 0.00673474 | 116.4814815 | 63.51044152 | 62.65 | 49.24801906 |
| LASS6 | 212442_s_at | 0.0110142 | 576.2444444 | 164.9074667 | 644.4090909 | 152.7681028 |
| LAT2 | 221581_s_at | 0.00682436 | 78.42592593 | 40.87693155 | 47.75454545 | 26.67113166 |
| Lbx1 | 208380_at | 0.0197061 | 3.422222222 | 2.135115442 | 2.95 | 1.865667249 |
| Ldlr | 202067_s_at | 0.0259326 | 7.703703704 | 2.583748243 | 9.936363636 | 5.393695213 |
| LEMD3 | 218604_at | 0.0122762 | 397.6481481 | 85.90959636 | 504.4181818 | 148.364996 |
| LEPROTL1 | 202594_at | 0.00481491 | 747.7518519 | 126.0911708 | 869.1136364 | 184.846068 |
| LGALS1 | 201105_at | 0.00545535 | 1245.3 | 606.7922341 | 891.8181818 | 633.7377132 |
| lgi1 | 206349_at | 0.00254855 | 840.6666667 | 275.9293945 | 1108.018182 | 263.4899486 |
| Lhb | 214471_x_at | 0.0243642 | 179.0888889 | 103.2794206 | 220.4409091 | 76.51139759 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| LILRA1 | 207872_s_at | 0.0198435 | 37.16666667 | 24.52577922 | 28.05909091 | 22.08077507 |
| LIN37 | 213526_s_at | 0.00466969 | 217.1703704 | 55.04317057 | 172.0545455 | 43.43845923 |
| Lin7b | 219760_at | 0.0173073 | 600.237037 | 172.1562509 | 448.3136364 | 165.3201895 |
| LIPF | 206334_at | 0.0318756 | 26.83703704 | 23.07087988 | 20.51818182 | 14.83745699 |
| Llgl1 | 206123_at | 0.0207515 | 60.76296296 | 35.80676932 | 39.74545455 | 26.62082477 |
| Lman2 | 200805_at | 0.00542854 | 241.1185185 | 56.4262012 | 189.2 | 38.46610134 |
| LMF1 | 46142_at | 0.0155256 | 219.7777778 | 70.39680573 | 165.0363636 | 59.26300979 |
| lmf2 | 31837_at | 0.0285315 | 328.4888889 | 70.19405702 | 274.9318182 | 92.42185572 |
| lmna | 212086_x_at | 0.00784913 | 248.0074074 | 84.59792653 | 214.2454545 | 81.71499092 |
| LMNB1 | 203276_at | 0.0268559 | 33.39259259 | 22.58832111 | 49.64545455 | 25.73168747 |
| LMO3 | 204424_s_at | 0.0162162 | 5190.7 | 1711.256288 | 5741.604545 | 1479.981905 |
| Lmo4 | 209205_s_at | 0.00911317 | 515.5703704 | 190.2001311 | 648.2863636 | 234.8628116 |
| LOC100127998 | 220405_at | 0.0278293 | 219.8148148 | 96.8028079 | 276.7318182 | 78.45233546 |
| LOC100128836 | 213356_x_at | 0.0118404 | 6488.388889 | 1530.254556 | 6877.804545 | 1623.819648 |
| LOC100130401 | 220612_at | 0.026202 | 92.2 | 29.04390576 | 120.6681818 | 44.24915804 |
| LOC220594 | 213510_x_at | 0.00229422 | 434.6037037 | 121.4545768 | 626.7363636 | 205.9434054 |
| LOC257152 | 215302_at | 0.0133518 | 53.4962963 | 28.88997007 | 50.56363636 | 22.08474038 |
| LOC284244 | 214162_at | 0.00531684 | 24.55185185 | 18.356038 | 38.23181818 | 22.73963157 |
| LOC441347 | 214949_at | 0.00350549 | 178.5481481 | 59.0990913 | 250.7818182 | 96.23411254 |
| LOC442497 | 200924_s_at | 0.000546145 | 354.7185185 | 103.3078485 | 286.2954545 | 75.48125265 |
| lonp1 | 209017_s_at | 0.0103724 | 618.7333333 | 159.4331859 | 477.1136364 | 188.8097109 |
| LONP2 | 221834_at | 0.0225909 | 270.7888889 | 118.7326581 | 366.2772727 | 148.287205 |
| Lpcat3 | 202793_at | 0.000480101 | 31.32592593 | 15.41075031 | 18.37272727 | 8.345468221 |
| LPHN2 | 206953_s_at | 0.000531591 | 132.8592593 | 32.08038293 | 189.4136364 | 47.41348307 |
| Lpl | 203548_s_at | 0.0286321 | 872.4111111 | 366.5692603 | 1218.795455 | 707.1670763 |
| Lpl | 203549_s_at | 0.0250384 | 2044.051852 | 1166.239717 | 2510.586364 | 1028.302077 |
| Lppr1 | 219732_at | 0.000628431 | 884.8444444 | 208.5927894 | 1182.136364 | 336.7307933 |
| LRCH4 | 90610_at | 0.0151351 | 277.8111111 | 102.1092376 | 230.25 | 76.84822859 |
| LRP12 | 220253_s_at | 0.0237214 | 59.07777778 | 25.10034222 | 105.2863636 | 76.16299749 |
| LRP6 | 205606_at | 0.0091809 | 102.0074074 | 67.22042344 | 183.4590909 | 95.39456238 |
| LRP8 | 205282_at | 0.0130056 | 106.4703704 | 25.80531869 | 140.6818182 | 39.69831034 |
| lrpprc | 211615_s_at | 0.00769137 | 608.1666667 | 128.3467629 | 688.2772727 | 199.7121284 |
| LRRC49 | 219338_s_at | 0.0322348 | 369.1111111 | 152.9664175 | 420.1363636 | 110.8188679 |
| LRRC8B | 212978_at | 0.00445457 | 271.7740741 | 57.28818909 | 317.6272727 | 66.43715385 |
| LRRC8B | 212976_at | 0.0199415 | 176.3185185 | 72.85890494 | 204.1272727 | 76.61589529 |
| LRRN2 | 216164_at | 0.0153405 | 178.9592593 | 39.32460826 | 152.1 | 69.36843663 |
| lrrn3 | 209840_s_at | 0.00413842 | 600.762963 | 177.4070204 | 772.9681818 | 162.8376942 |
| lrrn3 | 209841_s_at | 0.0101944 | 994.5814815 | 260.5337289 | 1274.986364 | 275.5670367 |
| Lrrtm2 | 206408_at | 0.00010373 | 836.1185185 | 345.4680694 | 1215.345455 | 331.1292033 |
| LRRTM4 | 220345_at | 0.00783258 | 89.15925926 | 27.99362921 | 123.1818182 | 36.62232778 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| lsm14a | 222099_s_at | 0.0149876 | 401.9740741 | 101.4200579 | 444.3727273 | 66.69545699 |
| LSM2 | 209449_at | 0.00187465 | 208.5037037 | 69.18854108 | 177.9318182 | 42.69165622 |
| LSM4 | 202736_s_at | 0.0141128 | 449.6333333 | 221.5750281 | 346.8590909 | 139.8615494 |
| LSM4 | 202737_s_at | 0.00306566 | 946.0259259 | 241.6065088 | 727.9090909 | 227.5136478 |
| lsm7 | 204559_s_at | 0.0236497 | 504.4814815 | 118.814118 | 429.8227273 | 113.3309227 |
| lsr | 208190_s_at | 0.00353717 | 32.91111111 | 23.05185348 | 14.72272727 | 11.32380265 |
| LSS | 211018_at | 0.0184412 | 49.43703704 | 20.17022078 | 35.16818182 | 21.93875428 |
| LTB4R | 216388_s_at | 0.0304477 | 44.66666667 | 35.19164018 | 68.94545455 | 37.61387443 |
| LTF | 202018_s_at | 0.0011797 | 11.14444444 | 4.707141329 | 9.15 | 4.672487866 |
| LUZP1 | 221831_at | 0.0139487 | 176.1481481 | 84.41863798 | 225.2681818 | 76.15356282 |
| Luzp2 | 215323_at | 0.0194863 | 92.08888889 | 48.53352793 | 151.7954545 | 75.39088916 |
| LY96 | 206584_at | 0.0269219 | 62.79259259 | 36.07197853 | 52.40909091 | 34.00425616 |
| LYN | 210754_s_at | 0.00387816 | 86.93333333 | 26.05035065 | 72.90909091 | 30.51026227 |
| LYN | 202625_at | 0.0299683 | 42.44074074 | 22.4132217 | 35.05 | 14.78412115 |
| LYPD3 | 204952_at | 0.00181451 | 27.18518519 | 13.33081173 | 21.25 | 6.771772645 |
| LYST | 203518_at | 0.00783448 | 158.5851852 | 52.07995852 | 220.0181818 | 82.56357802 |
| LYVE1 | 219059_s_at | 0.0186247 | 73.90740741 | 49.28148292 | 46.68181818 | 38.98938361 |
| lzts1 | 221722_x_at | 0.0138174 | 7.440740741 | 5.876763844 | 5.690909091 | 3.703011527 |
| MAD1L1 | 204857_at | 0.00144244 | 138.9185185 | 71.45123693 | 91.05 | 40.00798432 |
| Mag | 216617_s_at | 0.0253368 | 427.2925926 | 293.8231806 | 243.6545455 | 150.0109511 |
| MALT1 | 208309_s_at | 0.00790049 | 12.52222222 | 9.032221523 | 8.436363636 | 4.013019936 |
| MAMLD1 | 205088_at | 0.000305986 | 198.0444444 | 39.80738561 | 251.5681818 | 38.87725968 |
| MAN1A1 | 221760_at | 0.00225008 | 664.9037037 | 253.0865092 | 978.4727273 | 344.4956606 |
| MAN1A2 | 217922_at | 0.000109243 | 739.7851852 | 245.9607109 | 1028.190909 | 189.3073915 |
| Man1b1 | 65884_at | 0.00115524 | 298.1592593 | 67.98185991 | 230.1045455 | 55.59706636 |
| Man1b1 | 218636_s_at | 0.0321028 | 272.9259259 | 114.1268646 | 187.7181818 | 75.21334504 |
| MAP2K4 | 203266_s_at | 0.00289262 | 445.2814815 | 112.5375973 | 547.2318182 | 119.7569896 |
| MAP3K7 | 206853_s_at | 0.0183143 | 291.9444444 | 81.61268441 | 365.9454545 | 117.8577744 |
| MAP4 | 243_g_at | 0.00501431 | 769.3703704 | 317.5963304 | 524.0909091 | 140.4534728 |
| MAP4 | 212567_s_at | 0.0267481 | 743.3814815 | 307.7136544 | 558.8772727 | 229.9417544 |
| MAP4 | 33850_at | 0.0213182 | 589.1296296 | 263.9529384 | 415.0909091 | 174.8443087 |
| map4k3 | 218311_at | 0.028282 | 84.14074074 | 28.4192007 | 115.5227273 | 37.63349486 |
| MAPK12 | 206106_at | 0.0176649 | 193.5962963 | 60.81327968 | 152.4227273 | 49.13955764 |
| MAPK1IP1L | 212643_at | 0.0134377 | 1193.244444 | 311.402646 | 1412.327273 | 276.5902542 |
| MAPK4 | 204707_s_at | 0.0162311 | 56.58518519 | 26.34678062 | 49.72727273 | 23.32266794 |
| MAPKAPK5 | 212871_at | 0.0177362 | 87.97037037 | 33.92718237 | 101.1909091 | 28.06287005 |
| MARCKS | 201670_s_at | 0.00652283 | 623.1444444 | 202.1620073 | 876.0545455 | 268.5450813 |
| MARK1 | 221047_s_at | 0.00268172 | 217.0481481 | 39.43224345 | 273.8863636 | 74.05919959 |
| masp1 | 213749_at | 0.00759258 | 63.33703704 | 48.24689028 | 39.83181818 | 31.99942539 |
| mat1a | 205813_s_at | 0.0208354 | 11.72222222 | 4.213379179 | 9.827272727 | 4.584153016 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| matK | 206267_s_at | 0.00775356 | 254.4740741 | 70.15587366 | 193.6954545 | 56.90930527 |
| MATR3 | 200626_s_at | 0.0270047 | 1561.840741 | 559.6755862 | 1947.090909 | 540.1925591 |
| MAX | 209332_s_at | 0.0283614 | 1098.018519 | 200.8823039 | 965.3545455 | 164.0095547 |
| MBD3 | 41160_at | 0.0109025 | 909.2185185 | 369.0907935 | 679.9090909 | 143.1866711 |
| Mbnl1 | 201152_s_at | 0.00438623 | 564.1444444 | 155.2027665 | 803.1454545 | 307.1236244 |
| Mbnl1 | 201153_s_at | 0.0129767 | 465.3296296 | 131.9101 | 618.9772727 | 168.4969971 |
| Mboat2 | 213288_at | 0.0126961 | 381.4666667 | 110.2853676 | 483.2227273 | 110.0845603 |
| MBP | 216567_at | 0.021563 | 5.266666667 | 2.561399858 | 4.1 | 1.304570719 |
| MCM3APAS | 220459_at | 0.0186614 | 68.9037037 | 29.48066487 | 91.05454545 | 32.73976361 |
| Mcm5 | 216237_s_at | 0.00408545 | 45.34814815 | 32.73758567 | 15.57727273 | 6.672896981 |
| mcoln1 | 219952_s_at | 0.00743378 | 128.9111111 | 87.29707605 | 78.24090909 | 54.25168559 |
| MCTP1 | 220122_at | 0.00133426 | 246.4259259 | 129.1777684 | 651.3772727 | 535.0833108 |
| MCTS1 | 218163_at | 0.0312418 | 401.2074074 | 100.786606 | 426.5545455 | 138.8589134 |
| Mdk | 209035_at | 0.0249072 | 71.34074074 | 30.57333251 | 56.46818182 | 24.18687929 |
| ME1 | 204059_s_at | 0.0254257 | 501.2444444 | 95.98351354 | 640.2818182 | 188.9308557 |
| mecp2 | 202617_s_at | 0.00928481 | 149.8111111 | 54.33995791 | 195.5545455 | 48.9134194 |
| MED13 | 201986_at | 0.0316463 | 232.937037 | 53.7435946 | 298.2136364 | 88.33284616 |
| Med13l | 212209_at | 0.0123103 | 250.837037 | 92.49649951 | 329.7681818 | 104.7967802 |
| med18 | 221650_s_at | 0.0102739 | 98.73333333 | 43.02632468 | 74.99090909 | 40.57849429 |
| MED23 | 218846_at | 0.0319116 | 143.7851852 | 38.29033523 | 166.8227273 | 47.56077748 |
| med4 | 217843_s_at | 0.0232938 | 97.52222222 | 29.90257685 | 128.5818182 | 34.48982785 |
| Med7 | 204349_at | 0.0185169 | 146.8666667 | 68.98584024 | 97.68181818 | 34.02812053 |
| MEF2A | 212535_at | 0.00739622 | 618.1962963 | 133.2180788 | 754.0909091 | 181.4328314 |
| MEF2C | 209199_s_at | 0.015413 | 241.8222222 | 70.6084781 | 314.3954545 | 100.6226448 |
| MEF2C | 209200_at | 0.000759155 | 273.4037037 | 91.48482212 | 380.2863636 | 99.35132609 |
| Meis2 | 207480_s_at | 0.00825626 | 2407.488889 | 752.9868194 | 2983.709091 | 627.3177838 |
| mest | 202016_at | 0.0211948 | 354.6777778 | 100.5729713 | 452.4681818 | 106.3325349 |
| metap2 | 213899_at | 0.00106687 | 39.23703704 | 14.67006759 | 56.05 | 17.59203689 |
| METTL13 | 212407_at | 0.0270682 | 235.8074074 | 45.44788161 | 199.2590909 | 38.57274709 |
| MFNG | 204153_s_at | 0.020597 | 118.0037037 | 39.04658442 | 99.20909091 | 38.07518763 |
| mfsd5 | 212861_at | 0.0325104 | 286.8925926 | 45.55963063 | 260.9772727 | 51.03792177 |
| MFSD6 | 219858_s_at | 0.0313959 | 40.35925926 | 14.73050888 | 52.01818182 | 18.20459482 |
| MGA | 212945_s_at | 0.00045475 | 69.94444444 | 32.57685981 | 110.4454545 | 35.89326409 |
| MGAT4C | 207447_s_at | 0.00494801 | 55.52592593 | 18.19238202 | 83.90909091 | 38.03831288 |
| MIA3 | 212310_at | 0.0109613 | 268.0518519 | 78.49398003 | 341.0681818 | 96.07658843 |
| MINA | 213189_at | 0.0270355 | 198.1925926 | 66.15773067 | 244.8272727 | 84.81595302 |
| MKI67 | 212021_s_at | 0.0011872 | 110.037037 | 34.75483528 | 81.79090909 | 29.4639232 |
| MKI67 | 212023_s_at | 0.0135367 | 54.4 | 25.85579834 | 36.36363636 | 25.06252268 |
| MKKS | 218138_at | 0.027233 | 521.4592593 | 105.5668591 | 566.5 | 112.4190714 |
| MKRN1 | 209845_at | 0.00369483 | 534.0814815 | 154.4627663 | 655.5318182 | 171.175475 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| MLLT3 | 204917_s_at | 0.000483566 | 193.4888889 | 53.53842857 | 282.75 | 84.9403362 |
| MLST8 | 220587_s_at | 0.0157768 | 380.9 | 111.0358362 | 290.7363636 | 110.7723128 |
| Mmp28 | 219909_at | 0.00352596 | 86.87407407 | 48.35755921 | 58.37727273 | 29.97516324 |
| Mnat1 | 203565_s_at | 0.000137528 | 83.55185185 | 52.73736356 | 134.7045455 | 39.72786568 |
| Moap1 | 212508_at | 0.0196982 | 1936.311111 | 460.5236771 | 2100.222727 | 480.9296018 |
| MOBKL3 | 202919_at | 0.00952192 | 630.0962963 | 167.2018276 | 829.6 | 271.3237655 |
| Mocs1 | 211673_s_at | 0.0174711 | 110.1962963 | 44.57199432 | 88.35909091 | 30.29195491 |
| Mocs1 | 213181_s_at | 0.0284509 | 51.68518519 | 28.28103066 | 37.35454545 | 21.12522138 |
| MOCS2 | 218212_s_at | 0.00349281 | 223.4 | 71.41462358 | 312.8181818 | 134.2930968 |
| MON2 | 212755_at | 0.00766647 | 16.43333333 | 11.31316456 | 26.42272727 | 15.71208003 |
| mpg | 203686_at | 0.0294647 | 305.2703704 | 78.33139568 | 258.6454545 | 72.55557953 |
| MPHOSPH9 | 215731_s_at | 0.0153868 | 106.1 | 64.86673914 | 118.9590909 | 42.60048803 |
| MPHOSPH9 | 221965_at | 0.0015147 | 186.1814815 | 38.17299727 | 239.9409091 | 50.83824637 |
| mpl | 207550_at | 0.031009 | 19.61481481 | 17.59691196 | 10.15909091 | 8.928587532 |
| MPPE1 | 214071_at | 0.00417736 | 1909.351852 | 554.489421 | 2450.686364 | 609.6296513 |
| MPPED2 | 205413_at | 0.0146102 | 390.9444444 | 116.7651862 | 489.2272727 | 155.2927594 |
| Mpst | 203524_s_at | 0.00118777 | 387.8037037 | 101.5812387 | 275.05 | 98.45279144 |
| MRM1 | 219967_at | 0.0267418 | 80.06296296 | 24.88333004 | 61.05454545 | 28.42768147 |
| Mrpl24 | 218270_at | 0.001717 | 660.2296296 | 196.765518 | 502.85 | 128.5674577 |
| mrpl28 | 204599_s_at | 0.01228 | 666.937037 | 146.4098913 | 525.8181818 | 153.02446 |
| Mrpl3 | 208787_at | 0.0182792 | 487.9555556 | 180.2583559 | 627.8590909 | 184.3932177 |
| MRPS11P1 | 217386_at | 0.00775714 | 42.75555556 | 20.76013809 | 38.75909091 | 35.89538582 |
| mRpS12 | 204331_s_at | 0.00798643 | 284.5481481 | 149.2261278 | 213.7954545 | 62.32498908 |
| mrps18a | 218385_at | 0.00852943 | 418.0925926 | 187.474991 | 282.2636364 | 122.4591926 |
| MRPS2 | 218001_at | 0.00180614 | 271.1962963 | 57.86137599 | 199.3954545 | 53.71898199 |
| MRPS34 | 218112_at | 0.00372163 | 247.5592593 | 77.37936646 | 191.1454545 | 58.59530883 |
| MRPS7 | 217932_at | 0.019728 | 403.8 | 114.8369513 | 336.8 | 108.9996898 |
| mrto4 | 220688_s_at | 0.0332379 | 282.6185185 | 75.99502027 | 218.7590909 | 91.65575689 |
| msh3 | 210947_s_at | 0.0270298 | 109.3481481 | 28.70438683 | 130.9318182 | 30.69286231 |
| Msl1 | 212708_at | 0.0285451 | 622.1148148 | 157.6690538 | 739.3772727 | 212.4517692 |
| Mst4 | 218499_at | 0.00268942 | 137.0814815 | 53.38727187 | 203.15 | 74.33103402 |
| MT1F | 210524_x_at | 0.00997164 | 1199.933333 | 502.8743382 | 1044.290909 | 365.3104484 |
| MT1F | 213629_x_at | 0.0101016 | 1720.977778 | 711.1488875 | 1492.418182 | 581.06632 |
| MT1F | 217165_x_at | 0.0320051 | 1355.744444 | 910.7122886 | 1159.604545 | 637.5540145 |
| MT1G | 204745_x_at | 0.00755937 | 1624.140741 | 699.8649278 | 1366.709091 | 558.8982673 |
| MT1H | 206461_x_at | 0.00702458 | 2858.644444 | 1263.144082 | 2424.872727 | 1049.841766 |
| MT1X | 204326_x_at | 0.0204046 | 2181.337037 | 1699.802108 | 1749.331818 | 1135.343001 |
| MT1X | 208581_x_at | 0.0320482 | 3644.903704 | 2003.696675 | 3213.040909 | 1473.468335 |
| MT3 | 205970_at | 0.0127675 | 6353.27037 | 1355.519882 | 5140.368182 | 1902.231473 |
| MTDH | 212248_at | 0.00129158 | 343.6 | 81.33171867 | 444.4318182 | 108.1533981 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| MTF2 | 209705_at | 0.00752646 | 337.9555556 | 96.21729148 | 456.6136364 | 138.7180673 |
| mtg1 | 212767_at | 0.0261828 | 141.9333333 | 54.09195874 | 95.06363636 | 46.56409352 |
| mtmr3 | 202198_s_at | 0.0153104 | 76.13333333 | 44.00057692 | 59.46818182 | 30.58946888 |
| mtmr3 | 211507_s_at | 0.0316295 | 20.0037037 | 18.08683077 | 15.02727273 | 8.274929539 |
| Mtus2 | 214961_at | 0.0012307 | 57.65925926 | 32.03170616 | 79.74090909 | 29.13343128 |
| MTX2 | 203517_at | 0.00078689 | 261.0962963 | 76.71271323 | 331.3954545 | 84.73175869 |
| MUC4 | 204895_x_at | 0.00362958 | 16.33703704 | 15.31713842 | 9.581818182 | 3.834509513 |
| mudeng | 218139_s_at | 0.01749 | 356.3962963 | 84.17323017 | 462.9636364 | 145.5839982 |
| MUL1 | 218246_at | 0.00232526 | 251.7666667 | 49.78189353 | 202.1363636 | 43.85982591 |
| mybbp1a | 219098_at | 0.0136317 | 304.8777778 | 62.13261458 | 236.6227273 | 65.37556651 |
| MYBPC1 | 214087_s_at | 0.00534914 | 549.6222222 | 249.3013782 | 444.7909091 | 159.3242633 |
| MYBPC3 | 208040_s_at | 0.0257052 | 52.62222222 | 28.88418962 | 39.22272727 | 19.64297843 |
| MYCBP2 | 201960_s_at | 0.0115605 | 2472.622222 | 1297.091594 | 2620.922727 | 914.1951094 |
| MYCBP2 | 201959_s_at | 0.0303808 | 658.4296296 | 205.5611734 | 713.7090909 | 175.8860966 |
| MYF6 | 206372_at | 0.033408 | 23.16666667 | 23.7942624 | 43.22272727 | 31.11923202 |
| myh10 | 212372_at | 0.00324402 | 1084.818519 | 414.2788498 | 1475.768182 | 518.0168773 |
| MYH8 | 206717_at | 0.0162164 | 29.37037037 | 19.21979778 | 19.63636364 | 14.15511166 |
| MYH8 | 34471_at | 0.0182134 | 21.68148148 | 14.92981109 | 37.98181818 | 24.63506282 |
| MYL6B | 212082_s_at | 0.00205945 | 3893.533333 | 1067.590592 | 2744.813636 | 977.7425288 |
| MYLK | 202555_s_at | 0.029287 | 303.8 | 102.6738376 | 227.1409091 | 78.46104074 |
| MYO5A | 204527_at | 0.0245532 | 157.5 | 28.33075252 | 190.2227273 | 41.91626496 |
| MYST4 | 212462_at | 0.0268172 | 256.8296296 | 75.51645676 | 320.3954545 | 73.52098163 |
| MYST4 | 214496_x_at | 0.0258786 | 208.3222222 | 45.81430188 | 272.3 | 97.15249672 |
| MYT1L | 210016_at | 0.00534352 | 1820.333333 | 697.9613688 | 2383.354545 | 662.5065892 |
| N4BP2L1 | 213375_s_at | 0.0108905 | 418.6296296 | 140.3895372 | 549.5045455 | 180.3930378 |
| N4BP2L2 | 202259_s_at | 0.0125489 | 156.6222222 | 55.3234568 | 206.7454545 | 56.06471369 |
| NAA10 | 203025_at | 0.00250034 | 379.2222222 | 99.53184776 | 275.4863636 | 75.96274961 |
| naa15 | 219158_s_at | 0.02078 | 116.962963 | 29.29685134 | 146.3318182 | 40.56124571 |
| naa50 | 217745_s_at | 0.0136827 | 382.237037 | 132.9906103 | 443.65 | 126.5403145 |
| NAAA | 215178_x_at | 0.0323094 | 170.3851852 | 47.04757579 | 148.0136364 | 64.45145309 |
| NACA2 | 222018_at | 0.0305259 | 49.65185185 | 30.48462879 | 68.22727273 | 25.89624319 |
| Nae1 | 202268_s_at | 0.0188153 | 441.3851852 | 125.2866213 | 523.8227273 | 119.0313201 |
| nagA | 202943_s_at | 0.0270023 | 217.2592593 | 45.09026212 | 212.0045455 | 72.54877819 |
| NAMPT | 217738_at | 0.0123789 | 210.0851852 | 80.31135423 | 299.2090909 | 109.6734673 |
| NANS | 218189_s_at | 0.0274755 | 272.7148148 | 61.4535954 | 212.3136364 | 50.15393728 |
| NAP1L1 | 212967_x_at | 0.0152149 | 2262.177778 | 708.9503456 | 2519.836364 | 659.3398188 |
| NAP1L1 | 208752_x_at | 0.0244715 | 2418.707407 | 692.020526 | 2648.263636 | 642.9279805 |
| NAP1L2 | 219368_at | 0.0058633 | 700.5851852 | 181.0021944 | 885.9 | 290.4456412 |
| nap1l4 | 201414_s_at | 0.0142833 | 597.9962963 | 161.8449055 | 523.5636364 | 76.11755661 |
| Nars | 200027_at | 0.00601558 | 1909.4 | 422.4594828 | 2246.086364 | 466.7928186 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| Nat9 | 204382_at | 0.0198767 | 208.9111111 | 52.56117559 | 179.4727273 | 40.19931511 |
| NAV3 | 204823_at | 0.0029929 | 399.8444444 | 97.0417687 | 508.35 | 119.6141286 |
| NBEA | 221207_s_at | 0.017819 | 628.2296296 | 299.3053584 | 739.5818182 | 302.8930593 |
| Nbl1 | 37005_at | 0.0270619 | 1395.014815 | 367.8448667 | 1094.227273 | 316.3514459 |
| NBN | 202907_s_at | 0.0237531 | 437.6407407 | 110.5725006 | 551.5636364 | 141.9277299 |
| NBPF1 | 213612_x_at | 0.0252434 | 1418.181481 | 570.3570056 | 1807.604545 | 262.7932149 |
| NBPF8 | 201103_x_at | 0.00781884 | 1150.937037 | 480.9664598 | 1564.909091 | 310.5769606 |
| Ncam1 | 217359_s_at | 0.0252565 | 229.6592593 | 93.10660251 | 179.1090909 | 83.45512001 |
| ncapd3 | 212789_at | 0.00749314 | 58.91851852 | 20.75520393 | 75.18181818 | 19.63584275 |
| ncaph2 | 205086_s_at | 0.0261064 | 150.8962963 | 43.46716251 | 111.4545455 | 41.34085639 |
| ncf1 | 214084_x_at | 0.0305583 | 15.77777778 | 11.44597119 | 10.31818182 | 5.526010906 |
| ncl | 200610_s_at | 0.0237478 | 1695.081481 | 535.5642941 | 1403.840909 | 438.4870956 |
| NCOA1 | 209106_at | 0.00278102 | 718.9851852 | 196.108174 | 932.2136364 | 279.5563378 |
| NCOA1 | 210249_s_at | 0.0279886 | 406.2407407 | 64.72172539 | 480.1454545 | 95.22282003 |
| NCOA3 | 211352_s_at | 0.000711752 | 6.066666667 | 3.218336885 | 12.27727273 | 7.093587434 |
| NCOR1 | 200854_at | 0.0044064 | 370.6592593 | 83.17678698 | 465.2272727 | 85.73880147 |
| Ncr1 | 217088_s_at | 0.0289044 | 17.64074074 | 17.22456339 | 11.83636364 | 10.18339196 |
| ndp | 206022_at | 0.012708 | 382.1814815 | 104.2156567 | 324.2136364 | 66.63396314 |
| Ndrg2 | 206453_s_at | 0.00727242 | 5699.422222 | 1465.594389 | 4397.963636 | 1584.630018 |
| NDRG3 | 221082_s_at | 0.0014794 | 340.037037 | 92.29127031 | 259.0318182 | 46.75086336 |
| Ndufa13 | 220864_s_at | 0.0263245 | 4369.422222 | 1593.729411 | 3178.177273 | 1288.280411 |
| Ndufb7 | 202839_s_at | 0.00830398 | 597.6518519 | 213.8378616 | 414.4181818 | 171.7268724 |
| NDUFS6 | 203606_at | 0.0316107 | 1738.066667 | 614.8066306 | 1228.795455 | 492.9918733 |
| NDUFS7 | 211752_s_at | 0.0200295 | 1020.837037 | 337.5049357 | 773.2681818 | 212.0876108 |
| Ndufs8 | 203190_at | 0.00426607 | 1702.155556 | 519.3160475 | 1221.809091 | 349.0025991 |
| Ndufv1 | 208714_at | 0.00704187 | 2303.818519 | 665.9827966 | 1589.068182 | 581.94297 |
| NECAB3 | 210720_s_at | 0.00351736 | 303.6777778 | 57.11141832 | 263.3045455 | 56.99974501 |
| NECAP2 | 220731_s_at | 0.00267525 | 196.9925926 | 41.48733751 | 166.5 | 39.00828972 |
| nek1 | 213331_s_at | 0.0128023 | 184.7444444 | 50.6675312 | 239.6863636 | 76.57330316 |
| NENF | 218406_x_at | 0.0248874 | 127.4851852 | 52.41102867 | 100.1818182 | 64.10873677 |
| NETO2 | 218888_s_at | 0.00148953 | 579.8037037 | 230.9257964 | 866.1909091 | 314.754114 |
| Neu1 | 208926_at | 0.0160723 | 191.4851852 | 80.96479626 | 155.3954545 | 50.07560453 |
| NF1 | 212678_at | 0.0214496 | 165.3481481 | 68.46779912 | 229.0681818 | 85.41454313 |
| NFAT5 | 208003_s_at | 0.00676358 | 367.9555556 | 111.64608 | 525.5772727 | 217.8120442 |
| NFKBIB | 214062_x_at | 0.00838013 | 34.87407407 | 24.10430208 | 23.68181818 | 16.36289753 |
| NFYB | 218128_at | 0.00623552 | 69.73703704 | 20.93282568 | 98.90454545 | 36.49553759 |
| NFYB | 218127_at | 0.0236719 | 494.4555556 | 143.3724315 | 579.9227273 | 142.9052631 |
| Ngfr | 205858_at | 0.0171769 | 27.69259259 | 19.71884936 | 17.23636364 | 9.865598983 |
| NHP2L1 | 201076_at | 0.0235461 | 1182.196296 | 234.2313673 | 884.1727273 | 310.9519718 |
| nipbl | 213918_s_at | 0.0060853 | 83.84074074 | 37.84092473 | 112.3454545 | 27.10959639 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| NKAIN1 | 219438_at | 0.0117389 | 217.6259259 | 60.11390849 | 162.3863636 | 57.61898906 |
| Nkiras2 | 222105_s_at | 0.0161633 | 161.7185185 | 59.63210311 | 122.1545455 | 50.75906419 |
| NKRF | 205004_at | 0.0265833 | 330.3518519 | 58.21064779 | 363.1636364 | 66.21460453 |
| NKTR | 202380_s_at | 0.0284952 | 143.5925926 | 67.68729529 | 197.9136364 | 51.97939423 |
| nlgn1 | 205893_at | 0.00132289 | 160.8444444 | 36.97237361 | 221.7272727 | 68.6637853 |
| NLGN4X | 221933_at | 0.0156731 | 308.3888889 | 164.155989 | 501.6454545 | 278.0373985 |
| NLRP2 | 221690_s_at | 0.0188628 | 59.75925926 | 37.169914 | 83.54545455 | 48.86561482 |
| Nme1 | 201268_at | 0.00586983 | 2079.22963 | 533.3835738 | 1572.527273 | 404.7202869 |
| NME7 | 216070_at | 0.0040344 | 23.63333333 | 15.27967479 | 42.75454545 | 19.53989149 |
| NMT1 | 201157_s_at | 0.00950116 | 243.3666667 | 48.02858924 | 203.4954545 | 47.85937215 |
| NMT2 | 215743_at | 0.0140372 | 88.6037037 | 34.66784679 | 124.1954545 | 42.89695824 |
| NMUR1 | 221383_at | 0.00739087 | 14.67407407 | 17.59599151 | 9.040909091 | 7.131797282 |
| noc2l | 202115_s_at | 0.000408836 | 238.4333333 | 38.64362819 | 186.9272727 | 52.57698376 |
| Noc4l | 218860_at | 0.032703 | 126.6037037 | 58.80371836 | 74.94545455 | 51.71186405 |
| Nol4 | 206045_s_at | 0.000996062 | 98.01111111 | 27.88000846 | 130.4681818 | 32.05384438 |
| NOL8 | 218244_at | 0.00431369 | 93.4 | 46.28617504 | 117.0181818 | 43.92161455 |
| Nomo1 | 221853_s_at | 0.0213227 | 1795.381481 | 734.7033933 | 1383.431818 | 566.6234043 |
| nosip | 217950_at | 0.00782822 | 691.6222222 | 243.1099298 | 463.8772727 | 180.7511863 |
| NOX3 | 221089_at | 0.0159956 | 7.125925926 | 7.967269226 | 4.004545455 | 1.780175827 |
| NPAS2 | 213462_at | 0.00967169 | 461.6777778 | 120.4830608 | 578.7136364 | 151.5812254 |
| Nploc4 | 217796_s_at | 0.0330292 | 513.7185185 | 112.3092949 | 442.4772727 | 79.52528159 |
| NPPA | 209957_s_at | 0.0153401 | 165.1259259 | 59.85239275 | 212.1590909 | 103.9356424 |
| NPRL3 | 214273_x_at | 0.00343058 | 320.5259259 | 92.53590818 | 261.8090909 | 77.70801827 |
| NPY | 206001_at | 0.00170038 | 1454.974074 | 468.0301968 | 1768.209091 | 500.3834938 |
| Npy1r | 205440_s_at | 0.000981546 | 143.3444444 | 36.40422982 | 205.05 | 58.59031084 |
| NQO2 | 203814_s_at | 0.0225766 | 267.1703704 | 78.74450806 | 199.3363636 | 98.13652563 |
| NR1D2 | 209750_at | 0.00816493 | 288.3333333 | 93.36505276 | 417.4090909 | 146.1135009 |
| NR1H3 | 203920_at | 0.0175212 | 222.7777778 | 53.21730729 | 178.7681818 | 53.65180853 |
| NR3C1 | 216321_s_at | 0.0312343 | 561.9259259 | 211.0794247 | 636.4954545 | 169.3807362 |
| NR3C2 | 205259_at | 0.00816716 | 253.3111111 | 73.68063274 | 342.7681818 | 112.4575577 |
| nrbf2 | 221803_s_at | 0.0108624 | 50.55555556 | 22.8450017 | 65.39090909 | 20.0814036 |
| NRIP1 | 202599_s_at | 0.000996849 | 330.7888889 | 83.60516792 | 470.2681818 | 124.7130703 |
| NRIP1 | 202600_s_at | 0.00871199 | 189.4592593 | 65.14953367 | 282.7727273 | 105.195189 |
| NRIP2 | 215104_at | 0.0211284 | 112.9407407 | 65.73432109 | 63.34090909 | 42.58051935 |
| NRXN1 | 209914_s_at | 0.0167878 | 396.362963 | 147.2870357 | 493.5636364 | 72.17466608 |
| Nrxn3 | 205795_at | 0.00672653 | 98.89259259 | 61.47012361 | 154.8590909 | 76.98241394 |
| Nrxn3 | 215021_s_at | 0.0121773 | 10.92592593 | 5.488000378 | 18.61363636 | 11.82613311 |
| nsfl1c | 220248_x_at | 0.0153713 | 679.5259259 | 236.5113131 | 564.2863636 | 152.5713238 |
| NT5C | 219214_s_at | 0.00142903 | 99.68888889 | 28.1936072 | 80.63181818 | 23.96597561 |
| nt5m | 219708_at | 0.0132711 | 103.4666667 | 58.01403013 | 70.20454545 | 31.68258463 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| nthl1 | 209731_at | 0.0107192 | 294.1925926 | 83.01374273 | 214.8136364 | 56.48208562 |
| NTRK3 | 213960_at | 2.11708E-05 | 764.5296296 | 257.242736 | 1046.509091 | 211.7424827 |
| NTRK3 | 215311_at | 0.00482121 | 1043.777778 | 396.3627712 | 1222.745455 | 229.1469766 |
| NUBP2 | 218227_at | 0.00206251 | 218.7555556 | 86.66578747 | 161.85 | 53.34984938 |
| nudC | 201173_x_at | 0.000146762 | 1235.118519 | 170.9428088 | 958.9772727 | 188.5699818 |
| nudC | 210574_s_at | 0.00068796 | 1024.066667 | 132.2366817 | 841.4772727 | 171.593459 |
| NUDT11 | 219855_at | 0.0118881 | 799.5851852 | 180.9022977 | 978.25 | 235.5635103 |
| Nudt18 | 219665_at | 0.00320209 | 176.2703704 | 58.48647322 | 122.6045455 | 41.30991438 |
| NUDT3 | 211973_at | 0.0205512 | 492.0592593 | 188.1195922 | 733.2227273 | 354.8558821 |
| NUDT4 | 212181_s_at | 0.0282557 | 512.2148148 | 113.7349507 | 582.1272727 | 141.7815092 |
| NUFIP1 | 205136_s_at | 0.00185507 | 185.8481481 | 57.0609955 | 242.4545455 | 57.21169317 |
| NUP188 | 214675_at | 0.0152715 | 43.77037037 | 41.88637391 | 21.27272727 | 14.58499496 |
| nupl1 | 204435_at | 0.0320058 | 210.5111111 | 77.52516878 | 256.85 | 90.20482381 |
| nupr1 | 209230_s_at | 0.00122029 | 285.1777778 | 83.76606314 | 211.1818182 | 74.81500127 |
| oaz1 | 215952_s_at | 0.0312106 | 1864.17037 | 818.5289722 | 1546.777273 | 635.9205266 |
| OCA2 | 206498_at | 0.00996736 | 189.6518519 | 73.88122157 | 246.2681818 | 92.31910697 |
| ODC1 | 200790_at | 0.021194 | 493.4296296 | 178.9872617 | 431.3181818 | 86.31704923 |
| Ogt | 209240_at | 0.000577659 | 1242.733333 | 272.9182633 | 1558.063636 | 413.672687 |
| Ola1 | 219293_s_at | 0.00732211 | 1332.377778 | 252.2375717 | 1489.422727 | 285.5610233 |
| omd | 205907_s_at | 0.0264777 | 84.85185185 | 47.63479958 | 72.42272727 | 44.77924617 |
| Opa1 | 212213_x_at | 0.000188044 | 879.4333333 | 168.8793721 | 1125.831818 | 206.7946448 |
| Opa1 | 212214_at | 0.00205893 | 483.3074074 | 129.8753187 | 625.0409091 | 189.2816411 |
| Opa1 | 214306_at | 0.00161998 | 578.6518519 | 252.6631786 | 700.1318182 | 183.0725835 |
| OPA3 | 206357_at | 0.0215938 | 33.64814815 | 17.00984716 | 45.80454545 | 17.00793869 |
| OPCML | 214111_at | 0.00377702 | 551.062963 | 229.3900527 | 663.6545455 | 243.0211469 |
| OR2H1 | 216817_s_at | 0.0177537 | 75.25925926 | 45.50307056 | 46.89090909 | 25.48685766 |
| OR5V1 | 221431_s_at | 0.0289156 | 56.65925926 | 27.62528467 | 74.81818182 | 46.70664923 |
| OSBPL8 | 212582_at | 0.00149798 | 1502.937037 | 522.8920098 | 2122.35 | 600.060442 |
| OSBPL9 | 218047_at | 0.0203341 | 274.9111111 | 78.06486126 | 356.2863636 | 87.25632353 |
| OSGIN1 | 219475_at | 0.0148288 | 72.37407407 | 38.6086538 | 55.30909091 | 26.78133517 |
| oxct1 | 202780_at | 0.000451054 | 618.2259259 | 210.934094 | 798.2 | 224.5434182 |
| p4hb | 200656_s_at | 0.0167412 | 294.3037037 | 128.0619126 | 258.2863636 | 105.5251191 |
| p4hb | 200654_at | 0.0228799 | 1105.892593 | 430.2401654 | 975.5181818 | 319.2252879 |
| PABPC1 | 215823_x_at | 0.0301238 | 1265.362963 | 367.7423901 | 1634.336364 | 317.0318214 |
| Pacrg | 214204_at | 0.0163594 | 180.4222222 | 50.02961687 | 225.4409091 | 56.91753148 |
| paf1 | 202093_s_at | 0.00541661 | 382.2111111 | 111.2205098 | 271.6681818 | 86.78801973 |
| Pafah1b1 | 200816_s_at | 0.00452016 | 1393.685185 | 451.1636107 | 1641.122727 | 470.6019711 |
| PAFAH1B3 | 203228_at | 0.0233705 | 286.9592593 | 128.6470851 | 209.0681818 | 94.72228775 |
| Paip1 | 208051_s_at | 0.0127753 | 466.6333333 | 120.0287466 | 592.7818182 | 167.2491146 |
| Paip1 | 209064_x_at | 0.000669377 | 656.5222222 | 171.3029555 | 878.4363636 | 194.0530721 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| Pak3 | 214078_at | 0.0134751 | 64.38148148 | 35.34816976 | 88.31363636 | 27.22181015 |
| Pak3 | 214607_at | 0.00219269 | 887.1407407 | 315.8005666 | 1123.322727 | 211.9575203 |
| pak7 | 213990_s_at | 0.00768676 | 142.3777778 | 38.50394918 | 184 | 39.51563886 |
| palld | 200897_s_at | 0.0280808 | 429.0185185 | 134.5704706 | 587.1090909 | 161.9514798 |
| PANK3 | 218433_at | 0.0128357 | 128.3407407 | 39.40932396 | 170.9772727 | 60.06057206 |
| PAOX | 50400_at | 0.0254002 | 127.2592593 | 39.77307032 | 100.0227273 | 32.55047263 |
| PAPSS2 | 203058_s_at | 0.0139958 | 101.0222222 | 50.02099047 | 74.45454545 | 27.83346268 |
| PARD6A | 205245_at | 0.00234354 | 358.7333333 | 77.42913385 | 291.4272727 | 41.28644632 |
| parp6 | 219639_x_at | 0.0282237 | 981.0074074 | 121.4438678 | 873.3909091 | 92.35229086 |
| PARVB | 216253_s_at | 0.00581607 | 50.05555556 | 21.9056602 | 36.22727273 | 18.92524597 |
| PATZ1 | 209431_s_at | 0.00558904 | 173.3962963 | 55.49718968 | 126.7318182 | 42.9532014 |
| PATZ1 | 210581_x_at | 0.0275097 | 80.05185185 | 34.92717005 | 70.56363636 | 37.04426625 |
| pbrm1 | 220355_s_at | 0.00822954 | 238.4148148 | 57.96984431 | 300.4681818 | 70.61227727 |
| PBX1 | 212148_at | 0.00390681 | 628.8259259 | 166.9632308 | 795.6818182 | 165.7736427 |
| PBX1 | 212151_at | 0.00170508 | 810.5148148 | 150.279851 | 994.7227273 | 133.537289 |
| PCBP2 | 213264_at | 0.0265855 | 69.84074074 | 37.08354662 | 48.21818182 | 27.07190841 |
| PCDH1 | 203918_at | 0.02889 | 77.34074074 | 29.60649954 | 51.44090909 | 31.88749059 |
| PCDH9 | 216456_at | 0.0218645 | 105.9962963 | 59.48816612 | 166.7136364 | 62.46355353 |
| pcdha13 | 210674_s_at | 0.00112672 | 365.3296296 | 73.46393053 | 473.6045455 | 120.1915593 |
| PCDHB17 | 216355_at | 0.0323034 | 61.65185185 | 27.82099885 | 59.58181818 | 27.60754963 |
| PCDHGB6 | 221682_s_at | 0.0233157 | 21.1 | 22.79613665 | 12.83636364 | 14.00467764 |
| PCIF1 | 222045_s_at | 0.0083298 | 47.48148148 | 37.80981799 | 25.66818182 | 14.06939896 |
| PCLO | 213558_at | 0.00561053 | 1164.025926 | 447.7714712 | 1481.227273 | 323.3350189 |
| pcm1 | 214118_x_at | 0.0178852 | 418.4888889 | 144.6597529 | 516.6136364 | 119.2403587 |
| pcm1 | 214937_x_at | 0.0272715 | 370.3703704 | 129.1438787 | 444.1590909 | 96.27715775 |
| pcmtd2 | 212406_s_at | 0.0173291 | 314.2962963 | 114.5178739 | 424.6909091 | 151.3906266 |
| PCNT | 203660_s_at | 0.0316703 | 485.9074074 | 208.8727657 | 586.4909091 | 116.6115975 |
| PCSK5 | 205559_s_at | 0.0103754 | 32.95185185 | 16.12311695 | 44.11363636 | 14.55872494 |
| PCYT2 | 209577_at | 0.00546591 | 371.5851852 | 94.31290271 | 298.0954545 | 84.25713183 |
| PDAP1 | 202290_at | 0.000864111 | 219.4962963 | 65.25126277 | 165.1363636 | 59.97543581 |
| PDE3B | 222330_at | 0.00185479 | 13.60740741 | 9.897044078 | 28.93181818 | 16.41095413 |
| PDE4DIP | 205872_x_at | 0.00812493 | 577.0444444 | 269.806183 | 722.9681818 | 281.2508106 |
| PDE4DIP | 213388_at | 0.0161011 | 308.1222222 | 111.7826439 | 399.8681818 | 105.0305551 |
| PDE4DIP | 214129_at | 0.014375 | 161.1407407 | 37.31469353 | 136.9636364 | 48.15849374 |
| Pde6a | 206623_at | 0.00615209 | 25.52962963 | 11.92185501 | 45.1 | 26.80007107 |
| Pdgfb | 217112_at | 0.0272403 | 12.16666667 | 7.626925986 | 21.56818182 | 17.94166172 |
| PDGFC | 218718_at | 0.00300091 | 286.4592593 | 56.54650407 | 367.3863636 | 95.04019348 |
| pdgfra | 203131_at | 0.0123004 | 453.0851852 | 181.0089346 | 610.7772727 | 231.434946 |
| Pdha1 | 200979_at | 0.0261715 | 416.2592593 | 95.3354977 | 466.0636364 | 97.89734441 |
| PDHX | 203067_at | 1.90714E-05 | 329.5592593 | 91.50781496 | 488.5954545 | 137.2156921 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| PDIA3 | 208612_at | 0.00809159 | 587.3185185 | 205.8843907 | 457.1772727 | 155.698206 |
| Pdia4 | 208658_at | 0.0287278 | 259.6888889 | 75.59043658 | 212.6227273 | 87.54733105 |
| PDS5A | 217331_at | 0.0175755 | 59.48888889 | 39.13963497 | 83.28636364 | 38.45612584 |
| pdxK | 202671_s_at | 0.00251715 | 488.3851852 | 112.5221917 | 375.1590909 | 113.9445172 |
| pdxK | 218019_s_at | 0.0243032 | 2347.755556 | 763.6293328 | 1866.822727 | 588.2341143 |
| Pdzd2 | 209493_at | 0.0106524 | 712.5740741 | 270.4992416 | 1020.509091 | 340.4380468 |
| PECI | 218025_s_at | 0.00377964 | 609.1444444 | 221.406779 | 494.9681818 | 129.5211304 |
| pef1 | 217923_at | 0.00448422 | 1036.585185 | 349.4792331 | 766.5954545 | 253.3402765 |
| PEG10 | 212092_at | 0.007902 | 444.0074074 | 316.1883372 | 878.8090909 | 656.5997824 |
| PEG10 | 212094_at | 0.0200674 | 2143.344444 | 957.7735794 | 2951.336364 | 1087.29981 |
| PEG3 | 209243_s_at | 0.0231055 | 993.2074074 | 561.5193578 | 1586.522727 | 968.034713 |
| pelp1 | 215354_s_at | 0.0104223 | 242.6703704 | 65.76923418 | 200.2863636 | 65.38190587 |
| PES1 | 202212_at | 0.00557398 | 226.3296296 | 96.24840784 | 138.0772727 | 62.16648869 |
| Pex16 | 221604_s_at | 0.00355721 | 316.8925926 | 80.19340528 | 245.2772727 | 72.70145693 |
| Pex16 | 49878_at | 0.000128853 | 1109.859259 | 308.1108857 | 839.0136364 | 125.85519 |
| pex3 | 203969_at | 0.00690227 | 55.18518519 | 41.14488195 | 73.18636364 | 41.56555689 |
| pfkp | 201037_at | 0.00160472 | 727.8555556 | 193.7870071 | 592.5954545 | 136.1110978 |
| PGAP1 | 213469_at | 0.00512978 | 251.6296296 | 74.53540106 | 347.0454545 | 113.8057774 |
| PGAP1 | 220576_at | 0.00326981 | 94.45185185 | 35.15616119 | 143.3045455 | 45.62207566 |
| Pgcp | 208454_s_at | 0.0186501 | 70.73333333 | 47.17870282 | 50.64090909 | 29.98246565 |
| pgls | 218387_s_at | 0.00450102 | 419.3444444 | 106.8408462 | 312.6681818 | 88.96039454 |
| PGRMC2 | 213227_at | 0.0094906 | 326.2222222 | 62.47537566 | 373.6090909 | 92.32286468 |
| PHACTR2 | 204049_s_at | 0.00707955 | 57.06666667 | 23.06819322 | 82.15 | 23.97891435 |
| Phb | 200658_s_at | 0.00925199 | 346.9259259 | 98.87831135 | 273.4590909 | 102.4922049 |
| Phb | 200659_s_at | 0.00630919 | 188.7851852 | 51.97499919 | 133.4863636 | 52.90327468 |
| PHF14 | 204525_at | 0.0177606 | 50.0037037 | 16.45818668 | 57.27272727 | 13.82524199 |
| phf20 | 209423_s_at | 0.0255624 | 86.2962963 | 43.41071723 | 66.35909091 | 45.4878284 |
| PHF20L1 | 222133_s_at | 0.00939875 | 75.45555556 | 20.19562659 | 98.89545455 | 30.9097993 |
| PHF3 | 217954_s_at | 0.0028114 | 265.1666667 | 84.82487843 | 352.1818182 | 80.69868493 |
| PHGDH | 201397_at | 0.00719635 | 797.7 | 286.5126162 | 605.8818182 | 217.8610864 |
| phlda1 | 217997_at | 0.0270878 | 433.8814815 | 90.02282632 | 513.3318182 | 134.9296832 |
| PI4KB | 206138_s_at | 0.00357346 | 820.4740741 | 162.2102282 | 658.5545455 | 177.0295959 |
| PIAS1 | 217863_at | 0.00620119 | 215.3888889 | 54.42485528 | 288.7 | 83.83812066 |
| PIAS1 | 217862_at | 0.0212043 | 323.7037037 | 90.54264818 | 426.0636364 | 141.639773 |
| PIAS4 | 212881_at | 0.00711412 | 196.4703704 | 78.71695553 | 146.9227273 | 55.12671923 |
| PICALM | 212511_at | 0.00130876 | 289.237037 | 89.55206542 | 379.5272727 | 119.8752216 |
| PIGG | 218652_s_at | 0.0329427 | 356.9037037 | 83.94690392 | 407.5818182 | 90.63471235 |
| Pigt | 217770_at | 0.0113633 | 545.6333333 | 173.6752584 | 377.0090909 | 130.3244848 |
| PIH1D1 | 217872_at | 0.00514305 | 676.6925926 | 143.5381454 | 548.0863636 | 114.3538214 |
| Pik3cb | 212688_at | 0.0309527 | 643.2851852 | 185.6765647 | 674.4727273 | 149.0877791 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| Pikfyve | 213111_at | 0.0168224 | 205.7481481 | 69.45552739 | 269.5818182 | 74.0275601 |
| PION | 222150_s_at | 0.007497 | 81.82592593 | 20.07741924 | 110.3363636 | 31.88730969 |
| PION | 213142_x_at | 0.0332104 | 82.97407407 | 24.17765326 | 120.6272727 | 51.29987637 |
| PITPNB | 202522_at | 0.00398569 | 1027.977778 | 248.8235447 | 1168.277273 | 172.4767698 |
| pitX1 | 208502_s_at | 0.0219056 | 4.492592593 | 3.989305504 | 3.090909091 | 0.867349049 |
| pja2 | 201133_s_at | 0.0206906 | 1109.681481 | 400.1176625 | 1514.431818 | 625.5883428 |
| PKIA | 204612_at | 0.0106376 | 1209.796296 | 281.2274531 | 1471.740909 | 331.159935 |
| PKP4 | 214874_at | 0.0219974 | 327.1814815 | 64.33586174 | 376.3090909 | 128.198681 |
| PLAGL1 | 209318_x_at | 0.00582737 | 116.5222222 | 34.44977764 | 155.0909091 | 39.79204167 |
| PLCB1 | 213222_at | 0.00529849 | 1709.981481 | 694.1408874 | 2234.118182 | 933.6525359 |
| Plcd1 | 205125_at | 0.0243454 | 349.037037 | 105.4928767 | 293.5045455 | 116.8989775 |
| PLCL2 | 213309_at | 0.0055843 | 392.7555556 | 157.9510862 | 456.8363636 | 130.8015274 |
| plekha1 | 219024_at | 0.0259571 | 118.5814815 | 46.59380973 | 140.9681818 | 51.831305 |
| PLEKHA5 | 220952_s_at | 0.00704832 | 592.8555556 | 303.0597356 | 728.85 | 241.1356677 |
| PLEKHA5 | 214989_x_at | 0.0201931 | 453.5185185 | 205.9364167 | 584.9090909 | 211.3810099 |
| PLEKHG3 | 217044_s_at | 0.0130701 | 100.8 | 59.54594219 | 71.80909091 | 37.83076235 |
| PLEKHO1 | 218223_s_at | 0.0155666 | 292.6814815 | 88.29192853 | 234.6590909 | 79.54466645 |
| PLIN1 | 205913_at | 0.00401749 | 38.52592593 | 30.57254415 | 23.35454545 | 13.03985565 |
| PLIN2 | 209122_at | 0.00754039 | 150.4777778 | 49.30971455 | 117.6636364 | 36.47969488 |
| PLXNA1 | 221538_s_at | 0.0126255 | 99.95555556 | 58.45689624 | 139.6545455 | 42.61271582 |
| Plxna2 | 213030_s_at | 0.00287209 | 288.9333333 | 77.9092322 | 363.5363636 | 50.27829737 |
| plxnc1 | 213241_at | 0.000616043 | 178.1222222 | 48.45816858 | 261.6 | 69.71380952 |
| Plxnd1 | 212235_at | 0.0069182 | 40.93333333 | 25.55651355 | 23.10909091 | 9.609861457 |
| PML | 211013_x_at | 0.0119987 | 19.03333333 | 12.16792758 | 13.50454545 | 4.866941669 |
| PMPCA | 212088_at | 0.00438036 | 342.9703704 | 115.1575637 | 273.1909091 | 71.83080589 |
| Pms1 | 213677_s_at | 0.00113762 | 264.1518519 | 48.26090447 | 328.7818182 | 71.61642294 |
| PMS2L1 | 216843_x_at | 0.0221284 | 386.3296296 | 70.14024311 | 447.1863636 | 62.10758174 |
| PMS2L1 | 217485_x_at | 0.0272993 | 662.4777778 | 152.8672862 | 586.7545455 | 118.2363079 |
| PMS2L2 | 215410_at | 0.0178343 | 33.15185185 | 22.03380917 | 23.86818182 | 16.98827008 |
| PNLIPRP1 | 206694_at | 0.00026794 | 62.58888889 | 40.19883593 | 34.32272727 | 20.15475678 |
| PNMA1 | 218224_at | 0.0296014 | 1534.418519 | 448.4542881 | 1786.05 | 522.0754486 |
| PNMA2 | 209598_at | 0.0169585 | 2894.959259 | 949.2569751 | 3747.436364 | 1130.907476 |
| PNMAL1 | 218824_at | 0.000995335 | 1579.207407 | 396.7974264 | 1900.736364 | 523.3867991 |
| Pnmt | 206793_at | 0.00401379 | 367.537037 | 99.05655008 | 275.5363636 | 90.27371365 |
| pnpla3 | 220675_s_at | 0.0141124 | 18.37407407 | 17.83383976 | 12.17272727 | 8.182337646 |
| Pofut1 | 212349_at | 0.0213767 | 27.94814815 | 17.81966007 | 21.07272727 | 17.17457095 |
| Pold2 | 201115_at | 0.010032 | 406.6925926 | 91.71500979 | 317.8318182 | 94.69285882 |
| POLDIP2 | 217806_s_at | 0.0211809 | 815.9592593 | 196.6718162 | 669.8090909 | 127.6478448 |
| POLG | 203366_at | 0.026301 | 159.4592593 | 37.26049939 | 140.2181818 | 42.26881814 |
| POLR1D | 218258_at | 0.0219044 | 603.0148148 | 320.8739109 | 457.4318182 | 112.9625871 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| POLR2E | 213887_s_at | 0.0248458 | 280.8555556 | 144.8813688 | 224.0636364 | 109.9997989 |
| POLR3C | 209382_at | 0.0145062 | 269.9037037 | 116.606404 | 203.7909091 | 63.11129179 |
| POLR3C | 210573_s_at | 0.0245183 | 205.0185185 | 86.7507439 | 155.1272727 | 32.20418757 |
| Polr3d | 208361_s_at | 0.010942 | 74.78518519 | 29.44393243 | 62.71363636 | 24.34428251 |
| POMGNT1 | 217944_at | 0.0164445 | 288.7444444 | 92.90969285 | 231.1181818 | 52.69564576 |
| por | 208928_at | 0.0256405 | 245.5814815 | 97.88589133 | 204.6136364 | 66.36976718 |
| POU3F3 | 208563_x_at | 0.0168421 | 50.55925926 | 27.60049135 | 69.51818182 | 32.27398534 |
| POU4F1 | 206940_s_at | 0.0267537 | 80.55555556 | 32.80982889 | 69.63181818 | 28.97528317 |
| ppan | 221649_s_at | 0.0276895 | 185.0222222 | 62.23960113 | 140.8090909 | 47.38755019 |
| PPARA | 206870_at | 0.0217517 | 46.62962963 | 19.91340513 | 64.3 | 33.10261103 |
| PPARGC1A | 219195_at | 0.018884 | 70.05185185 | 26.67518828 | 92.10909091 | 32.10761531 |
| ppiB | 200967_at | 0.00120163 | 988.1740741 | 281.988679 | 741.7 | 213.9308633 |
| ppiB | 200968_s_at | 0.00586939 | 871.0148148 | 228.5172468 | 710.1772727 | 212.5658664 |
| ppie | 210502_s_at | 0.0163175 | 270.862963 | 43.234247 | 216.7681818 | 74.27164034 |
| Ppih | 204228_at | 0.00145408 | 181.7592593 | 52.14778747 | 134.6863636 | 49.17839533 |
| PPM1B | 209296_at | 0.024124 | 503.1444444 | 168.6993738 | 598.8136364 | 159.9347286 |
| Ppp1ca | 200846_s_at | 0.0315772 | 634.5925926 | 351.6893504 | 457.0090909 | 207.5173542 |
| PPP1R12A | 201603_at | 0.00274427 | 248.8703704 | 96.78529694 | 326.9181818 | 108.879215 |
| PPP1R12A | 201602_s_at | 0.0237944 | 264.8666667 | 118.6094107 | 333.7727273 | 107.7949605 |
| PPP1R12A | 201604_s_at | 0.0300222 | 93.05925926 | 45.35965896 | 133.8272727 | 57.5672541 |
| PPP1R12B | 201957_at | 0.00621492 | 353.2703704 | 82.11072175 | 420.7181818 | 75.71671286 |
| PPP1R15A | 202014_at | 0.0187697 | 104.437037 | 52.58394862 | 83.70454545 | 34.43723728 |
| PPP1R2P9 | 207377_at | 0.0180078 | 4.97037037 | 2.562272851 | 6.472727273 | 2.750096417 |
| ppp2r3c | 218852_at | 0.0257054 | 255.3148148 | 66.53966257 | 225.5227273 | 45.37884898 |
| PPP2R5C | 201877_s_at | 0.0113822 | 726.237037 | 167.5574601 | 907.0681818 | 250.694233 |
| PPP2R5E | 203338_at | 0.00132651 | 205.6296296 | 56.7596472 | 280.5818182 | 88.84063654 |
| ppp3ca | 202429_s_at | 0.00877559 | 4333.866667 | 1627.699854 | 5493.363636 | 1593.91902 |
| ppp3ca | 202457_s_at | 0.0133229 | 5360.481481 | 2052.18388 | 6536.65 | 1670.026643 |
| PPP3CC | 207000_s_at | 0.0264522 | 57.60740741 | 21.67369774 | 48.07272727 | 24.56005626 |
| PPPDE1 | 212371_at | 0.00535329 | 330.2481481 | 100.9190474 | 431.7727273 | 81.62301369 |
| PQBP1 | 207769_s_at | 0.00202526 | 274.3851852 | 103.8600601 | 195.7863636 | 66.73113285 |
| PQBP1 | 214527_s_at | 0.0116757 | 401.962963 | 234.2219101 | 271.6227273 | 130.7782344 |
| PRAMEF11 | 217365_at | 0.00347349 | 86.97777778 | 31.31838159 | 72.21363636 | 32.56595206 |
| PRDM2 | 216433_s_at | 0.0259492 | 5.551851852 | 6.579827585 | 3.681818182 | 2.270438675 |
| PRDX1 | 208680_at | 0.00467737 | 2313.181481 | 691.9172744 | 1894.777273 | 519.1615979 |
| Prdx4 | 201923_at | 0.00399271 | 492.2518519 | 169.2075839 | 384.6363636 | 87.4769877 |
| PRIM2 | 205628_at | 0.0125095 | 25.97407407 | 17.31503554 | 19.79545455 | 12.61939087 |
| PRKAB1 | 201834_at | 0.00428539 | 147.037037 | 48.34924348 | 103.0954545 | 42.9606739 |
| PRKACB | 202741_at | 0.00909168 | 5028.659259 | 997.9669477 | 6166.945455 | 1534.274477 |
| PRKACB | 202742_s_at | 0.027255 | 944.4555556 | 332.0341958 | 1402.968182 | 722.3714843 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| PRKAR1A | 200603_at | 0.0113734 | 1960.181481 | 391.7150859 | 2271.481818 | 494.5126371 |
| prkar2b | 203680_at | 0.00320184 | 622.1407407 | 284.9749966 | 964.15 | 354.1755561 |
| PRKCB | 207957_s_at | 0.0196179 | 1944.025926 | 939.3735489 | 2415.440909 | 962.3638227 |
| PRKCB | 209685_s_at | 0.0273809 | 1100.77037 | 465.2784607 | 1437.595455 | 620.8745809 |
| Prkce | 216753_at | 0.00529442 | 68.91481481 | 31.38870085 | 55.99545455 | 20.39361425 |
| PRKCI | 209678_s_at | 0.00035437 | 824.5259259 | 268.1529079 | 1230.795455 | 331.4291097 |
| PRKCI | 213518_at | 0.000469291 | 188.4444444 | 67.43924521 | 269.2909091 | 77.30373557 |
| PRKCI | 209677_at | 0.0281476 | 22.47777778 | 12.66464896 | 35.05454545 | 15.66335509 |
| Prosapip1 | 204447_at | 0.030674 | 1610.388889 | 393.73382 | 1760.104545 | 371.2208795 |
| prpf4b | 202127_at | 0.00991357 | 163.362963 | 50.60551162 | 211.6863636 | 51.07904514 |
| PRPF6 | 208880_s_at | 0.0290265 | 578.237037 | 199.036831 | 388.5318182 | 195.2185525 |
| PRPS1 | 215486_at | 0.0216161 | 26.80740741 | 22.06683774 | 36.70454545 | 20.19777162 |
| Prr16 | 220014_at | 0.0293477 | 24.11851852 | 12.66084324 | 37.33636364 | 20.61563312 |
| Prx | 222255_at | 0.0114023 | 5.111111111 | 4.351333424 | 3.422727273 | 1.85727189 |
| PRY | 208332_at | 0.00964011 | 105.5333333 | 46.04831075 | 85.86363636 | 50.86554213 |
| PSD3 | 203354_s_at | 0.00529537 | 892.9333333 | 343.7866434 | 1566.322727 | 892.3632796 |
| PSD3 | 218613_at | 0.00109207 | 1174.551852 | 380.5160225 | 1563.668182 | 376.0263268 |
| PSD3 | 203355_s_at | 0.0262506 | 384.0185185 | 112.8154246 | 474.85 | 162.6504981 |
| Psd4 | 215923_s_at | 0.0297192 | 35.9962963 | 30.58203949 | 28.86818182 | 21.41213244 |
| psen2 | 204262_s_at | 0.00483705 | 106.4555556 | 25.650676 | 89.74090909 | 20.72120283 |
| PSIP1 | 209337_at | 0.0114422 | 708.1666667 | 214.5472854 | 922.1227273 | 307.9435275 |
| PSIP1 | 205961_s_at | 0.0325491 | 176.2888889 | 93.34501072 | 253.7227273 | 109.2389645 |
| psmb1 | 214289_at | 0.0113838 | 36.15925926 | 22.99577318 | 61.98636364 | 32.81176176 |
| psmb9 | 204279_at | 0.000854807 | 181.2703704 | 46.24396688 | 144.7545455 | 35.86993339 |
| psmc3 | 201267_s_at | 0.0181701 | 688.7518519 | 534.5097188 | 426.6136364 | 244.8319643 |
| psmc4 | 201252_at | 0.006574 | 191.2777778 | 99.71159694 | 133.5454545 | 55.59001904 |
| Psmd11 | 208776_at | 0.0116848 | 228.3037037 | 60.97988623 | 268.6681818 | 95.20081225 |
| PSMD4 | 200882_s_at | 0.0188747 | 2086.381481 | 375.097048 | 1635.763636 | 525.0120584 |
| PSMD4 | 210460_s_at | 0.00767721 | 1156.648148 | 409.4625355 | 813.9727273 | 327.9316482 |
| PSMD4 | 211609_x_at | 0.00241096 | 1572.088889 | 416.585354 | 1171.945455 | 374.838342 |
| PSMD8 | 200820_at | 0.0330367 | 631.2037037 | 320.4182333 | 460.2227273 | 159.830538 |
| PSME3 | 200987_x_at | 0.0253145 | 259.7888889 | 98.16056444 | 207.9727273 | 58.09649757 |
| Psme4 | 212222_at | 0.0218301 | 410.3740741 | 99.50446682 | 464.6045455 | 111.2664519 |
| PSORS1C2 | 220635_at | 0.0315349 | 22.61111111 | 7.345398001 | 29.09545455 | 11.53113703 |
| PSPC1 | 218371_s_at | 0.0171976 | 207.7555556 | 38.10898676 | 238.5454545 | 69.3541136 |
| PSPN | 221373_x_at | 0.00590427 | 22.71111111 | 20.69768351 | 15.31363636 | 6.477749128 |
| PTDSS2 | 221005_s_at | 0.00626717 | 206.4222222 | 76.27360837 | 151.2454545 | 51.72634704 |
| ptgds | 211663_x_at | 0.0264295 | 3720.137037 | 1416.782739 | 3262.640909 | 1615.840523 |
| Ptger4 | 204897_at | 0.0215703 | 29.92592593 | 18.98249381 | 39.79090909 | 18.11442228 |
| PTH1R | 205911_at | 1.38696E-05 | 248.7037037 | 67.61496467 | 173.0454545 | 54.3350341 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| PTMA | 200773_x_at | 0.00514876 | 3651.625926 | 875.1051583 | 3168.204545 | 748.8638407 |
| PTMA | 211921_x_at | 0.00649965 | 2580.433333 | 1760.819832 | 1376.322727 | 507.5783467 |
| PTMA | 200772_x_at | 0.0214542 | 2191.951852 | 1425.836905 | 1328.445455 | 425.8546295 |
| PTMAP7 | 208549_x_at | 0.011942 | 839.4074074 | 565.7985677 | 489.6636364 | 182.4983224 |
| PTN | 208408_at | 0.00989909 | 33.77037037 | 21.05138064 | 65.90909091 | 63.24626779 |
| PTPLA | 219654_at | 0.00136777 | 40.31851852 | 24.93966623 | 70.07727273 | 36.51578826 |
| ptplb | 212640_at | 0.0307853 | 1079.603704 | 240.2042248 | 1242.609091 | 273.6502267 |
| PTPN11 | 212610_at | 0.0333857 | 1213.640741 | 344.7708127 | 1470.736364 | 415.7045752 |
| PTPN2 | 213136_at | 0.00803189 | 164.1962963 | 69.36402571 | 244.5681818 | 85.87218845 |
| PTPN6 | 206687_s_at | 0.00456914 | 85.94074074 | 14.30968632 | 76.52727273 | 17.2893356 |
| PTPRT | 205948_at | 0.00970632 | 177.6555556 | 34.87075404 | 217.5545455 | 62.65960746 |
| PTTG1 | 203554_x_at | 0.0255044 | 426.9925926 | 108.9125193 | 379.7590909 | 56.12093794 |
| PUF60 | 209899_s_at | 0.023104 | 1820.996296 | 375.2928841 | 1393.722727 | 453.9978308 |
| PUM1 | 201165_s_at | 0.00818734 | 671.737037 | 150.2848223 | 827.3863636 | 160.6289996 |
| PUM2 | 216221_s_at | 0.000812839 | 841.6592593 | 180.2551466 | 1089.077273 | 221.1151756 |
| PUM2 | 201493_s_at | 0.0201982 | 296.0481481 | 82.50385711 | 392.2181818 | 118.5483853 |
| purA | 204020_at | 0.00329319 | 578.2333333 | 201.34267 | 811.8681818 | 196.546106 |
| PWP1 | 201607_at | 0.0074101 | 327.937037 | 70.05835012 | 277.7909091 | 56.02193371 |
| pycard | 221666_s_at | 0.0146069 | 39.85185185 | 27.49891425 | 19.92727273 | 13.64506476 |
| PYROXD1 | 219802_at | 0.0200269 | 132.0925926 | 58.90174299 | 155.3772727 | 54.70638451 |
| QARS | 217846_at | 0.0120424 | 897.5185185 | 164.1974492 | 731.0909091 | 135.6949201 |
| Qpctl | 220438_at | 0.0252346 | 47.95555556 | 33.35590518 | 28.79090909 | 16.06951889 |
| R3HCC1 | 212866_at | 0.00739113 | 364.0851852 | 112.9293438 | 269.2136364 | 80.45327716 |
| R3HCC1 | 35156_at | 0.00656913 | 793.137037 | 172.3724013 | 618.9227273 | 124.0950171 |
| R3hdm1 | 202754_at | 0.0128435 | 479.7814815 | 108.9374981 | 573.2045455 | 125.0031104 |
| Rab11fip2 | 203883_s_at | 0.00725913 | 350.8555556 | 103.7314704 | 468.9045455 | 137.0209455 |
| Rab11fip2 | 203884_s_at | 0.0200563 | 279.2666667 | 73.3147797 | 344.1227273 | 92.60324962 |
| RAB1A | 213440_at | 0.00717151 | 376.962963 | 124.1864732 | 455.5 | 137.3155005 |
| rab21 | 203885_at | 0.00402234 | 347.5148148 | 82.58071438 | 426.4272727 | 107.3569799 |
| RAB22A | 213405_at | 0.00245395 | 514.6444444 | 153.6277627 | 681.7181818 | 201.2245077 |
| RAB22A | 218360_at | 0.026273 | 148.0703704 | 36.09260328 | 186.7681818 | 54.32702902 |
| RAB27B | 207017_at | 0.0177829 | 4.744444444 | 2.999786317 | 7.345454545 | 4.470722459 |
| RAB28 | 209084_s_at | 0.00643453 | 112.9185185 | 32.30816802 | 153.3772727 | 41.80569489 |
| Rab3gap1 | 213531_s_at | 0.00787257 | 1672.396296 | 698.4908862 | 1804.668182 | 437.4103145 |
| RAB40AL | 215782_at | 0.0241275 | 10.57407407 | 9.684269266 | 20.99090909 | 18.29121332 |
| rab40b | 204547_at | 0.000244673 | 1771.674074 | 312.6229107 | 2057.968182 | 528.5320735 |
| RAB6A | 210406_s_at | 0.0118406 | 962.8296296 | 313.513269 | 1186.390909 | 347.4537817 |
| RAB6A | 201047_x_at | 0.0221695 | 1160.211111 | 294.9118608 | 1349.131818 | 385.5365332 |
| Rabgap1l | 203020_at | 5.08183E-05 | 747.0407407 | 130.7621395 | 947.3590909 | 151.5182518 |
| Rabif | 204478_s_at | 0.0203079 | 271.0481481 | 53.19160844 | 237.1818182 | 43.80661655 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| RALBP1 | 202845_s_at | 0.0150958 | 329.5185185 | 115.6133711 | 426.4909091 | 177.3319484 |
| ralgapa1 | 213049_at | 0.00183843 | 474.9925926 | 143.9981729 | 621.0090909 | 177.445852 |
| ralyl | 213967_at | 0.0134953 | 893.4481481 | 159.0486799 | 964.8045455 | 136.7829267 |
| RANBP6 | 213019_at | 0.00152115 | 397.837037 | 146.705991 | 451.0272727 | 84.56924006 |
| RAP2A | 221830_at | 0.0231771 | 1677.62963 | 554.4063178 | 2051.509091 | 501.3869088 |
| RAPGEF2 | 203097_s_at | 0.00689568 | 1554.103704 | 342.8189189 | 1873.904545 | 509.413612 |
| Rarb | 208412_s_at | 0.00160732 | 7.237037037 | 3.606527005 | 15.38181818 | 10.81505284 |
| RARRES2 | 209496_at | 0.00918039 | 250.6444444 | 108.0385947 | 179.2772727 | 55.61881261 |
| Rasa1 | 202677_at | 0.0197041 | 637.4962963 | 147.4285263 | 759.6318182 | 157.0656168 |
| Rasa1 | 210621_s_at | 0.0238995 | 147.1333333 | 50.58068193 | 196.85 | 62.48380171 |
| rasal1 | 219752_at | 0.0108736 | 465.1037037 | 88.158535 | 370.7772727 | 91.32916882 |
| RASAL2 | 219026_s_at | 0.0293379 | 23.8962963 | 19.58359756 | 45.92727273 | 32.09871948 |
| RASL12 | 219167_at | 0.00411206 | 243.2 | 88.36584791 | 204.9636364 | 88.08128576 |
| RB1CC1 | 202033_s_at | 0.0324892 | 445.9555556 | 192.8327101 | 689.0454545 | 333.1183655 |
| RBM25 | 212030_at | 0.00277201 | 163.8148148 | 64.25026611 | 253.1818182 | 112.8871608 |
| RBM25 | 212031_at | 0.00156671 | 141.2888889 | 46.7970605 | 192.8454545 | 60.90427092 |
| RBM25 | 212033_at | 0.00095582 | 374.2481481 | 110.4175062 | 600.2045455 | 241.6859995 |
| RBM26 | 220509_at | 0.00657725 | 44.95925926 | 19.60687201 | 58.50454545 | 24.4505814 |
| Rbm39 | 207941_s_at | 0.0077578 | 1112.355556 | 443.0904443 | 1272.845455 | 376.3587583 |
| rbm42 | 205740_s_at | 0.0142406 | 481.1407407 | 134.0814599 | 367.5363636 | 127.6503951 |
| RBM9 | 216215_s_at | 0.00707015 | 636.537037 | 151.3252334 | 729.5136364 | 139.719291 |
| RBMS2P1 | 34187_at | 0.00890695 | 29.61111111 | 13.49490882 | 20.11818182 | 11.64656648 |
| RCN2 | 201485_s_at | 0.0100517 | 695.0888889 | 232.7355834 | 1042.654545 | 510.8946874 |
| Rdh8 | 220683_at | 0.0327587 | 46.06296296 | 35.68280288 | 34.34545455 | 21.32996388 |
| RECK | 205407_at | 0.0124753 | 74.23703704 | 25.69892467 | 99.28181818 | 37.55352544 |
| Recql5 | 34063_at | 0.00391358 | 57.78518519 | 15.78981424 | 46.50909091 | 18.55562831 |
| REEP1 | 204365_s_at | 0.000917884 | 1138.655556 | 209.3804953 | 1331.204545 | 279.9963834 |
| REEP5 | 208873_s_at | 0.00424455 | 2399.688889 | 856.291127 | 2786.35 | 869.3831386 |
| REG1A | 207778_at | 0.0287911 | 24.91851852 | 15.89523482 | 24.01363636 | 24.37979834 |
| RELN | 205923_at | 0.00443261 | 544.2111111 | 167.5276173 | 681.35 | 211.3082735 |
| REPS2 | 220873_at | 0.010207 | 57.61111111 | 22.74536865 | 70.38181818 | 32.92864777 |
| RER1 | 202296_s_at | 0.0143803 | 374.5888889 | 112.0514797 | 316.2954545 | 81.05859419 |
| REV3L | 208070_s_at | 0.0141846 | 195.337037 | 71.8259978 | 273.0454545 | 91.15429477 |
| RFK | 203224_at | 0.000443788 | 629.2037037 | 151.7424526 | 828.0272727 | 208.5898143 |
| RFK | 203225_s_at | 0.0079328 | 399.3 | 109.1301728 | 512.8590909 | 194.4983698 |
| RFPL1S | 214120_at | 0.00282872 | 516.6148148 | 174.5324693 | 688.95 | 228.3951354 |
| rfx3 | 217671_at | 0.0157506 | 156.5555556 | 63.36708885 | 226.1681818 | 73.07081618 |
| RFX7 | 218430_s_at | 0.00862872 | 27.96296296 | 20.40230281 | 44.70909091 | 19.918355 |
| rfxank | 202758_s_at | 0.00023841 | 237.3851852 | 47.80389994 | 166.4045455 | 60.7860297 |
| Rgl2 | 209110_s_at | 0.0298764 | 471.1666667 | 100.9344685 | 529.8636364 | 134.3967068 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| RGPD6 | 212842_x_at | 6.81379E-05 | 825.2222222 | 230.2100301 | 1188.654545 | 276.0842603 |
| RHOD | 31846_at | 0.0135841 | 455.8296296 | 80.10484867 | 405.2954545 | 96.74119858 |
| rhoq | 212120_at | 0.0228277 | 710.3962963 | 205.7111576 | 886.2727273 | 248.2366731 |
| RHOQP2 | 212119_at | 0.0114881 | 1388.648148 | 324.8954677 | 1748.709091 | 566.4753447 |
| RHOT1 | 218323_at | 0.031861 | 570.9407407 | 160.5261715 | 661.9727273 | 218.009334 |
| RING1 | 35685_at | 0.00275727 | 678.9740741 | 162.8719993 | 579.8863636 | 110.9905457 |
| RNASE1 | 201785_at | 0.0248208 | 1364.025926 | 660.8083753 | 877.75 | 413.3343219 |
| RNASET2 | 217983_s_at | 0.0274103 | 530.6185185 | 273.5850986 | 396.2136364 | 180.4179072 |
| RNF114 | 200867_at | 0.00899106 | 228.7481481 | 62.57907841 | 184.0090909 | 44.97477504 |
| RNF126 | 215031_x_at | 0.0197175 | 223.6666667 | 36.07853613 | 187.4 | 52.01621542 |
| RNF138 | 218738_s_at | 0.00991901 | 166.5444444 | 59.43688529 | 222.9090909 | 73.00831596 |
| Rnf144a | 204040_at | 0.0139326 | 427.5037037 | 81.45237155 | 514.0727273 | 102.8632202 |
| RNF17 | 221033_s_at | 0.022022 | 43.96296296 | 19.1466034 | 62.68181818 | 38.42908914 |
| Rnf38 | 218528_s_at | 0.0164531 | 378.037037 | 76.25055938 | 474.6954545 | 119.9487687 |
| RNF44 | 203286_at | 0.00954758 | 349.3925926 | 77.28238393 | 408.9363636 | 81.85281532 |
| Rnf8 | 203161_s_at | 0.0246489 | 8.096296296 | 3.369031073 | 7.572727273 | 2.751481301 |
| rnh1 | 206050_s_at | 0.0329068 | 877.5259259 | 287.326007 | 678.3772727 | 206.4438144 |
| rnmt | 202683_s_at | 0.0274396 | 361.1814815 | 66.51701365 | 422.4363636 | 88.3105966 |
| RNMTL1 | 218993_at | 0.00826201 | 285.0259259 | 46.76813998 | 225.0909091 | 57.18763527 |
| RNPEPL1 | 218301_at | 0.0282808 | 137.2925926 | 44.12853539 | 120.1409091 | 28.52570535 |
| RNU2-2 | 214349_at | 0.0115461 | 106.1925926 | 35.7079815 | 88.78636364 | 26.95909239 |
| ROCK2 | 202762_at | 0.000342789 | 289.3481481 | 151.5904588 | 498.4272727 | 181.7459954 |
| ROD1 | 207223_s_at | 0.00603803 | 63.65185185 | 31.02035771 | 101.0818182 | 40.84477744 |
| Rom1 | 205806_at | 0.0147894 | 110.5851852 | 39.82870731 | 87.85909091 | 37.78361523 |
| RORB | 206443_at | 0.00813135 | 16.37407407 | 19.40766289 | 7.540909091 | 3.609730117 |
| rp2 | 205191_at | 0.0275626 | 18.48518519 | 7.662882753 | 26.53181818 | 9.247310361 |
| RPA1 | 201529_s_at | 0.0151504 | 208.2444444 | 91.30878858 | 178.0954545 | 50.57793117 |
| RPL13AP7 | 200715_x_at | 0.0125292 | 2296.362963 | 696.9838019 | 1796.813636 | 402.4725691 |
| RPL18 | 200022_at | 0.00196323 | 5200.366667 | 1431.74008 | 4173.463636 | 1236.548971 |
| RPL18AP3 | 200869_at | 0.0162005 | 4142.248148 | 1972.707039 | 3298.213636 | 1296.991024 |
| RPL35P2 | 200002_at | 0.0157467 | 5154.622222 | 2227.195561 | 4035.409091 | 1562.976057 |
| rpl36 | 219762_s_at | 0.00970292 | 2573.537037 | 813.5424078 | 1909.85 | 644.4656397 |
| RPL8P2 | 200936_at | 0.0109946 | 4225.92963 | 1370.24882 | 3326.827273 | 1073.457973 |
| RPN1 | 201011_at | 0.0265958 | 489.7037037 | 140.6298318 | 403.7818182 | 81.03629778 |
| Rprd1a | 218209_s_at | 0.0258977 | 212.1296296 | 51.5394458 | 270.4272727 | 91.53312792 |
| rps10 | 200095_x_at | 0.0210782 | 17174.36296 | 4758.118347 | 13735.48182 | 4101.217103 |
| rps21 | 214097_at | 0.0309413 | 84.32592593 | 62.01174574 | 49.13636364 | 61.81876388 |
| RPS26P8 | 217753_s_at | 0.00824865 | 3114.125926 | 1148.903827 | 2321.404545 | 866.1296777 |
| RPS27AP11 | 217144_at | 0.0172355 | 746.6407407 | 197.1128772 | 635.9545455 | 132.3408109 |
| RPS28 | 208904_s_at | 0.0166419 | 12200.34074 | 4191.784137 | 9464 | 2881.24645 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| RPS3P3 | 208692_at | 0.0106407 | 6977.666667 | 1984.797032 | 5533.045455 | 1818.965969 |
| RPS6 | 201254_x_at | 0.020224 | 9090.277778 | 1727.311258 | 7747.918182 | 1592.102068 |
| RPS6KA2 | 204906_at | 0.0266329 | 514.8407407 | 178.7813109 | 411.6454545 | 115.1528952 |
| Rps6ka3 | 203843_at | 0.0111893 | 136.2814815 | 35.12071531 | 173.0318182 | 43.83365077 |
| RPS6KA5 | 204633_s_at | 0.000209791 | 460.5814815 | 85.17820251 | 597.2090909 | 147.6870079 |
| RPS6P1 | 200081_s_at | 0.00403217 | 5395.062963 | 1239.448367 | 4223.045455 | 1235.883524 |
| RPS9P4 | 214317_x_at | 0.0157474 | 2611.518519 | 1140.413329 | 1869.268182 | 640.9797466 |
| RPS9P4 | 217747_s_at | 0.00386083 | 4354.455556 | 1324.16571 | 3161.172727 | 1285.87279 |
| RRBP1 | 201205_at | 0.000215844 | 144.6407407 | 38.29679902 | 112.1818182 | 45.01294667 |
| RRP7A | 202937_x_at | 0.00480403 | 214.4777778 | 94.01459925 | 116.5227273 | 69.69107295 |
| RRP7A | 33307_at | 0.0137276 | 222.6296296 | 77.61561508 | 155.7727273 | 36.08921725 |
| RSBN1 | 213694_at | 0.00660353 | 181.4740741 | 48.07466623 | 246.3681818 | 72.11871421 |
| Rsl1d1 | 212018_s_at | 0.0195146 | 221.3740741 | 55.41866939 | 193.95 | 38.33404244 |
| RSRC2 | 202302_s_at | 0.00499949 | 464.4703704 | 136.4417227 | 621.8363636 | 201.990779 |
| Rtf1 | 212301_at | 0.000836058 | 384.2259259 | 88.59285261 | 470.1454545 | 80.36653371 |
| RTN1 | 210222_s_at | 0.0199725 | 2403.422222 | 833.612381 | 2845.572727 | 984.6463412 |
| RUFY3 | 203724_s_at | 0.0260296 | 757.1518519 | 232.0158671 | 895.8363636 | 300.4932636 |
| RUNDC3B | 215321_at | 0.00249182 | 288.2481481 | 77.49106336 | 395.3454545 | 116.6118785 |
| RUNX1T1 | 205528_s_at | 0.0173214 | 44.05555556 | 17.39233548 | 60.98181818 | 21.41280517 |
| RYBP | 201845_s_at | 0.0155873 | 421.0851852 | 109.2622382 | 494.3727273 | 113.2803441 |
| RYR2 | 214044_at | 0.0173287 | 534.6740741 | 208.0859264 | 653.2227273 | 219.9230687 |
| S100A13 | 202598_at | 0.0190628 | 2067.525926 | 546.1733978 | 1663.259091 | 831.312463 |
| S100P | 204351_at | 0.0103179 | 15.46666667 | 9.772488857 | 10.93636364 | 6.674082456 |
| S100PBP | 218370_s_at | 0.0280178 | 272.4481481 | 91.64583322 | 314.3681818 | 98.54510394 |
| SAC3D1 | 205449_at | 0.0138128 | 296.9925926 | 93.77965962 | 193.4045455 | 98.7400024 |
| SACS | 213262_at | 0.0121442 | 483.6444444 | 206.6398192 | 595.6636364 | 178.0895001 |
| SAE1 | 217946_s_at | 0.0236818 | 627.8740741 | 132.6686114 | 520.6954545 | 131.2837983 |
| Sap30bp | 217965_s_at | 0.0253945 | 243.0925926 | 49.88241501 | 195.1454545 | 70.13179245 |
| SARS | 200802_at | 0.00816424 | 1405.659259 | 429.3924162 | 1115.718182 | 300.4681231 |
| SARS2 | 218702_at | 0.0274056 | 197.6851852 | 58.70977971 | 162.7727273 | 45.55107214 |
| Satb1 | 203408_s_at | 0.0236996 | 365.7740741 | 102.9430634 | 467.2681818 | 133.040815 |
| SC5DL | 211423_s_at | 0.0175676 | 591.862963 | 183.7174799 | 743.0454545 | 192.7382897 |
| SCAMP1 | 212416_at | 0.000321787 | 1366.340741 | 233.1046963 | 1634.022727 | 253.6876293 |
| SCAMP1 | 212425_at | 4.68022E-05 | 350.7148148 | 93.60697584 | 495.9954545 | 109.3925369 |
| Scand1 | 218206_x_at | 0.000614165 | 1005.988889 | 319.2696333 | 656.6681818 | 211.0744766 |
| SCARB1 | 215834_x_at | 0.0246025 | 15.58148148 | 15.18425391 | 11.03181818 | 3.84563901 |
| Scin | 222272_x_at | 0.0316085 | 74.47777778 | 32.11429508 | 90.85454545 | 48.93419028 |
| SCLY | 219808_at | 0.00285272 | 52.22592593 | 37.877247 | 79.60454545 | 46.13092628 |
| Scn1a | 210383_at | 0.0215057 | 136.0444444 | 43.88661381 | 175.7181818 | 66.06848277 |
| SCN3A | 210432_s_at | 0.000245903 | 537.6333333 | 266.9810437 | 943.3 | 361.8074824 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| SCN8A | 207049_at | 0.0193034 | 12.21111111 | 14.55808877 | 28.69090909 | 25.20362614 |
| SCP2 | 201339_s_at | 0.0273783 | 220.3222222 | 77.22002198 | 302.0181818 | 112.1406627 |
| Sdc4 | 202071_at | 0.000853829 | 1126.607407 | 398.577895 | 865.7863636 | 288.7584298 |
| sdcbp | 200958_s_at | 0.0105509 | 1846.544444 | 518.4553592 | 2209.977273 | 593.1532773 |
| SDF2L1 | 218681_s_at | 0.0233317 | 296.0185185 | 71.3939506 | 229.1590909 | 92.89458777 |
| SDHA | 201093_x_at | 0.0293508 | 567.1962963 | 113.3149643 | 475.3318182 | 111.3240888 |
| sdhC | 202004_x_at | 0.0165276 | 661.8592593 | 183.9215055 | 555.4 | 137.6817241 |
| sdhC | 210131_x_at | 0.00678954 | 700.537037 | 172.2874413 | 582.7045455 | 123.0757586 |
| sec13 | 207707_s_at | 0.0250176 | 666.4333333 | 113.7021311 | 547.1681818 | 128.7354259 |
| Sec14l2 | 204541_at | 0.0328478 | 124.9740741 | 28.86650431 | 116.7409091 | 35.80544863 |
| SEC61A1 | 217716_s_at | 0.0064299 | 263.9444444 | 77.38111146 | 212.0954545 | 87.86994978 |
| SEC63 | 201916_s_at | 0.00722181 | 387.5 | 113.8924594 | 486.3409091 | 124.4711313 |
| Sel1l3 | 212314_at | 0.0126881 | 165.1592593 | 55.05994816 | 223.25 | 80.76188841 |
| SELENBP1 | 214433_s_at | 0.00446295 | 372.7037037 | 90.02725861 | 295.9909091 | 128.9653402 |
| SEMA5A | 213169_at | 0.0263175 | 218.9518519 | 37.180075 | 263.15 | 55.58296887 |
| SEMA6A | 220454_s_at | 0.0298017 | 126.6555556 | 31.34605034 | 163.5954545 | 74.9627811 |
| SENP6 | 202318_s_at | 0.0163306 | 221.4777778 | 59.12328276 | 270.0409091 | 62.34995444 |
| SEPHS2 | 200961_at | 0.0308394 | 368.4851852 | 92.47382459 | 412.3727273 | 116.2891641 |
| SEPX1 | 217977_at | 0.00323968 | 315.3814815 | 145.1114321 | 203.6818182 | 97.94113702 |
| serbp1 | 217724_at | 0.00644094 | 1141.785185 | 290.7835578 | 1360.477273 | 272.280587 |
| SERF2 | 217756_x_at | 0.0172168 | 1804.707407 | 636.6013763 | 1419.336364 | 466.5875956 |
| SERINC1 | 208671_at | 0.0168222 | 1446.396296 | 468.131711 | 1772.359091 | 565.153335 |
| SERINC3 | 221472_at | 0.0137837 | 478.1555556 | 121.5962592 | 551.7181818 | 90.39447221 |
| SERINC3 | 221473_x_at | 0.0244212 | 1260.425926 | 343.1861175 | 1477.390909 | 428.8321027 |
| Serpinf1 | 202283_at | 0.00350761 | 42.44444444 | 32.68090872 | 22.36363636 | 10.37430642 |
| SERPING1 | 200986_at | 0.00161896 | 169.0555556 | 56.24383955 | 138.65 | 46.02753575 |
| Serpini1 | 205352_at | 0.00895311 | 1604.514815 | 451.8308054 | 1920.754545 | 578.3287134 |
| set | 200631_s_at | 0.000191426 | 1366.077778 | 337.389034 | 1606.890909 | 350.7988433 |
| set | 40189_at | 0.0122363 | 921.4 | 251.1447529 | 1028.859091 | 266.3466639 |
| set | 210231_x_at | 0.024969 | 1176.933333 | 294.4548744 | 1229.081818 | 202.1000168 |
| SETBP1 | 205933_at | 0.000340794 | 121.162963 | 29.72235818 | 157.15 | 28.54906804 |
| SETD2 | 215038_s_at | 0.0282261 | 105.4444444 | 23.3432305 | 130.6227273 | 33.56730172 |
| SETD4 | 219482_at | 0.0131712 | 62.23703704 | 49.7799245 | 92.47272727 | 48.97962824 |
| Setx | 201964_at | 0.00352178 | 223.6259259 | 76.88027952 | 300.5045455 | 77.88333447 |
| SEZ6L | 207873_x_at | 0.0120579 | 88.64444444 | 33.28588675 | 67.51818182 | 32.26127911 |
| sf3a3 | 203818_s_at | 0.0194158 | 308.1592593 | 45.37648713 | 275.4954545 | 43.0340339 |
| SF4 | 215004_s_at | 8.48806E-05 | 210.4333333 | 40.76687947 | 149.8727273 | 41.06457379 |
| SFN | 33322_i_at | 0.00998172 | 843.6185185 | 324.2667777 | 617.7227273 | 134.5716978 |
| SFN | 33323_r_at | 0.0155969 | 526.2037037 | 206.5302632 | 395.3772727 | 93.89380492 |
| SFRP5 | 207468_s_at | 0.00729302 | 24.84814815 | 20.62029192 | 15.16363636 | 8.44492214 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| SFRS1 | 201741_x_at | 0.0020392 | 57.8 | 24.99206028 | 82.11363636 | 39.00428909 |
| SFRS13A | 206095_s_at | 0.00892465 | 94.44444444 | 27.92987556 | 122.2954545 | 36.22407089 |
| sfrs18 | 212179_at | 0.000835144 | 753.6407407 | 257.697584 | 1016.495455 | 257.3536579 |
| SFTPC | 38691_s_at | 0.00920753 | 363.3037037 | 115.8335858 | 281.0590909 | 101.2642261 |
| SFTPC | 205982_x_at | 0.0319383 | 14.72962963 | 4.358176649 | 12.55454545 | 3.950976645 |
| SGCD | 213543_at | 0.00585387 | 31.8037037 | 22.49703368 | 53.29545455 | 24.90476101 |
| SGK1 | 201739_at | 0.0302761 | 835.0148148 | 392.9824059 | 666.8681818 | 182.337237 |
| SGSM3 | 214779_s_at | 0.0265607 | 235.9074074 | 84.09502375 | 189.8136364 | 66.02894961 |
| Sgta | 201396_s_at | 0.0061774 | 312.0407407 | 109.4393694 | 240.0045455 | 80.98376367 |
| SH2B1 | 40149_at | 0.00876826 | 212.2703704 | 43.16227711 | 198.4681818 | 26.9278646 |
| SH2D4A | 219749_at | 0.0176875 | 89.22592593 | 29.91491257 | 109.9454545 | 52.95601704 |
| SH3BP5 | 201811_x_at | 0.0283071 | 909.6296296 | 222.7610393 | 966.8727273 | 194.8999748 |
| sh3glb1 | 209090_s_at | 0.00201502 | 410.0148148 | 114.6848682 | 611.1863636 | 188.529574 |
| sh3yl1 | 204019_s_at | 0.00154293 | 417.8222222 | 140.2282709 | 604.0954545 | 204.6832128 |
| SHANK2 | 213308_at | 0.00976543 | 365.1259259 | 117.9688733 | 552.2090909 | 206.190321 |
| SHC3 | 206330_s_at | 0.010979 | 363.3703704 | 166.7982425 | 558.7909091 | 178.3438143 |
| SHISA6 | 217479_at | 0.0297249 | 35.9962963 | 26.53851311 | 22.9 | 19.24330434 |
| SHMT1 | 209980_s_at | 0.0319325 | 24.94074074 | 12.99764059 | 19.62272727 | 9.424129709 |
| SHMT1 | 217304_at | 0.0224085 | 65.93703704 | 30.0560649 | 54.95 | 14.71609906 |
| SHOC2 | 202777_at | 0.00455213 | 424.5740741 | 81.43641499 | 523.85 | 106.2994277 |
| SIDT1 | 219734_at | 0.0115626 | 41.25925926 | 30.92288497 | 58.99090909 | 18.69593562 |
| SILV | 209848_s_at | 0.026029 | 140.3703704 | 60.19052963 | 164.1136364 | 53.91709063 |
| Sipa1 | 204164_at | 0.0152315 | 66.02222222 | 29.88666198 | 46.85 | 34.2614562 |
| SIPA1L1 | 202254_at | 0.00424757 | 829.937037 | 244.6027048 | 1043.740909 | 200.0097704 |
| SIVA1 | 210792_x_at | 0.0125379 | 229.2962963 | 62.65560618 | 182.4772727 | 76.01375146 |
| Six2 | 206510_at | 0.00787987 | 53.29259259 | 21.91860688 | 72.71818182 | 23.96367561 |
| SLA | 203760_s_at | 0.00718606 | 153.7481481 | 69.43042655 | 111.3227273 | 49.61884177 |
| SLAMF7 | 219159_s_at | 0.0097542 | 21.64814815 | 11.65294187 | 37.81363636 | 30.32516314 |
| Slc12a4 | 209402_s_at | 0.0101892 | 72.64444444 | 40.29712085 | 45.01363636 | 24.74837744 |
| Slc13a3 | 205244_s_at | 0.0232926 | 15.53333333 | 9.783384659 | 11.01818182 | 4.099202752 |
| SLC16A5 | 206600_s_at | 0.0280932 | 44.2 | 26.75479828 | 24.53636364 | 18.54237221 |
| SLC18A2 | 213549_at | 0.0243847 | 188.2333333 | 66.29573603 | 235.7363636 | 71.01615206 |
| SLC1A1 | 213664_at | 0.0084949 | 469.1185185 | 134.593765 | 582.0636364 | 164.1256677 |
| slc1a4 | 209610_s_at | 0.0257039 | 978.1407407 | 434.6271242 | 869.9727273 | 213.7908038 |
| SLC22A7 | 221662_s_at | 0.017406 | 47.48148148 | 27.31459228 | 33.74090909 | 22.45466669 |
| SLC24A3 | 219090_at | 0.0284214 | 613.5888889 | 125.8826723 | 655.2727273 | 126.2191827 |
| SLC24A6 | 218749_s_at | 0.0193975 | 104.7148148 | 38.54703125 | 74.92272727 | 52.1006803 |
| slc25a10 | 218275_at | 0.00188337 | 58.78888889 | 30.96535699 | 41.10454545 | 23.64816468 |
| Slc25a11 | 207088_s_at | 0.0186178 | 402.9888889 | 167.6324077 | 335.5772727 | 107.9260723 |
| Slc25a11 | 209003_at | 0.02084 | 870.5037037 | 213.6418201 | 682.6227273 | 230.3825492 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| SLC25A23 | 220182_at | 0.0235581 | 199.7555556 | 130.1514305 | 285.7454545 | 141.5538758 |
| SLC25A36 | 201919_at | 0.00563125 | 675.8444444 | 84.74454071 | 814.6727273 | 162.8842715 |
| SLC25A6 | 212085_at | 0.00656931 | 2100.540741 | 801.2693657 | 1718.336364 | 518.5902682 |
| Slc29a3 | 219344_at | 0.015054 | 167.0888889 | 57.74234104 | 141.6045455 | 60.35941933 |
| SLC2A3P1 | 221751_at | 0.000920538 | 318.0888889 | 100.7125969 | 527.3772727 | 220.7364102 |
| SLC30A9 | 202614_at | 0.00590046 | 644.9888889 | 194.9546246 | 799.3954545 | 284.3362387 |
| SLC35A1 | 203306_s_at | 0.00643386 | 257.3 | 60.17818414 | 337.2818182 | 99.66063194 |
| SLC38A6 | 214830_at | 0.0301941 | 70.54074074 | 19.35155051 | 92.62272727 | 29.26366074 |
| SLC39A6 | 202088_at | 0.0143281 | 697.1518519 | 297.9518848 | 821.8409091 | 258.7985881 |
| SLC48A1 | 48106_at | 0.024719 | 695.237037 | 206.1407308 | 558.7363636 | 142.6981848 |
| SLC5A3 | 212944_at | 0.00288376 | 449.7296296 | 136.5649573 | 635.45 | 186.7991454 |
| slc5a6 | 204087_s_at | 0.0215306 | 227.1592593 | 62.31256361 | 192.6954545 | 56.98956026 |
| SLC6A1 | 205152_at | 0.00968363 | 789.9185185 | 236.4542012 | 1014.790909 | 307.5538418 |
| SLC6A8 | 210854_x_at | 0.0181069 | 211.2888889 | 53.12767882 | 193.1090909 | 62.76692266 |
| SLC7A11 | 207528_s_at | 0.00608856 | 60.06666667 | 23.30414291 | 84.83181818 | 37.28826429 |
| SLC7A11 | 209921_at | 0.00835279 | 335.1407407 | 113.3587235 | 464.8409091 | 181.558847 |
| SLCO2B1 | 211557_x_at | 0.00937296 | 52.6 | 32.96843479 | 31.46363636 | 12.37957402 |
| SLFN12 | 219885_at | 0.0184714 | 27.27407407 | 25.45772654 | 17.35 | 12.48624958 |
| Slit2 | 209897_s_at | 0.0252294 | 362.6740741 | 80.22567013 | 402.5590909 | 83.47473333 |
| SLIT3 | 203813_s_at | 0.0276221 | 44.94444444 | 24.66584891 | 55.29090909 | 32.4117984 |
| SLITRK5 | 214930_at | 0.0335575 | 375.1037037 | 128.3300747 | 435.9318182 | 138.8053601 |
| SLK | 206875_s_at | 0.0304716 | 170.3851852 | 66.23012737 | 217.6590909 | 75.64408301 |
| SMARCA1 | 203874_s_at | 0.00172156 | 236.1777778 | 66.56210133 | 338.4363636 | 98.10911101 |
| SMARCAL1 | 218452_at | 0.0268626 | 136.1 | 53.52470314 | 96.54545455 | 32.38245744 |
| smarcd2 | 201827_at | 0.0142955 | 119.7888889 | 65.36605408 | 78.65454545 | 32.51244051 |
| Smarce1 | 214871_x_at | 0.0301825 | 63.61111111 | 26.81730689 | 47.02272727 | 19.60048425 |
| SMC2 | 204240_s_at | 0.0184136 | 35.64814815 | 24.24889165 | 63.71818182 | 44.38002164 |
| smc3 | 209257_s_at | 0.0159244 | 114.337037 | 52.4851052 | 164.55 | 65.02388389 |
| smc3 | 209259_s_at | 0.011029 | 128.1592593 | 45.69951405 | 170.8818182 | 48.34005178 |
| SMCHD1 | 212579_at | 0.00104033 | 97.15185185 | 26.69326291 | 139.9 | 36.64517119 |
| smg5 | 212147_at | 0.00296793 | 162.9703704 | 73.0419522 | 96.08636364 | 50.12802937 |
| SMURF2 | 205596_s_at | 0.0286433 | 349.9222222 | 99.76828282 | 459 | 129.8998479 |
| SMYD2 | 212922_s_at | 0.0272316 | 179.6444444 | 45.54546615 | 170.4045455 | 36.88055982 |
| SNAP91 | 204953_at | 0.0260166 | 780.9259259 | 225.7508831 | 839.5045455 | 288.8395344 |
| Snapc5 | 213203_at | 6.94876E-05 | 609.7555556 | 179.9586498 | 719.3909091 | 120.9600836 |
| Snca | 204467_s_at | 0.00339277 | 825.0703704 | 232.7009997 | 1020.077273 | 311.2142501 |
| snf8 | 218391_at | 0.0179255 | 582.8148148 | 109.3283611 | 483.9636364 | 110.7080483 |
| SNIP1 | 219409_at | 0.0258706 | 107.9333333 | 26.15905491 | 85.78636364 | 27.85739699 |
| SNN | 218032_at | 0.0301682 | 1886.248148 | 547.9758609 | 2398.259091 | 910.6924831 |
| SNORA21 | 215224_at | 0.0269703 | 34.25925926 | 27.82977458 | 21.56818182 | 17.60661094 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| SNORA25 | 221580_s_at | 0.00523182 | 315.6222222 | 106.6645617 | 397.2272727 | 96.83555123 |
| SNORA67 | 211787_s_at | 0.0145182 | 1391.092593 | 299.6787163 | 1110.209091 | 289.6382701 |
| Snrk | 209481_at | 0.0172163 | 454.162963 | 110.2916558 | 566.9909091 | 137.5301868 |
| SNRNP25 | 218493_at | 0.0236596 | 879.5962963 | 443.8230265 | 623.5636364 | 195.9577543 |
| SNRNP27 | 212440_at | 0.0177844 | 524.437037 | 121.5219991 | 645.6590909 | 139.8058131 |
| snrnp35 | 205300_s_at | 0.00581694 | 162.6814815 | 52.52603777 | 114.0545455 | 50.09760689 |
| SNRPB | 213175_s_at | 0.00675977 | 386.3851852 | 158.4571811 | 309.2909091 | 72.55976131 |
| snta1 | 203516_at | 0.0326674 | 847.837037 | 262.3255422 | 752.0045455 | 301.0642891 |
| Snx11 | 53912_at | 0.000432617 | 611.3851852 | 240.7712667 | 364.3409091 | 142.2732169 |
| snx17 | 200991_s_at | 0.00573955 | 282.9333333 | 196.5281757 | 161.6909091 | 100.631534 |
| SNX27 | 221006_s_at | 0.00119448 | 409.7296296 | 78.88469099 | 540.0954545 | 164.1766977 |
| snx3 | 200067_x_at | 0.0320088 | 2276.733333 | 748.8612606 | 2745.831818 | 735.0123338 |
| SNX9 | 215284_at | 0.0110505 | 65.55925926 | 22.73171724 | 91.04090909 | 43.16050508 |
| SOCS6 | 206020_at | 0.0244783 | 55.78518519 | 24.98654567 | 43.2 | 21.88036737 |
| SOHLH2 | 220129_at | 0.0260593 | 73.48518519 | 48.02705731 | 105.6136364 | 54.70201786 |
| SORCS3 | 215522_at | 0.024942 | 205.4444444 | 60.59247436 | 251.9681818 | 75.88833517 |
| Sort1 | 212797_at | 0.00697636 | 32.43333333 | 19.35430781 | 18.55 | 22.17340213 |
| Sort1 | 212807_s_at | 0.0049044 | 340.0888889 | 143.4278332 | 228.9363636 | 74.49280276 |
| SOS1 | 212780_at | 0.0056931 | 138.2148148 | 48.828087 | 178.8454545 | 57.86930865 |
| SOX5 | 216561_x_at | 0.0289194 | 57.58518519 | 20.8775865 | 46.66363636 | 22.05878608 |
| sp1 | 214732_at | 0.0300482 | 19.73703704 | 12.97607705 | 28.28181818 | 19.94011598 |
| SP110 | 208012_x_at | 0.00647725 | 193.9111111 | 64.81101125 | 153.75 | 35.35889125 |
| SP110 | 208392_x_at | 0.0123237 | 15.45185185 | 17.38092169 | 9.254545455 | 5.204734774 |
| SP110 | 209762_x_at | 0.00252234 | 182.2777778 | 45.33092282 | 147.9636364 | 29.68359408 |
| SP3 | 213168_at | 0.00115582 | 325.662963 | 82.65240072 | 433.6590909 | 88.67532356 |
| SPATA2 | 204434_at | 0.00478097 | 437.0185185 | 62.92378196 | 502.8590909 | 72.9610115 |
| Spats2 | 218324_s_at | 0.00766788 | 132.1592593 | 34.4913619 | 164.7272727 | 43.85289459 |
| Spats2l | 222154_s_at | 0.0114546 | 673.5592593 | 138.0405884 | 789.8727273 | 129.9736207 |
| SPG11 | 203513_at | 0.0322148 | 310.1407407 | 72.49313102 | 377.9090909 | 85.55444888 |
| SPG7 | 214494_s_at | 0.0263509 | 539.3703704 | 126.2992838 | 431.7954545 | 110.9957163 |
| SPRED2 | 212458_at | 0.0298861 | 150.6444444 | 49.43353217 | 209.6136364 | 72.88317655 |
| Sptlc2 | 203127_s_at | 0.0289528 | 207.0074074 | 42.47248816 | 180.3 | 58.53943726 |
| sqlE | 209218_at | 0.00921353 | 281.262963 | 70.46006042 | 332.9318182 | 98.06905432 |
| SR140 | 212060_at | 0.0121915 | 91.5 | 27.25195829 | 116.4909091 | 41.65002611 |
| srd5a1 | 204675_at | 0.00634638 | 275.8666667 | 93.25292736 | 301.5090909 | 77.98501632 |
| srd5a1 | 211056_s_at | 0.00144165 | 88.36666667 | 53.93115982 | 134.2272727 | 64.44761758 |
| srp54 | 203605_at | 0.0310048 | 250.5222222 | 59.02194724 | 288.5181818 | 72.75361314 |
| SRPX2 | 216465_at | 0.00973723 | 31.62592593 | 26.90805702 | 19.40454545 | 12.27973465 |
| SS18L1 | 213140_s_at | 0.00343911 | 221.837037 | 71.14737764 | 287.5590909 | 62.33855842 |
| SSH1 | 221752_at | 0.0256584 | 227.037037 | 53.30548498 | 275.5318182 | 42.98188308 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| Ssh3 | 219241_x_at | 0.0306886 | 157.4111111 | 29.46022525 | 131.8272727 | 45.33787633 |
| SSNA1 | 210378_s_at | 0.00608688 | 346.4222222 | 73.99398278 | 277.2454545 | 55.72912146 |
| Sstr2 | 217455_s_at | 0.0283378 | 105.1444444 | 48.50031985 | 137.4818182 | 52.02486252 |
| SSX2IP | 203016_s_at | 0.0159346 | 286.2407407 | 88.66730062 | 409.3090909 | 165.5310931 |
| SSX2IP | 210871_x_at | 0.00352256 | 655.837037 | 173.679174 | 810.5090909 | 205.0542388 |
| ST3GAL2 | 217650_x_at | 0.0307694 | 135.2185185 | 59.47402172 | 172.4772727 | 71.12312551 |
| st3gal5 | 216075_at | 0.00235624 | 45.4962963 | 31.16021232 | 31.3 | 24.8219373 |
| ST3GAL6 | 210942_s_at | 0.0119542 | 40.21111111 | 27.63117433 | 58.02272727 | 27.75014254 |
| ST6GALNAC5 | 220979_s_at | 0.0214288 | 417.2185185 | 130.5087266 | 551.2045455 | 161.2663295 |
| STAG2 | 209022_at | 0.0291132 | 412.1259259 | 146.5729107 | 567.1181818 | 184.0333656 |
| STAG3L3 | 209971_x_at | 0.00938996 | 520.137037 | 79.87077615 | 430.2409091 | 78.2101909 |
| Stat3 | 208991_at | 0.0141012 | 304.9296296 | 108.1206976 | 273.2636364 | 114.1923004 |
| stip1 | 213330_s_at | 0.0328198 | 261.0814815 | 108.1249955 | 229.8863636 | 67.87772827 |
| stk19 | 204090_at | 0.000836658 | 185.5074074 | 85.3360458 | 94.36363636 | 57.28873026 |
| stk19 | 36019_at | 0.0155587 | 402.3962963 | 69.14446683 | 345.7181818 | 100.128335 |
| stt3a | 202223_at | 0.0138259 | 170.1777778 | 37.57022484 | 149.7045455 | 36.53382617 |
| STUB1 | 217934_x_at | 0.0054288 | 2259.574074 | 485.7299476 | 1710.590909 | 443.6795292 |
| STX12 | 212111_at | 0.00336787 | 939.9740741 | 273.8102327 | 741.5 | 160.1813318 |
| STX4 | 203530_s_at | 0.0333345 | 299.4481481 | 59.7389151 | 244.5363636 | 73.27785052 |
| STX5 | 203330_s_at | 0.0187008 | 147.4814815 | 31.10060644 | 124.0181818 | 48.16535641 |
| STX6 | 212799_at | 9.12208E-05 | 567.5407407 | 107.0382148 | 660.4227273 | 79.14918964 |
| STX7 | 212632_at | 0.027454 | 525.0074074 | 121.0883369 | 617.0363636 | 148.1573538 |
| Stx8 | 204690_at | 0.0248143 | 672.5333333 | 254.7269503 | 513.6545455 | 122.7025429 |
| sub1 | 221727_at | 0.0334436 | 815.3037037 | 302.1924164 | 994.3636364 | 318.5329848 |
| SUCLA2 | 202930_s_at | 0.00929265 | 407.3481481 | 103.3932908 | 475.8454545 | 138.1164441 |
| Sumo1 | 211069_s_at | 0.00660791 | 975.6148148 | 327.469559 | 1099.631818 | 263.6162929 |
| supt5h | 201480_s_at | 0.0215248 | 643.9259259 | 130.8494425 | 557.8363636 | 111.0754164 |
| SURF1 | 204295_at | 0.032555 | 1342.111111 | 259.5652924 | 1078.577273 | 331.0203791 |
| Suv39h1 | 218619_s_at | 0.0299124 | 180.9851852 | 54.62985028 | 135.4636364 | 46.76583557 |
| suv420h1 | 218242_s_at | 0.023489 | 325.2481481 | 137.8020553 | 423.1681818 | 122.4107309 |
| SUZ12 | 212287_at | 0.0136287 | 324.7851852 | 108.1745978 | 399.0409091 | 106.7865189 |
| SYDE1 | 44702_at | 0.0109492 | 215.8111111 | 71.40380475 | 179.9954545 | 31.39993141 |
| SYMPK | 202339_at | 0.00327042 | 167.437037 | 52.37847582 | 120.4454545 | 46.95459537 |
| SYMPK | 32402_s_at | 0.00587749 | 232.0703704 | 71.95190602 | 166.3545455 | 62.65373266 |
| SYNCRIP | 217833_at | 0.00238022 | 362.2111111 | 73.411445 | 446.8 | 77.01801892 |
| SYNPO2L | 219804_at | 0.0130976 | 12.16296296 | 10.97616818 | 21.29090909 | 12.97539463 |
| Syt1 | 203998_s_at | 0.000831259 | 421.6407407 | 212.0299494 | 629.05 | 286.6518857 |
| Syt1 | 203999_at | 0.000496838 | 2661.822222 | 803.1452658 | 3695.681818 | 1037.786844 |
| Taf5 | 210053_at | 0.0301699 | 113.9740741 | 51.92546872 | 136.5090909 | 36.59610842 |
| TANC2 | 208425_s_at | 0.0272297 | 72.55925926 | 53.06374439 | 120.0181818 | 71.7010436 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| taok2 | 204877_s_at | 0.0225974 | 76.95555556 | 26.0477274 | 59.42727273 | 28.06820234 |
| TAPBPL | 218747_s_at | 0.024048 | 50.22592593 | 21.83537343 | 37.31818182 | 21.23107867 |
| TARBP1 | 202813_at | 0.00165847 | 199.0259259 | 88.86767861 | 311.2181818 | 111.9472352 |
| TARBP2 | 203677_s_at | 0.0132493 | 187.1666667 | 45.48621938 | 153.7227273 | 54.58854696 |
| TARDBP | 221264_s_at | 0.000902386 | 296.5481481 | 93.14714319 | 379.5818182 | 69.55184867 |
| tardbpl | 216420_at | 0.0221385 | 33.27037037 | 23.78580402 | 24.44090909 | 15.34556424 |
| TAX1BP3 | 209154_at | 0.0301711 | 580.2481481 | 225.7735291 | 432.2954545 | 128.34003 |
| TBC1D5 | 201814_at | 0.0158395 | 647.662963 | 194.6431096 | 747.0909091 | 179.4602912 |
| TBC1D9 | 212956_at | 0.00988025 | 475.9851852 | 152.3948684 | 619.8727273 | 222.9381874 |
| TBCB | 201804_x_at | 0.0306463 | 1969.233333 | 541.1015794 | 1688.677273 | 447.5336667 |
| TBCCD1 | 206451_at | 0.0241032 | 62.40740741 | 17.46345472 | 49.89545455 | 15.05451925 |
| tbcel | 222365_at | 0.0330744 | 71.86666667 | 31.32712022 | 84.34090909 | 25.76619526 |
| Tbk1 | 218520_at | 0.00766669 | 197.3962963 | 40.23062822 | 238.9090909 | 44.46203205 |
| TCEA1 | 216241_s_at | 0.00446744 | 608.6333333 | 218.145747 | 860.0045455 | 290.9756568 |
| Tceb2 | 200085_s_at | 0.0297175 | 3945.451852 | 1130.648613 | 2972.813636 | 1245.523046 |
| tcerg1 | 202396_at | 0.000163057 | 291.3111111 | 78.16289368 | 418.7045455 | 145.2475112 |
| TCF25 | 213311_s_at | 0.00766144 | 1272.181481 | 461.2164385 | 870.5454545 | 337.2090488 |
| TCF4 | 212385_at | 0.00545579 | 108.4148148 | 53.01902927 | 166.1045455 | 61.412768 |
| TCF4 | 212387_at | 0.032169 | 408.4333333 | 150.4259772 | 490.9363636 | 125.14527 |
| TCL6 | 221054_s_at | 0.018116 | 4.014814815 | 3.649837057 | 2.745454545 | 1.065353629 |
| TCN2 | 204043_at | 0.00531073 | 207.1777778 | 45.80899587 | 172.3227273 | 52.47287673 |
| TECPR2 | 204308_s_at | 0.0236405 | 485.7296296 | 112.3099277 | 441.2909091 | 52.13247694 |
| Tecr | 208336_s_at | 0.00208502 | 922.1666667 | 258.8073013 | 694.7363636 | 182.3758065 |
| TEK | 206702_at | 0.00861833 | 230.5777778 | 51.56736694 | 272.9272727 | 76.52980858 |
| Terf2ip | 201174_s_at | 0.029403 | 2091.196296 | 467.5180223 | 2251.927273 | 586.247597 |
| TESC | 218872_at | 0.00115176 | 750.6481481 | 230.1123427 | 508.2227273 | 122.0745983 |
| Tex264 | 218548_x_at | 0.0243993 | 188.1185185 | 46.20283905 | 148.6545455 | 47.01272095 |
| TFAP2A | 204654_s_at | 0.0160396 | 27.14074074 | 18.82470266 | 16.06818182 | 12.94108946 |
| TFEB | 221866_at | 0.0193291 | 170.962963 | 101.3760105 | 110.8772727 | 61.58302898 |
| TFPT | 218996_at | 0.00958571 | 439.1407407 | 125.609524 | 316.5363636 | 95.31967541 |
| TGFB2 | 220406_at | 0.0257858 | 55.32962963 | 22.77722909 | 48.56363636 | 15.71897687 |
| tgm2 | 211003_x_at | 0.00902257 | 10.48888889 | 6.393947459 | 8.318181818 | 4.205737166 |
| THAP7 | 218492_s_at | 0.000134013 | 368.3296296 | 79.62698042 | 276.5272727 | 70.55015225 |
| Thoc5 | 209418_s_at | 0.00103453 | 163.9037037 | 44.30958814 | 115.8136364 | 40.50358356 |
| THOC6 | 218848_at | 0.00601653 | 58.13703704 | 29.89618123 | 40.14545455 | 27.26144543 |
| thrA | 214883_at | 0.0316864 | 37.02962963 | 27.83490911 | 22.85454545 | 18.30635402 |
| thrB | AFFX-r2-Bs-thr-M_s_at | 0.0334729 | 24.59259259 | 16.38808024 | 42.74090909 | 30.85889019 |
| THSD7A | 213894_at | 0.000503873 | 133.8222222 | 44.1778428 | 220.1863636 | 86.27337114 |
| THSD7A | 214920_at | 0.00679477 | 217.262963 | 121.5727675 | 291.2318182 | 101.036134 |
| Thtpa | 214341_at | 0.0223473 | 17.21851852 | 15.14679547 | 9.240909091 | 4.221448532 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| Tia1 | 201448_at | 0.0293655 | 197.1555556 | 62.99907407 | 250.3863636 | 91.86499046 |
| Tia1 | 201450_s_at | 0.025008 | 59.76296296 | 29.90931355 | 82.58181818 | 30.66571898 |
| tiam1 | 213135_at | 0.00127537 | 1328.459259 | 264.1897064 | 1596.977273 | 248.9540901 |
| TIMM8B | 218357_s_at | 0.025885 | 1753.7 | 411.0389173 | 1421.927273 | 395.0783155 |
| timp2 | 203167_at | 0.00804426 | 78.6037037 | 48.28683115 | 39.07727273 | 24.86879728 |
| tjp3 | 213412_at | 0.0168323 | 5.840740741 | 2.883542061 | 6.586363636 | 2.319543357 |
| tjp3 | 35148_at | 0.00939516 | 16.03703704 | 13.1719734 | 11.95909091 | 9.426844096 |
| tkt | 208700_s_at | 0.00639801 | 716.9481481 | 171.1281984 | 541.3954545 | 158.9258092 |
| TLE3 | 212770_at | 0.00446909 | 129.3666667 | 51.05231856 | 102.1636364 | 44.37538513 |
| Tlk1 | 202606_s_at | 0.00131336 | 329.3074074 | 103.0569892 | 475.2545455 | 142.3301117 |
| TLL2 | 215008_at | 0.0185792 | 72.21111111 | 35.59233208 | 93.40454545 | 40.56883013 |
| TLN2 | 212701_at | 0.00965175 | 381.7444444 | 119.1775674 | 495.4227273 | 133.6424367 |
| tm2d3 | 221702_s_at | 0.0204884 | 1285.714815 | 221.7147539 | 1348.363636 | 314.5282084 |
| TM9SF3 | 217758_s_at | 3.75087E-05 | 351.5555556 | 109.7138668 | 450.5727273 | 103.1120573 |
| TMBIM1 | 217730_at | 0.000660687 | 382.1481481 | 155.7616433 | 252.0409091 | 91.8193706 |
| TMED3 | 208837_at | 0.0262332 | 348.3925926 | 71.93848294 | 280.7636364 | 52.74746255 |
| TMEM109 | 201361_at | 0.0288586 | 333.0444444 | 96.58864137 | 306.3090909 | 79.58486282 |
| Tmem111 | 217882_at | 0.0262273 | 973.2037037 | 323.7001218 | 802.3681818 | 205.4093298 |
| TMEM132A | 218834_s_at | 0.0231728 | 506.1037037 | 100.6797416 | 443.2818182 | 109.3252101 |
| tmem161a | 43977_at | 0.0233562 | 502.1407407 | 162.3298263 | 403.6363636 | 94.92535185 |
| TMEM204 | 219315_s_at | 0.00103346 | 245.3962963 | 70.68895835 | 194.5045455 | 57.3549805 |
| TMEM30A | 217743_s_at | 0.00107115 | 400.7777778 | 144.0964296 | 564.1681818 | 182.6881037 |
| TMEM47 | 209655_s_at | 0.00999784 | 402.0888889 | 155.4806798 | 662.8272727 | 327.3299401 |
| TMEM5 | 204807_at | 0.00441938 | 86.40740741 | 28.27817759 | 113.9227273 | 35.96340643 |
| TMEM97 | 214283_at | 0.00940393 | 152.7592593 | 52.46854193 | 124.3545455 | 54.7924806 |
| TMPRSS3 | 220177_s_at | 0.00148597 | 126.7518519 | 37.14802376 | 114.6363636 | 38.33781604 |
| tmub2 | 218419_s_at | 0.0255014 | 156.5518519 | 35.86398848 | 143.6590909 | 30.4330281 |
| TMX4 | 201580_s_at | 0.00578378 | 485.262963 | 95.83793672 | 628.7227273 | 188.5762873 |
| TNFRSF1B | 203508_at | 0.00338978 | 88.55925926 | 31.21513759 | 70.86818182 | 34.82671917 |
| Tnfsf12 | 209499_x_at | 0.0134724 | 181.2740741 | 82.23566788 | 174.1363636 | 64.59201296 |
| TNIK | 211828_s_at | 0.00185758 | 364.1962963 | 109.4893724 | 484.8863636 | 102.2415874 |
| Tnip1 | 207196_s_at | 0.00371947 | 253.4814815 | 56.57621841 | 185.4227273 | 65.61507472 |
| tnks | 202561_at | 0.0270499 | 532.762963 | 93.78602138 | 635.8090909 | 146.6162659 |
| tnpo1 | 212635_at | 0.0164314 | 198.5148148 | 57.82078215 | 246.9045455 | 85.65932789 |
| toe1 | 204080_at | 0.000963247 | 182.0296296 | 41.39264906 | 131.2363636 | 47.73941713 |
| TOM1 | 202807_s_at | 0.0088126 | 237.1888889 | 55.13373484 | 191.2545455 | 51.78887293 |
| TOMM20 | 200662_s_at | 0.0147042 | 2555.659259 | 520.6821334 | 2825.963636 | 731.398221 |
| TOMM70A | 201519_at | 0.00249119 | 2987.892593 | 1047.346992 | 3578.268182 | 1018.039736 |
| TOP1 | 208901_s_at | 0.00404954 | 555.1518519 | 193.4572848 | 712.8909091 | 166.0828018 |
| TOP2B | 211987_at | 0.0123999 | 546.7740741 | 153.2530451 | 642.3954545 | 159.3930765 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| TOPBP1 | 202633_at | 0.0123297 | 165.6037037 | 40.27257591 | 222.8272727 | 81.27983515 |
| Tox4 | 201684_s_at | 0.00713643 | 567.9 | 167.2710306 | 446.9636364 | 124.3554259 |
| TPD52 | 201690_s_at | 0.0022044 | 700.6037037 | 174.5370745 | 931.9863636 | 270.249388 |
| TPK1 | 221218_s_at | 0.00719709 | 103.8148148 | 27.55048099 | 127.3772727 | 21.03461845 |
| tpp2 | 203374_s_at | 0.0120161 | 108.5518519 | 30.84644812 | 139.85 | 44.77614958 |
| tpp2 | 203375_s_at | 0.0137442 | 134.9481481 | 41.79478593 | 161.0454545 | 37.95059103 |
| TPSB2 | 210084_x_at | 0.0132307 | 12.27777778 | 3.220049371 | 16.15 | 7.498809429 |
| TPST2 | 204079_at | 0.0264188 | 186.7037037 | 59.0014438 | 165.9318182 | 47.51593604 |
| TRAF3IP2 | 215411_s_at | 0.00281089 | 126.3740741 | 70.29380973 | 85.23181818 | 47.71618859 |
| TRAF5 | 204352_at | 0.0232273 | 224.4518519 | 98.19579879 | 266.4318182 | 82.27738442 |
| TRAK1 | 202080_s_at | 0.0012657 | 281.837037 | 81.99355579 | 366.4636364 | 124.3489045 |
| TRAPPC2P1 | 219351_at | 0.00999296 | 197.7333333 | 39.06630458 | 237.7090909 | 50.47283955 |
| TRAPPC6A | 204985_s_at | 0.0149588 | 320.1148148 | 82.10290777 | 252.6818182 | 77.79520512 |
| TRAV8-6 | 217170_at | 0.0307067 | 23.11851852 | 23.63286559 | 15.12727273 | 5.119540699 |
| trex1 | 205875_s_at | 0.00590211 | 77.15925926 | 31.46275282 | 45.86818182 | 26.0837367 |
| trex1 | 34689_at | 0.0123801 | 301.3814815 | 62.45119964 | 255.2409091 | 66.10484212 |
| Trex2 | 207891_s_at | 0.00296204 | 132.8555556 | 48.7340296 | 99.97727273 | 39.4436057 |
| Trex2 | 213334_x_at | 0.0017878 | 387.5259259 | 113.3114177 | 287.2818182 | 71.76518347 |
| trgv7 | 215345_x_at | 0.00294764 | 35.31111111 | 24.56334563 | 63.98636364 | 30.62604393 |
| TRHDE | 219937_at | 0.0273926 | 32.45555556 | 15.5514613 | 52.60454545 | 41.20549521 |
| trim23 | 204732_s_at | 0.00939474 | 211.7148148 | 70.45530882 | 261.0318182 | 91.33060503 |
| TRIM24 | 213301_x_at | 0.0295629 | 187.3814815 | 52.49994166 | 220.5909091 | 49.44012164 |
| trim33 | 212435_at | 0.00333983 | 333.937037 | 110.1238224 | 469.4045455 | 120.6931034 |
| TRIM37 | 213009_s_at | 0.00367474 | 1267.185185 | 169.8526527 | 1458.918182 | 275.9562071 |
| TRIM52 | 221897_at | 0.00593215 | 133.437037 | 37.4488076 | 174.2363636 | 49.98332622 |
| TRIO | 215406_at | 0.00383363 | 13.86296296 | 12.57892463 | 7.963636364 | 4.054456156 |
| Trmt1 | 210463_x_at | 0.00974714 | 198.0592593 | 68.95324647 | 145.5545455 | 54.58718433 |
| trmt5 | 221952_x_at | 0.0133916 | 1439.888889 | 638.2427591 | 1138.113636 | 343.3741279 |
| Trmt61a | 221907_at | 0.00266229 | 343.6777778 | 110.6634862 | 237.8772727 | 63.7302943 |
| Tro | 205028_at | 0.00754477 | 38.64074074 | 18.84089781 | 55.82272727 | 21.78201381 |
| Trpc1 | 205803_s_at | 0.0315371 | 145.137037 | 53.84328505 | 204.35 | 90.76883118 |
| TSC1 | 209390_at | 0.03112 | 585.4481481 | 93.37418672 | 645.85 | 70.88436425 |
| TSC22D2 | 204094_s_at | 0.0169594 | 214.2222222 | 50.51945043 | 267.1045455 | 80.77756924 |
| TSFM | 214331_at | 0.0068804 | 57.75555556 | 38.24259942 | 87.08636364 | 37.01467271 |
| Tsga10 | 213411_at | 0.000412132 | 501.1481481 | 185.2020983 | 661.5954545 | 137.0767824 |
| TSPAN3 | 200972_at | 0.0227419 | 1692.411111 | 332.2454842 | 1967.659091 | 445.6177656 |
| Tspan31 | 203227_s_at | 0.0270001 | 789.6259259 | 241.5127845 | 596.3272727 | 212.672841 |
| TSPAN7 | 202242_at | 0.00754576 | 3250.818519 | 1039.142047 | 3967.131818 | 742.5828723 |
| tspO | 202096_s_at | 0.00823776 | 272.5888889 | 74.91604703 | 207.2136364 | 77.01523841 |
| Tspy1 | 217160_at | 0.0256114 | 15.27777778 | 7.514362317 | 15.92727273 | 7.507024128 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| Tssc4 | 218612_s_at | 0.017909 | 172.7333333 | 81.64530699 | 104.3909091 | 73.46130766 |
| TST | 209605_at | 0.0165474 | 471.8888889 | 273.6859055 | 248.9318182 | 142.2258612 |
| TSTA3 | 201644_at | 0.00566554 | 125.1111111 | 65.42768958 | 84.75 | 52.9106232 |
| TSTA3 | 36936_at | 0.000192799 | 254.1259259 | 46.29046747 | 199.1318182 | 42.77607683 |
| TTC19 | 217964_at | 0.0199738 | 705.6259259 | 194.1410601 | 824.7636364 | 233.7186252 |
| TTC23 | 219838_at | 0.0193358 | 175.7962963 | 61.98194825 | 156.8409091 | 28.8754247 |
| TTC3L | 208073_x_at | 0.00340674 | 2556.162963 | 1087.086514 | 3095.254545 | 906.6540574 |
| TTC3L | 208662_s_at | 0.013273 | 1699.225926 | 684.6547651 | 2135.536364 | 558.3064584 |
| TTC3L | 210645_s_at | 0.000369541 | 1578.844444 | 755.745375 | 2260.818182 | 672.5731227 |
| TTLL12 | 216251_s_at | 0.0320202 | 351.7777778 | 66.17353836 | 327.2227273 | 71.15306728 |
| TTLL2 | 217423_at | 0.0274217 | 69.63333333 | 22.95138675 | 85.28181818 | 33.82264156 |
| Ttrap | 202266_at | 0.0196666 | 537.962963 | 158.7122581 | 674.1045455 | 163.0853369 |
| TUBA1A | 209118_s_at | 0.0108849 | 13395.14815 | 4094.189989 | 10504.56364 | 2883.881605 |
| TUBA4A | 212242_at | 0.00837219 | 1559.77037 | 419.8757562 | 1053.495455 | 401.1128763 |
| tuba4b | 207490_at | 0.00717941 | 144.962963 | 42.06923916 | 109.6772727 | 34.65293132 |
| tubB | 209026_x_at | 0.0302107 | 2262.051852 | 1240.967858 | 1732.781818 | 568.7787516 |
| TUBB2C | 208977_x_at | 0.0292469 | 3559.981481 | 1125.63266 | 3025.627273 | 723.7293852 |
| TUBB2C | 213726_x_at | 0.0328768 | 3685.396296 | 1052.060177 | 3124.8 | 756.2563354 |
| Tubgcp2 | 202477_s_at | 0.00259609 | 523.5740741 | 160.7832669 | 400.7909091 | 103.4777036 |
| TUBGCP3 | 203690_at | 0.00582442 | 129.3555556 | 64.42354642 | 158.1090909 | 64.3871838 |
| TUG1 | 212337_at | 0.00732772 | 251.9037037 | 67.82631371 | 366.4590909 | 138.6094673 |
| TUG1 | 222244_s_at | 0.00487616 | 566.6407407 | 174.1385793 | 789.7772727 | 229.1776976 |
| TULP4 | 218184_at | 0.0271218 | 699.3148148 | 222.2317254 | 850.35 | 167.7894024 |
| tusc2 | 203272_s_at | 0.0104785 | 320.037037 | 131.7549244 | 231.3818182 | 75.44445851 |
| TUSC3 | 213423_x_at | 0.00918922 | 629.8777778 | 249.1908449 | 780.0318182 | 318.6895106 |
| TUSC3 | 209228_x_at | 0.0226419 | 470.2814815 | 183.659122 | 577.5818182 | 237.3666134 |
| tut1 | 218965_s_at | 0.0201963 | 51.48888889 | 31.61314641 | 34.42272727 | 24.21190049 |
| TXN2 | 209077_at | 0.0148984 | 620.5555556 | 131.2739717 | 538.4 | 139.7800858 |
| TXN2 | 209078_s_at | 0.0248944 | 246.762963 | 96.62827325 | 204.2454545 | 55.97364794 |
| TXNIP | 201010_s_at | 0.00747403 | 663.4 | 320.9738343 | 536.2454545 | 129.0777312 |
| TXNRD1 | 201266_at | 0.00473555 | 363.0925926 | 112.0749094 | 487.3772727 | 116.9913222 |
| TYROBP | 204122_at | 0.0263843 | 188.1407407 | 90.32902787 | 139.6954545 | 58.113407 |
| UAP1 | 209340_at | 0.0232591 | 214.0518519 | 52.11542198 | 253.9272727 | 60.46085851 |
| Ubap2l | 210500_at | 0.003925 | 34.18148148 | 18.80713934 | 26.50909091 | 18.11571034 |
| ube2b | 211763_s_at | 0.0144462 | 710.8518519 | 223.0481896 | 810.5863636 | 212.2256622 |
| ube2d4 | 65521_at | 0.0149258 | 307.5 | 73.7273042 | 288.5454545 | 72.28066149 |
| UBE2W | 218521_s_at | 0.00176128 | 112.9962963 | 34.42535382 | 175.8045455 | 67.1398787 |
| Ube3a | 213128_s_at | 0.00296664 | 316.4148148 | 95.39390685 | 381.4318182 | 77.74252612 |
| ubl3 | 201534_s_at | 0.0144802 | 300.2592593 | 136.0306845 | 504.2454545 | 243.134393 |
| ubl3 | 201535_at | 0.000944736 | 1510.259259 | 464.5635911 | 2071.377273 | 538.1374058 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| UBR2 | 212756_s_at | 0.00121967 | 110.6296296 | 28.43487586 | 140.1409091 | 26.02018738 |
| UBR2 | 212760_at | 0.000469393 | 389.8111111 | 86.14732164 | 527.5727273 | 113.0019856 |
| Ubxn1 | 201871_s_at | 0.00468229 | 662.0074074 | 192.4238949 | 479.8 | 155.2057283 |
| UBXN2B | 212934_at | 0.0257356 | 255.9925926 | 61.86028256 | 305.6318182 | 60.29507116 |
| ubxn6 | 220757_s_at | 0.0138757 | 488.5 | 164.8197244 | 355.5954545 | 119.496545 |
| UCHL5 | 219960_s_at | 0.033514 | 176.0962963 | 48.78645368 | 212.25 | 59.51533416 |
| UCHL5 | 220083_x_at | 0.0219701 | 49.28518519 | 21.0694402 | 54.58636364 | 18.90321957 |
| UFM1 | 218050_at | 0.00326291 | 314.9851852 | 107.9867574 | 417.0681818 | 111.2988614 |
| UGCG | 204881_s_at | 0.0135013 | 493.7703704 | 112.7269022 | 633.9772727 | 193.5841959 |
| Ugt1a1 | 204532_x_at | 0.0272067 | 156.0518519 | 67.97333397 | 125.6727273 | 50.11935451 |
| Ulk2 | 204063_s_at | 0.0301525 | 206.137037 | 39.44844882 | 239.1 | 53.53543553 |
| Uqcrc1 | 201903_at | 0.0255149 | 1733.266667 | 652.80003 | 1230.268182 | 494.7246366 |
| Use1 | 219348_at | 0.003412 | 287.6777778 | 81.26534569 | 198.5409091 | 72.92525632 |
| Use1 | 221706_s_at | 0.0223701 | 212.3222222 | 56.31578091 | 171.4772727 | 50.86913117 |
| USF2 | 202152_x_at | 0.00788682 | 882.5555556 | 214.9151627 | 676.5409091 | 173.8573653 |
| USF2 | 214879_x_at | 0.014785 | 654.8703704 | 132.580512 | 508.3454545 | 161.9561985 |
| USO1 | 201831_s_at | 0.0134451 | 169.5407407 | 75.90509894 | 223.3181818 | 71.62301197 |
| USO1 | 201832_s_at | 0.00659763 | 398.6666667 | 127.3622937 | 499.7045455 | 148.7538218 |
| USP15 | 209475_at | 0.000319714 | 319.037037 | 69.29271328 | 428.7590909 | 93.62485252 |
| USP21 | 218367_x_at | 0.0100722 | 203.7518519 | 61.48684268 | 261.7590909 | 93.63841631 |
| usp25 | 220419_s_at | 0.0096959 | 437.4148148 | 71.98737445 | 521.7227273 | 114.9864503 |
| usp33 | 212513_s_at | 0.0100122 | 657.1407407 | 136.9770482 | 763.8136364 | 189.710989 |
| USP34 | 212066_s_at | 0.00802915 | 638.0740741 | 218.5493125 | 801.1318182 | 280.7197999 |
| USP46 | 203870_at | 0.000601231 | 297.2703704 | 93.25797477 | 465.1136364 | 147.836484 |
| usp48 | 220078_at | 0.00597493 | 132.7296296 | 66.14395614 | 152.8409091 | 43.64118478 |
| usp6 | 206405_x_at | 0.00675432 | 440.9444444 | 95.9793621 | 574.7772727 | 168.4121501 |
| Usp7 | 201498_at | 0.0112964 | 704.3074074 | 274.9891186 | 772.4909091 | 205.100593 |
| usp8 | 202745_at | 0.0246361 | 157.0444444 | 47.75317415 | 206.0272727 | 66.09821827 |
| USP9X | 201100_s_at | 0.000935802 | 357.4925926 | 92.00330231 | 443.5 | 117.9872875 |
| UTP14C | 203614_at | 0.0122794 | 442.0777778 | 116.2727574 | 530.7227273 | 124.9283449 |
| UXT | 218495_at | 0.0153182 | 652.4222222 | 218.7204527 | 480.4772727 | 155.5791758 |
| Vamp4 | 213480_at | 0.0110426 | 485.7703704 | 130.6162666 | 587.4909091 | 108.0980944 |
| vamp5 | 204929_s_at | 8.31834E-05 | 173.3222222 | 59.69652311 | 121.3227273 | 55.0211382 |
| Vamp8 | 202546_at | 0.00524412 | 46.70740741 | 40.60850542 | 13.70909091 | 16.64397243 |
| vat1 | 208626_s_at | 0.00518372 | 614.7888889 | 145.1441361 | 512.7954545 | 156.2231386 |
| vbp1 | 201472_at | 0.00424551 | 1142.155556 | 284.3965181 | 1280.804545 | 208.1109674 |
| VENTXP1 | 216726_at | 0.0223493 | 9.992592593 | 3.553863112 | 8.640909091 | 3.242377007 |
| VKORC1 | 217949_s_at | 0.0214861 | 302.037037 | 79.94794532 | 275.4 | 68.55435105 |
| VPS13A | 214785_at | 0.00194966 | 105.4962963 | 35.44745278 | 166.9772727 | 59.844934 |
| Vps26a | 201807_at | 0.0209255 | 1120 | 268.6817591 | 1284.104545 | 214.3307535 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| VPS28 | 218679_s_at | 0.00141662 | 987.6148148 | 296.7682594 | 710.6636364 | 245.41215 |
| vwf | 202112_at | 0.000428275 | 530.5777778 | 164.4143086 | 370.4272727 | 135.4692802 |
| WAPAL | 212267_at | 0.0289065 | 201.4777778 | 61.04415384 | 250.9181818 | 59.07322846 |
| wars | 200629_at | 0.0224606 | 679.062963 | 127.5056353 | 554.0045455 | 131.4769959 |
| WAS | 205400_at | 0.0160786 | 39.82222222 | 27.65264396 | 30.28181818 | 23.67762931 |
| WASF1 | 204165_at | 0.000680754 | 1685.466667 | 425.9593309 | 2213.122727 | 559.026804 |
| Wasf2 | 221725_at | 0.0197768 | 268.1555556 | 81.30900382 | 217.3090909 | 66.00837544 |
| WASL | 205810_s_at | 0.0124701 | 21.46666667 | 11.22147666 | 16.65454545 | 9.6033589 |
| WASL | 205809_s_at | 0.0204074 | 433.2962963 | 205.9408102 | 555.2136364 | 222.9582543 |
| WBP4 | 203599_s_at | 0.00549544 | 272.9777778 | 76.74717902 | 354.9545455 | 96.71402975 |
| Wbscr22 | 207628_s_at | 0.0232891 | 501.8333333 | 72.57037963 | 421.1681818 | 112.7363354 |
| WDFY3 | 212602_at | 0.0316105 | 153 | 54.91066171 | 212.8863636 | 82.10275383 |
| WDR11 | 218090_s_at | 0.0326525 | 164.7074074 | 41.97149148 | 195.0272727 | 65.67508901 |
| WDR37 | 211383_s_at | 0.0253173 | 222.6888889 | 47.26943502 | 256.7409091 | 55.4649152 |
| WDR44 | 219297_at | 0.00769219 | 149.3703704 | 38.47099622 | 193.1681818 | 53.91045827 |
| Wdr61 | 215156_at | 0.0213316 | 137.4111111 | 78.58058741 | 176.4772727 | 77.47856805 |
| WDR7 | 212880_at | 3.39459E-06 | 817.9666667 | 199.3419077 | 1121.981818 | 258.7248118 |
| WDR74 | 218278_at | 0.00527549 | 152.4407407 | 45.38513192 | 121.5636364 | 42.28974372 |
| WDR74 | 221712_s_at | 0.00309645 | 241.2962963 | 63.54866386 | 186.8409091 | 51.23034498 |
| WLS | 221958_s_at | 0.00379368 | 312.862963 | 107.3721965 | 278.3863636 | 91.33623542 |
| wnt10b | 206213_at | 0.0122596 | 233.8740741 | 138.6098637 | 338.8136364 | 115.7779907 |
| wnt5b | 221029_s_at | 0.0196637 | 71.48518519 | 27.55921881 | 52.62727273 | 23.85188785 |
| WRAP53 | 220258_s_at | 0.0136701 | 30.20740741 | 24.41180241 | 15.83636364 | 7.709891325 |
| wrnip1 | 218015_s_at | 0.0116457 | 57.97777778 | 25.51956012 | 41.08636364 | 15.06166042 |
| WSB1 | 201295_s_at | 0.0008641 | 30.44814815 | 18.91188821 | 54.94090909 | 24.53079035 |
| WSCD1 | 213157_s_at | 0.00471431 | 120.9074074 | 42.29856268 | 92.50909091 | 38.17895093 |
| wt1 | 216953_s_at | 0.00412562 | 15.71851852 | 13.09204212 | 8.154545455 | 3.601683108 |
| WWP1 | 212638_s_at | 0.00270123 | 664.0666667 | 212.9157237 | 868.7636364 | 278.1709521 |
| XK | 206698_at | 0.0144717 | 146.962963 | 36.13920892 | 179.2090909 | 39.78975591 |
| XPNPEP1 | 217380_s_at | 0.0180335 | 22.2037037 | 18.24072961 | 35.52272727 | 20.45552508 |
| Xrcc4 | 210812_at | 0.0275037 | 9.962962963 | 4.269313415 | 16.00909091 | 13.90111024 |
| XRCC6 | 200792_at | 0.00641846 | 2623.803704 | 609.9806961 | 2050.536364 | 589.8275701 |
| YEATS2 | 221203_s_at | 0.000175753 | 305.5148148 | 72.01524253 | 354.5227273 | 80.3922167 |
| YIF1A | 202418_at | 0.00116263 | 374.8851852 | 72.83478514 | 302.5818182 | 73.14860046 |
| YIPF6 | 212343_at | 0.0248701 | 241.4074074 | 87.58557102 | 313.3772727 | 84.65407442 |
| YME1L1 | 201351_s_at | 0.0180795 | 289.6962963 | 78.51493969 | 350.4409091 | 89.85087465 |
| YME1L1 | 201352_at | 0.0272755 | 630.7444444 | 232.2870478 | 777.4181818 | 254.6257153 |
| YME1L1 | 216304_x_at | 0.0238153 | 263.3888889 | 72.6101727 | 314.7636364 | 82.16085005 |
| Ythdc2 | 213077_at | 0.0187208 | 143.8296296 | 49.09235265 | 195.1318182 | 56.18762265 |
| ZAK | 218833_at | 0.0303535 | 61.15185185 | 22.53826439 | 49.97272727 | 25.66882827 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| zap70 | 214032_at | 0.0118965 | 27.69259259 | 20.96394205 | 40.42272727 | 25.42550148 |
| zbtb11 | 204847_at | 0.0142097 | 237.8 | 66.92939449 | 309.7454545 | 97.49615244 |
| ZBTB16 | 205883_at | 0.00431488 | 179.7037037 | 72.83101876 | 140.7818182 | 49.16403676 |
| ZBTB20 | 205383_s_at | 0.014745 | 1189.114815 | 487.795828 | 1518.372727 | 390.8758385 |
| Zc3h14 | 213064_at | 0.0113061 | 282.8888889 | 97.66539948 | 374.8 | 111.468441 |
| ZC3H15 | 201595_s_at | 0.00386158 | 389.4148148 | 92.20435374 | 484.5681818 | 119.4561501 |
| ZCCHC11 | 212704_at | 0.0271465 | 210.8777778 | 77.65543883 | 288.9954545 | 90.04090328 |
| ZCCHC14 | 212655_at | 0.030493 | 206.1925926 | 89.7430517 | 273.7863636 | 61.3696163 |
| zcchc8 | 218478_s_at | 0.00173967 | 121.237037 | 28.26967862 | 171.75 | 48.4756861 |
| ZDHHC17 | 212982_at | 0.00016695 | 523.5666667 | 181.4280786 | 779.6272727 | 213.0665941 |
| ZEB1 | 212758_s_at | 0.00508386 | 321.0481481 | 120.838498 | 438.2954545 | 134.647821 |
| ZEB1 | 212764_at | 0.00261663 | 519.262963 | 178.0729823 | 837.9590909 | 343.3511886 |
| Zfc3h1 | 213065_at | 0.000387699 | 292.7296296 | 80.01711747 | 415.2545455 | 96.96460683 |
| ZFHX3 | 208033_s_at | 0.00931097 | 20.95555556 | 13.74765248 | 39.94545455 | 26.01226318 |
| ZFP36L2 | 201368_at | 0.0192862 | 364.5407407 | 85.62639896 | 497.6090909 | 209.8911507 |
| ZFPL1 | 209428_s_at | 0.0181403 | 155.8481481 | 79.85701342 | 120.4681818 | 52.51699395 |
| ZFX | 214678_x_at | 0.0118258 | 37.42962963 | 13.3289683 | 50.36818182 | 21.47260461 |
| zgpat | 221848_at | 0.0013476 | 92.18148148 | 53.15345012 | 41.10454545 | 30.35779459 |
| zgpat | 57539_at | 0.00465174 | 151.637037 | 56.21522616 | 104.6 | 28.83268648 |
| ZMAT4 | 219877_at | 0.00196716 | 132.3962963 | 98.4273433 | 174.4136364 | 86.71956607 |
| Zmiz1 | 212124_at | 0.028589 | 582.3407407 | 100.597795 | 705.5227273 | 153.8963131 |
| zmpste24 | 202939_at | 0.0321296 | 504.7925926 | 146.5846223 | 620.65 | 143.1739926 |
| Zmym4 | 202051_s_at | 0.0205659 | 336.0555556 | 61.3489034 | 420.9409091 | 98.92595432 |
| zmynd11 | 202136_at | 0.0278584 | 2068.962963 | 594.0927143 | 2441.245455 | 568.908974 |
| ZNF12 | 217488_x_at | 0.0312498 | 13.3962963 | 4.299953621 | 19.38181818 | 12.32514412 |
| ZNF12 | 219571_s_at | 0.0281365 | 167.537037 | 61.42986713 | 207.5681818 | 49.67665339 |
| ZNF131 | 221842_s_at | 0.0277117 | 126.2222222 | 42.73185025 | 177.0909091 | 69.55167938 |
| ZNF148 | 203319_s_at | 0.00633545 | 227.8888889 | 92.85603552 | 334.5181818 | 135.1482101 |
| ZNF174 | 205252_at | 0.0302011 | 187.8 | 24.57163781 | 170.1636364 | 27.90797028 |
| ZNF204P | 214823_at | 0.0118793 | 156.2888889 | 40.94101135 | 188.5909091 | 44.6347602 |
| ZNF211 | 205437_at | 0.0175218 | 103.2925926 | 37.11392985 | 128.2136364 | 34.91809867 |
| znf292 | 212368_at | 0.00167699 | 465.6962963 | 151.4499295 | 669.3954545 | 181.6426987 |
| ZNF32 | 209538_at | 0.0239884 | 321.237037 | 69.16640552 | 259.1954545 | 60.62603148 |
| ZNF394 | 214714_at | 0.0238605 | 106.1740741 | 67.23184109 | 78.65909091 | 34.77397301 |
| ZNF408 | 219224_x_at | 0.000540605 | 189.6037037 | 94.40258912 | 103.5227273 | 50.71111395 |
| ZNF440 | 215892_at | 0.0206329 | 38.32592593 | 21.50712928 | 47.64090909 | 27.74030348 |
| ZNF45 | 222028_at | 0.00296503 | 131.0111111 | 42.84563826 | 144.8727273 | 28.20351518 |
| ZNF460 | 216273_at | 0.00666527 | 52.64814815 | 32.70651982 | 28.85454545 | 17.60591695 |
| ZNF500 | 41113_at | 0.00559496 | 93.81851852 | 27.04893055 | 82.51818182 | 21.67993666 |
| ZNF529 | 215307_at | 0.00164618 | 271.1148148 | 74.48821643 | 353.4363636 | 116.5552701 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| znf574 | 218762_at | 0.0130369 | 55.20740741 | 31.94805792 | 41.03181818 | 23.38056552 |
| znf574 | 221844_x_at | 0.0210736 | 923.9481481 | 338.1187028 | 1036.154545 | 273.7183167 |
| ZNF587 | 219981_x_at | 0.0241338 | 451.7740741 | 187.2390381 | 511.1954545 | 105.8590099 |
| znf593 | 204175_at | 0.013153 | 311.9333333 | 103.3476582 | 209.3454545 | 60.44092533 |
| ZNF688 | 213527_s_at | 0.00652331 | 221.3888889 | 77.60553774 | 169.5227273 | 49.34869065 |
| ZNF688 | 213529_at | 0.0034678 | 53.78518519 | 24.12352353 | 33.59090909 | 25.3574993 |
| ZNF747 | 206180_x_at | 0.00728677 | 265.6407407 | 90.73563993 | 215.8409091 | 84.78859795 |
| ZNF75D | 214813_at | 0.00686269 | 63.93703704 | 27.80471941 | 77.47727273 | 23.60516352 |
| ZNF768 | 218916_at | 0.023467 | 153.4111111 | 51.90699029 | 113.7818182 | 40.65942913 |
| ZNF804A | 215767_at | 0.0106307 | 186.6851852 | 65.64769434 | 244.2318182 | 78.95668726 |
| znf84 | 204453_at | 0.0128237 | 39.56296296 | 26.46616342 | 53.75 | 27.45855318 |
| ZNF91 | 206059_at | 0.0190582 | 509.1333333 | 159.8225699 | 715.6181818 | 258.8677115 |
| Znhit1 | 201541_s_at | 0.00678464 | 566.437037 | 141.7956687 | 418.6227273 | 154.9160078 |
| ZNHIT6 | 218932_at | 0.0215171 | 235.4296296 | 67.0943699 | 274.2136364 | 43.88338763 |
| ZWILCH | 218349_s_at | 0.00248835 | 20.27407407 | 18.45352984 | 44.50909091 | 26.37421015 |
| ZXDB | 215263_at | 0.00720609 | 55.67777778 | 25.09146857 | 45.19545455 | 20.85860511 |
| | 214376_at | 0.00916607 | 394.9222222 | 95.61148279 | 435.6 | 89.70484937 |
| | 207371_at | 0.0124008 | 5.433333333 | 5.429265427 | 16.38181818 | 15.85273407 |
| | 208187_s_at | 0.0154991 | 86.67777778 | 36.45429523 | 63.85 | 23.54154888 |
| | 208340_at | 0.015611 | 14.59259259 | 11.53329381 | 20.52727273 | 13.78174023 |
| | 213156_at | 0.017336 | 213.2518519 | 104.7797998 | 299.4181818 | 91.56385561 |
| | 213904_at | 0.00149499 | 1287.144444 | 487.0809634 | 1838.972727 | 588.4411312 |
| | 214809_at | 0.0135727 | 30.5962963 | 15.58748219 | 44.64090909 | 21.20549478 |
| | 215149_at | 0.00128211 | 143.0444444 | 44.45982917 | 226.7363636 | 92.45282733 |
| | 215287_at | 0.0087822 | 134.9185185 | 44.39718492 | 187.1045455 | 72.17460625 |
| | 215423_at | 0.00225659 | 253.6148148 | 83.73964094 | 344.8227273 | 101.3045147 |
| | 215469_at | 0.00108163 | 42.47777778 | 22.04372112 | 72.54090909 | 31.61602455 |
| | 216151_at | 0.00850791 | 15.05925926 | 18.82601022 | 7.627272727 | 10.90042296 |
| | 216384_x_at | 0.000632713 | 1110.633333 | 473.1983516 | 661.2909091 | 228.6952285 |
| | 216518_at | 0.00425202 | 53.41481481 | 26.84470588 | 86.01818182 | 41.61537761 |
| | 216565_x_at | 0.019365 | 201.3592593 | 111.8266559 | 170.5227273 | 74.00315265 |
| | 216715_at | 0.011029 | 62.72592593 | 36.43184989 | 42.98181818 | 23.94560575 |
| | 217313_at | 0.00153461 | 167.7111111 | 54.74258175 | 116.0954545 | 52.23112078 |
| | 217322_x_at | 0.0036469 | 78.17407407 | 28.70861024 | 65.44090909 | 22.09970177 |
| | 217435_x_at | 0.00185407 | 47.84074074 | 27.37027106 | 73.39090909 | 46.49840662 |
| | 217695_x_at | 0.00200642 | 47.68888889 | 14.5507952 | 69.13636364 | 23.68768106 |
| | 220697_at | 0.00364399 | 18.33333333 | 16.90172954 | 31.36818182 | 13.96800379 |
| | 220809_at | 0.0148045 | 7.181481481 | 4.143209183 | 13.13181818 | 10.48379186 |
| | AFFX-r2-Bs-phe-5_at | 0.0136151 | 5.822222222 | 7.672595255 | 11.86818182 | 10.56838891 |
| | 207879_at | 0.0236475 | 6.040740741 | 5.353737678 | 10.10909091 | 9.906991715 |

| Gene symbol | Probeset | P value | Mean Control | STDEV Control | Mean Heroin | STDEV Heroin |
|---|---|---|---|---|---|---|
| | 208278_s_at | 0.0273766 | 7.333333333 | 3.401244116 | 10.33181818 | 6.060204803 |
| | 209733_at | 0.0273327 | 164.7777778 | 48.51633613 | 200.5863636 | 55.99195772 |
| | 215182_x_at | 0.030908 | 94.75185185 | 74.66667144 | 69.18636364 | 32.87338329 |
| | 216406_at | 0.0321011 | 9.914814815 | 10.9434808 | 16.91818182 | 16.37828517 |
| | 216527_at | 0.0197785 | 52.81111111 | 40.40106942 | 44.42272727 | 20.9168406 |
| | 216794_at | 0.0223754 | 29.27037037 | 28.26386406 | 52.05 | 35.42499454 |
| | 216806_at | 0.0305296 | 146.5814815 | 58.78966443 | 120.0318182 | 42.58277526 |
| | 216861_at | 0.026026 | 4.822222222 | 5.495685954 | 3.55 | 2.22512707 |
| | 217459_at | 0.0206226 | 30.23703704 | 36.19196838 | 19.08181818 | 15.88241425 |
| | 217498_at | 0.0275511 | 31.41481481 | 21.55487993 | 46.49545455 | 21.77174834 |
| | 220906_at | 0.0251465 | 76.45555556 | 30.61270894 | 97.69545455 | 28.52296447 |
| | 220912_at | 0.0323135 | 49.41481481 | 21.05081222 | 59.45454545 | 17.5506811 |
| | 221973_at | 0.0289132 | 134.8777778 | 65.94514231 | 190.7090909 | 82.99621282 |
| | 222145_at | 0.0230974 | 16.71481481 | 19.87881949 | 33.47272727 | 25.4544632 |
| | 222312_s_at | 0.0287244 | 54.75925926 | 23.81420486 | 72.62727273 | 20.24721455 |

**Supplemental Table S4.** The most significantly enriched cluster from the gene ontology analysis (Database for Annotation, Visualization and Integrated Discovery v6.7) related to synaptic function.

| Annotation Cluster 1 | Enrichment Score: 4.638400628756887 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | Term | Count | % | PValue | List Total | Pop Hits | Pop Total | Fold Enrichment | Bonferroni | Benjamini | FDR |
| GOTERM_CC_FAT | GO:0045202~synapse | 46 | 4.590818363 | 9.27E-08 | 696 | 355 | 12782 | 2.379682694 | 4.49E-05 | 4.49E-05 | 1.33E-04 |
| GOTERM_CC_FAT | GO:0044456~synapse part | 34 | 3.393213573 | 1.39E-06 | 696 | 246 | 12782 | 2.538244089 | 6.73E-04 | 2.24E-04 | 0.001992408 |
| GOTERM_CC_FAT | GO:0014069~postsynaptic density | 16 | 1.596806387 | 4.89E-06 | 696 | 71 | 12782 | 4.138578598 | 0.002363952 | 5.92E-04 | 0.007009323 |
| SP_PIR_KEYWORDS | synapse | 28 | 2.794411178 | 1.26E-05 | 984 | 213 | 19235 | 2.569659147 | 0.006523746 | 5.45E-04 | 0.018253938 |
| SP_PIR_KEYWORDS | postsynaptic cell membrane | 18 | 1.796407186 | 4.18E-05 | 984 | 110 | 19235 | 3.198725055 | 0.021447983 | 0.001444378 | 0.06045516 |
| SP_PIR_KEYWORDS | cell junction | 39 | 3.892215569 | 1.73E-04 | 984 | 399 | 19235 | 1.910683721 | 0.085803097 | 0.004971451 | 0.249903844 |
| GOTERM_CC_FAT | GO:0045211~postsynaptic membrane | 19 | 1.896207585 | 3.70E-04 | 696 | 135 | 12782 | 2.584695615 | 0.163804673 | 0.016131476 | 0.528423673 |
| GOTERM_CC_FAT | GO:0030054~cell junction | 44 | 4.391217565 | 0.003685232 | 696 | 518 | 12782 | 1.559956508 | 0.832529311 | 0.074751885 | 5.154765208 |

**Supplemental Table S5.** List of differentially expressed genes related to glutamatergic neurotransmission from the human nucleus accumbens microarray.

| Symbol | Gene Name | Function related to Glutamate | Probe ID | Fold Diff | p value | CoM | CoSTD | He M | He STD |
|---|---|---|---|---|---|---|---|---|---|
| ALDH1L1 | aldehyde dehydrogenase 1 family, member L1 | Glutamine synthesis, glutamate metabolism | 205208_at | 0.719519882 | 0.00262464 | 504.8 | 123.2 | 363.2 | 161.4 |
| STX12 | syntaxin 12 | Part a presynaptic membrane complex that releases neurotransmitters from vesicles | 212111_at | 0.788851544 | 7.40E-11 | 940.0 | 273.8 | 741.5 | 160.2 |
| LYN | v-yes-1 Yamaguchi sarcoma viral related oncogene homolog | Interacts with glutamate receptors to regulate glutamate-mediated signaling | 210754_s_at | 0.838678193 | 0.00128792 | 86.9 | 26.1 | 72.9 | 30.5 |
| PHGDH | phosphoglycerate dehydrogenase | Glutamine synthesis | 201397_at | 0.759535939 | 0.00117179 | 797.7 | 286.5 | 605.9 | 217.9 |
| asl | argininosuccinate lyase | Glutamine synthesis | 204608_at | 0.775041829 | 0.00177278 | 163.0 | 35.9 | 126.3 | 41.7 |
| PLEKHG3 | pleckstrin homology domain containing, family G (with RhoGef domain) member 3 | Part of the post-synaptic density | 217044_s_at | 0.712391775 | 0.00200988 | 100.8 | 59.5 | 71.8 | 37.8 |
| HOMER3 | homer homolog 3 (Drosophila) | Part of the post-synaptic density | 204647_at | 0.718056919 | 2.38E-05 | 226.4 | 111.3 | 162.6 | 57.5 |
| Cps1 | carbamoyl-phosphate synthetase 1, mitochondrial | Glutamine synthesis, glutamate metabolism | 217564_s_at | 0.683418506 | 0.00016964 | 31.6 | 22.5 | 21.6 | 19.9 |
| PLEKHO1 | pleckstrin homology domain containing, family O member 1 | Part of the post-synaptic density | 218223_s_at | 0.801755853 | 0.0904817 | 292.7 | 88.3 | 234.7 | 79.5 |
| Lin7b | lin-7 homolog B (C. elegans) | forms a complex with Dlg (discs large) | 219760_at | 0.746894325 | 0.0593337 | 600.2 | 172.2 | 448.3 | 165.3 |
| STX5 | syntaxin 5 | Part a presynaptic membrane complex that releases neurotransmitters from vesicles | 203330_s_at | 0.840906808 | 0.0857359 | 147.5 | 31.1 | 124.0 | 48.2 |
| FAH | fumarylacetoacetate hydrolase (fumarylacetoacetase) | Glutamine synthesis | 202862_at | 0.866001341 | 0.00216767 | 154.1 | 38.1 | 133.5 | 47.5 |
| agxt | alanine-glyoxylate aminotransferase | Glutamate metabolism | 206957_at | 0.708797143 | 0.000305463 | 23.4 | 17.8 | 16.6 | 25.7 |
| ctps2 | CTP synthase II | Glutamine synthesis | 219080_s_at | 0.868562831 | 0.0331049 | 62.4 | 27.6 | 54.2 | 23.9 |
| FPGS | folylpolyglutamate synthase | Glutamate synthesis | 202945_at | 0.804266298 | 0.00049188 | 214.9 | 54.5 | 172.9 | 60.6 |
| LYN | v-yes-1 Yamaguchi sarcoma viral related oncogene homolog | Interacts with glutamate receptors to regulate glutamate-mediated signaling | 202625_at | 0.825857405 | 0.00743143 | 42.4 | 22.4 | 35.1 | 14.8 |
| Ppp1ca | protein phosphatase 1, catalytic subunit, alpha isoform | involved in DARPP32 signaling downstream of glutamate receptor activation | 200846_s_at | 0.720161402 | 4.63E-05 | 634.6 | 351.7 | 457.0 | 207.5 |
| PPP3CC | protein phosphatase 3 (formerly 2B), catalytic subunit, gamma isoform | involved in DARPP32 signaling downstream of glutamate receptor activation | 207000_s_at | 0.834488644 | 0.000308712 | 57.6 | 21.7 | 48.1 | 24.6 |
| Psd4 | pleckstrin and Sec7 domain containing 4 | Part of the post-synaptic density | 215923_s_at | 0.801976447 | 0.00212004 | 36.0 | 30.6 | 28.9 | 21.4 |
| Qpctl | glutaminyl-peptide cyclotransferase-like | Glutamine/glutamate synthesis | 220438_at | 0.600366501 | 6.59E-05 | 48.0 | 33.4 | 28.8 | 16.1 |
| slc1a4 | solute carrier family 1 (glutamate/neutral amino acid transporter), member 4 | Glutamate transport | 209610_s_at | 0.889414673 | 0.000452779 | 978.1 | 434.6 | 870.0 | 213.8 |
| STX4 | syntaxin 4 | Part a presynaptic membrane complex that releases neurotransmitters from vesicles | 203530_s_at | 0.816623396 | 0.012235 | 299.4 | 59.7 | 244.5 | 73.3 |
| Stx8 | syntaxin 8 | Part a presynaptic membrane complex that releases neurotransmitters from vesicles | 204690_at | 0.763760724 | 0.00298378 | 672.5 | 254.7 | 513.7 | 122.7 |
| Abi1 | abl-interactor 1 | Localized to the PSD and regulates dendrite formation | 209028_s_at | 1.286532678 | 0.0323768 | 321.1 | 70.8 | 413.1 | 142.5 |
| STX6 | syntaxin 6 | Part a presynaptic membrane complex that releases neurotransmitters from vesicles | 212799_at | 1.16365695 | 0.00043935 | 567.5 | 107.0 | 660.4 | 79.1 |
| Grm5 | glutamate receptor, metabotropic 5 | receptor | 214217_at | 1.602996384 | 0.00109434 | 418.6 | 146.7 | 671.0 | 246.9 |
| Syt1 | synaptotagmin I | Part a presynaptic membrane complex that releases neurotransmitters from vesicles | 203999_at | 1.388402947 | 1.06E-05 | 2661.8 | 803.1 | 3695.7 | 1037.8 |
| Syt1 | synaptotagmin I | Part a presynaptic membrane complex that releases neurotransmitters from vesicles | 203998_s_at | 1.491909911 | 6.03E-07 | 421.6 | 212.0 | 629.1 | 286.7 |
| GRIA2 | glutamate receptor, ionotropic, AMPA 2 | receptor | 205358_at | 1.405584094 | 7.29E-05 | 2856.0 | 1135.3 | 4014.3 | 1071.3 |
| PSD3 | pleckstrin and Sec7 domain containing 3 | Part of the post-synaptic density | 218613_at | 1.331289189 | 1.13E-07 | 1174.6 | 380.5 | 1563.7 | 376.0 |
| Akap9 | A kinase (PRKA) anchor protein (yotiao) 9 | Postsynaptic excitatory synapses; scaffolding proteins that ensure protein kinase target specificity | 210962_s_at | 1.352397695 | 0.000276254 | 269.8 | 98.9 | 364.8 | 101.5 |
| Erbb4 | v-erb-a erythroblastic leukemia viral oncogene homolog 4 (avian) | Interacts with neuregulin to modulate NMDA receptors by causing them to be "hypophosphorylated" | 214053_at | 1.361420346 | 0.000834179 | 764.9 | 233.1 | 1041.3 | 338.9 |

| Symbol | Gene Name | Function related to Glutamate | Probe ID | Fold Diff | p value | CoM | CoSTD | He M | He STD |
|---|---|---|---|---|---|---|---|---|---|
| nlgn1 | neuroligin 1 | participates in organization of glutamatergic synapses | 205893_at | 1.378519933 | 0.00647114 | 160.8 | 37.0 | 221.7 | 68.7 |
| DNM3 | dynamin 3 | Interacts with homer; controls vesicle trafficking | 209839_at | 1.446917436 | 0.000899122 | 710.3 | 237.7 | 1027.7 | 382.6 |
| DLGAP2 | discs, large (Drosophila) homolog-associated protein 2 | Participate in organization of synapses by regulated cell-cell junctions | 216916_s_at | 1.300596244 | 3.54E-08 | 13.9 | 4.1 | 18.1 | 6.3 |
| Gad1 | glutamate decarboxylase 1 (brain, 67kDa) | Glutamine synthesis, glutamate metabolism | 205278_at | 1.181962338 | 0.000115257 | 2835.5 | 613.6 | 3351.4 | 1060.6 |
| lgi1 | leucine-rich, glioma inactivated 1 | Downregulates glutamatergic synapse function; an epilepsy candidate gene | 206349_at | 1.318023214 | 0.000277323 | 840.7 | 275.9 | 1108.0 | 263.5 |
| DLGAP2 | discs, large (Drosophila) homolog-associated protein 2 | Participate in organization of synapses by regulated cell-cell junctions | 210227_at | 1.339679089 | 6.90E-05 | 454.7 | 147.0 | 609.1 | 160.6 |
| GLS | glutaminase | Glutamine/glutamate synthesis | 203159_at | 1.234400475 | 0.00391125 | 1492.9 | 447.5 | 1842.8 | 442.3 |
| PPP1R12A | protein phosphatase 1, regulatory (inhibitor) subunit 12A | involved in DARPP32 signaling downstream of glutamate receptor activation | 201603_at | 1.313608291 | 0.000151867 | 248.9 | 96.8 | 326.9 | 108.9 |
| PSD3 | pleckstrin and Sec7 domain containing 3 | Part of the post-synaptic density | 203354_s_at | 1.754131769 | 0.00388377 | 892.9 | 343.8 | 1566.3 | 892.4 |
| PLCB1 | phospholipase C, beta 1 (phosphoinositide-specific) | involved in signaling downstream of glutamate receptor activation | 213222_at | 1.30651601 | 0.00890285 | 1710.0 | 694.1 | 2234.1 | 933.7 |
| PCLO | piccolo (presynaptic cytomatrix protein) | Scaffolding protein that provides structural organization presynaptically for excitatory synpases | 213558_at | 1.272503679 | 0.00199762 | 1164.0 | 447.8 | 1481.2 | 323.3 |
| SLC7A11 | solute carrier family 7, (cationic amino acid transporter, y+ system) member 11 | Glutamate transport | 207528_s_at | 1.41229442 | 0.000895507 | 60.1 | 23.3 | 84.8 | 37.3 |
| ADCY1 | adenylate cyclase 1 (brain) | Calcium sensitive AC that will get activated after excitatory neurotransmission | 213245_at | 1.259410845 | 0.0172213 | 342.6 | 164.7 | 431.4 | 202.5 |
| Nrxn3 | neurexin 3 | Interact with neuroligins; participates in organization of glutamatergic synapses | 205795_at | 1.565932158 | 0.00786083 | 98.9 | 61.5 | 154.9 | 77.0 |
| PLEKHA5 | pleckstrin homology domain containing, family A member 5 | Part of the post-synaptic density | 220952_s_at | 1.229388834 | 9.22E-05 | 592.9 | 303.1 | 728.9 | 241.1 |
| Rab11fip2 | RAB11 family interacting protein 2 (class I) | involved in recycling of glutamate transporters | 203883_s_at | 1.33646037 | 0.0057209 | 350.9 | 103.7 | 468.9 | 137.0 |
| GFPT1 | glutamine-fructose-6-phosphate transaminase 1 | Glutamine synthesis, glutamate metabolism | 202722_s_at | 1.185841251 | 0.106597 | 118.0 | 29.5 | 140.0 | 36.0 |
| AKAP5 | A kinase (PRKA) anchor protein 5 | Postsynaptic excitatory synapses; scaffolding proteins that ensure protein kinase target specificity | 207800_at | 1.518209193 | 0.00692543 | 71.3 | 33.6 | 108.3 | 36.1 |
| SLC7A11 | solute carrier family 7, (cationic amino acid transporter, y+ system) member 11 | Glutamate transport | 209921_at | 1.387002094 | 0.000538279 | 335.1 | 113.4 | 464.8 | 181.6 |
| ABI2 | abl interactor 2 | Localized to the PSD and regulates dendrite formation | 216113_at | 2.253919801 | 0.00213138 | 22.2 | 20.8 | 50.1 | 30.7 |
| SLC1A1 | solute carrier family 1 (neuronal/epithelial high affinity glutamate transporter, system Xag), member 1 | Glutamate transport | 213664_at | 1.240760306 | 0.000155762 | 469.1 | 134.6 | 582.1 | 164.1 |
| ppp3ca | protein phosphatase 3 (formerly 2B), catalytic subunit, alpha isoform | involved in DARPP32 signaling downstream of glutamate receptor activation | 202429_s_at | 1.267543295 | 0.00115464 | 4333.9 | 1627.7 | 5493.4 | 1593.9 |
| PRKACB | protein kinase, cAMP-dependent, catalytic, beta | involved in signaling downstream of glutamate receptor activation | 202741_at | 1.226359778 | 0.059965 | 5028.7 | 998.0 | 6166.9 | 1534.3 |
| SHANK2 | SH3 and multiple ankyrin repeat domains 2 | PSD, scaffolding protein at glutamatergic synapses | 213308_at | 1.512379844 | 0.000295425 | 365.1 | 118.0 | 552.2 | 206.2 |
| sdcbp | syndecan binding protein (syntenin) | Binds glutamate receptors; involved in LTP | 200958_s_at | 1.196817807 | 0.0352174 | 1846.5 | 518.5 | 2210.0 | 593.2 |
| AKAP7 | A kinase (PRKA) anchor protein 7 | Postsynaptic excitatory synapses; scaffolding proteins that ensure protein kinase target specificity | 205771_s_at | 1.252085322 | 0.0489185 | 193.6 | 55.2 | 242.4 | 46.3 |
| Nrxn3 | neurexin 3 | Interact with neuroligins; participates in organization of glutamatergic synapses | 215021_s_at | 1.703620955 | 0.00888573 | 10.9 | 5.5 | 18.6 | 11.8 |
| Canx | calnexin | Colocalizes with glutamate receptors in ER compartments in dendrites | 200068_s_at | 1.137466405 | 0.00556841 | 2168.6 | 305.6 | 2466.7 | 431.8 |
| CALM3 | calmodulin 3 (phosphorylase kinase, delta); calmodulin 2 (phosphorylase kinase, delta); calmodulin 1 (phosphorylase kinase, delta) | Calcium sensitive kinase that will get activated in response to glutamate receptor stimulation | 211984_at | 1.214846752 | 9.39E-05 | 6565.4 | 1642.4 | 7976.0 | 2144.5 |
| GRM3 | glutamate receptor, metabotropic 3 | receptor | 205814_at | 1.156044618 | 0.00655383 | 1286.7 | 429.3 | 1487.5 | 371.3 |
| camk4 | calcium/calmodulin-dependent protein kinase IV | Calcium sensitive kinase that will get activated in response to glutamate receptor stimulation | 210349_at | 1.319657031 | 0.0112823 | 142.2 | 46.8 | 187.6 | 51.2 |
| ppp3ca | protein phosphatase 3 (formerly 2B), catalytic subunit, alpha isoform | involved in DARPP32 signaling downstream of glutamate receptor activation | 202457_s_at | 1.219414715 | 0.00304166 | 5360.5 | 2052.2 | 6536.7 | 1670.0 |
| GPHN | gephyrin | PSD, scaffolding protein at glutamatergic synapses | 215578_at | 1.468750236 | 0.00716162 | 44.6 | 24.0 | 65.5 | 21.5 |

| Symbol | Gene Name | Function related to Glutamate | Probe ID | Fold Diff | p value | CoM | CoSTD | He M | He STD |
|---|---|---|---|---|---|---|---|---|---|
| DLG1 | discs, large homolog 1 (Drosophila) | Participate in organization of synapses by regulated cell-cell junctions | 202515_at | 1.147480908 | 0.0165006 | 1497.5 | 339.3 | 1718.4 | 316.4 |
| GRIA1 | glutamate receptor, ionotropic, AMPA 1 | receptor | 209793_at | 1.195609808 | 0.0017351 | 475.5 | 121.9 | 568.5 | 171.9 |
| Pikfyve | phosphoinositide kinase, FYVE finger containing | Regulates the glutamate transporter | 213111_at | 1.310251492 | 2.99E-05 | 205.7 | 69.5 | 269.6 | 74.0 |
| NBEA | neurobeachin | Scaffolding protein involved in membrane trafficking and signaling | 221207_s_at | 1.177247591 | 0.00268495 | 628.2 | 299.3 | 739.6 | 302.9 |
| ITSN1 | intersectin 1 (SH3 domain protein) | Scaffolding protein that regulates vesicle trafficking and neurotransmission by particpating in MAPK signaling pathways | 209297_at | 1.510251052 | 0.000730752 | 159.8 | 94.2 | 241.4 | 106.3 |
| PRKCB | protein kinase C, beta | involved in signaling downstream of glutamate receptor activation | 207957_s_at | 1.242494185 | 0.0141362 | 1944.0 | 939.4 | 2415.4 | 962.4 |
| AFTPH | aftiphilin | Enriched in synapses and believed to function in vesicle turnover | 217939_s_at | 1.136021361 | 0.0273739 | 586.3 | 88.9 | 666.0 | 119.7 |
| AKAP6 | A kinase (PRKA) anchor protein 6 | Postsynaptic excitatory synapses; scaffolding proteins that ensure protein kinase target specificity | 205359_at | 1.215891748 | 0.00541697 | 223.3 | 52.7 | 271.5 | 68.0 |
| ALDH5A1 | aldehyde dehydrogenase 5 family, member A1 | Glutamine synthesis, glutamate metabolism | 203608_at | 1.266378599 | 8.01E-05 | 698.9 | 194.1 | 885.1 | 290.6 |
| GLS | glutaminase | Glutamine/glutamate synthesis | 203157_s_at | 1.36392504 | 1.34E-06 | 260.7 | 130.1 | 355.6 | 139.4 |
| HOMER1 | homer homolog 1 (Drosophila) | Part of the post-synaptic density | 213793_s_at | 1.168204332 | 0.00192353 | 732.0 | 313.7 | 855.2 | 194.6 |
| Jak2 | Janus kinase 2 | Can modulate activity of glutamate transporters | 205842_s_at | 1.299821158 | 0.0305009 | 77.4 | 24.3 | 100.6 | 32.0 |
| phlda1 | pleckstrin homology-like domain, family A, member 1 | Part of the post-synaptic density | 217997_at | 1.183115298 | 0.128618 | 433.9 | 90.0 | 513.3 | 134.9 |
| plekha1 | pleckstrin homology domain containing, family A (phosphoinositide binding specific) member 1 | Part of the post-synaptic density | 219024_at | 1.188787491 | 0.00725253 | 118.6 | 46.6 | 141.0 | 51.8 |
| PLEKHA5 | pleckstrin homology domain containing, family A member 5 | Part of the post-synaptic density | 214989_x_at | 1.289713798 | 8.02E-07 | 453.5 | 205.9 | 584.9 | 211.4 |
| PPP1R12A | protein phosphatase 1, regulatory (inhibitor) subunit 12A | involved in DARPP32 signaling downstream of glutamate receptor activation | 201602_s_at | 1.260153765 | 0.0440252 | 264.9 | 118.6 | 333.8 | 107.8 |
| PPP1R12A | protein phosphatase 1, regulatory (inhibitor) subunit 12A | involved in DARPP32 signaling downstream of glutamate receptor activation | 201604_s_at | 1.438086589 | 0.00151884 | 93.1 | 45.4 | 133.8 | 57.6 |
| PRKACB | protein kinase, cAMP-dependent, catalytic, beta | involved in signaling downstream of glutamate receptor activation | 202742_s_at | 1.485478246 | 0.0268617 | 944.5 | 332.0 | 1403.0 | 722.4 |
| PRKCB | protein kinase C, beta | involved in signaling downstream of glutamate receptor activation | 209685_s_at | 1.305990326 | 0.0147041 | 1100.8 | 465.3 | 1437.6 | 620.9 |
| PSD3 | pleckstrin and Sec7 domain containing 3 | Part of the post-synaptic density | 203355_s_at | 1.23652891 | 0.0336106 | 384.0 | 112.8 | 474.9 | 162.7 |
| Rab11fip2 | RAB11 family interacting protein 2 (class I) | involved in recycling of glutamate transporters | 203884_s_at | 1.232237028 | 0.0100236 | 279.3 | 73.3 | 344.1 | 92.6 |
| STX7 | syntaxin 7 | Part a presynaptic membrane complex that releases neurotransmitters from vesicles | 212632_at | 1.175290777 | 0.000133108 | 525.0 | 121.1 | 617.0 | 148.2 |

**Supplemental Table S6.** WGCNA analysis. Means of module eigengenes (ME) in control and heroin groups with p and FDR values.

| Module | ME: Mean (Control) | ME: Mean (Heroin) | P | FDR |
|---|---|---|---|---|
| turquoise | -0.06782162 | 0.07105122 | 0.000980476 | 0.00907793 |
| orange | -0.070895165 | 0.07427112 | 0.001249632 | 0.027820049 |
| yellow | 0.069764495 | -0.07308661 | 0.001918624 | 0.03623932 |
| darkgreen | 0.064165704 | -0.0672212 | 0.004464288 | 0.042366086 |
| darkgrey | -0.06305456 | 0.06605715 | 0.014723554 | 0.057396612 |
| greenyellow | -0.054679703 | 0.057283502 | 0.015570099 | 0.0645047 |
| brown | -0.0544336 | 0.05702568 | 0.015720095 | 0.06642123 |
| darkred | -0.054894987 | 0.057509035 | 0.015901145 | 0.067237024 |
| lightcyan | 0.058256924 | -0.06103106 | 0.020291066 | 0.07974015 |
| purple | 0.0513953 | -0.053842682 | 0.023439059 | 0.08797327 |
| red | -0.050776374 | 0.053194292 | 0.024768976 | 0.08830003 |
| grey60 | 0.038824543 | -0.040673338 | 0.09092399 | 0.21302246 |
| black | 0.038207356 | -0.04002675 | 0.095492825 | 0.21973296 |
| royalblue | -0.03649535 | 0.038233224 | 0.111575164 | 0.23111999 |
| darkturquoise | 0.035128392 | -0.036801178 | 0.12756357 | 0.23610274 |
| lightgreen | 0.0347273 | -0.036380976 | 0.13026358 | 0.2466229 |
| lightyellow | -0.03287303 | 0.034438413 | 0.15236562 | 0.25554046 |
| white | 0.032399148 | -0.03394197 | 0.15861131 | 0.25991783 |
| skyblue | 0.030406438 | -0.031854365 | 0.18607543 | 0.28400987 |
| tan | -0.02993788 | 0.031363495 | 0.196988 | 0.2856326 |
| magenta | 0.024661606 | -0.025835969 | 0.28582183 | 0.39470634 |
| darkorange | -0.017637515 | 0.0184774 | 0.45368692 | 0.59804183 |
| grey | -0.013198874 | 0.013827395 | 0.57154423 | 0.69391483 |
| midnightblue | -0.01297216 | 0.013589883 | 0.57427436 | 0.72064275 |
| blue | 0.011410135 | -0.011953481 | 0.62367165 | 0.7234591 |
| green | -0.009361117 | 0.009806885 | 0.6852034 | 0.7623411 |
| salmon | 0.008571279 | -0.008979434 | 0.70976585 | 0.7642653 |
| cyan | 0.003298298 | -0.00345536 | 0.8882256 | 0.919948 |
| pink | -0.00122521 | 0.001283554 | 0.95784897 | 0.95784897 |

**Supplemental Table S7.** WGCNA analysis. Estimated module membership for each gene using module eigengenes across all modules is shown. MM shows Pearson's correlation and p.MM shows corresponding p values.

**(see separate Excel file)**

## Supplemental References

1. Sillivan SE, Whittard JD, Jacobs MM, Ren Y, Mazloom AR, Caputi FF, et al. (2013): ELK1 transcription factor linked to dysregulated striatal mu opioid receptor signaling network and OPRM1 polymorphism in human heroin abusers. *Biol Psychiatry*. 74:511-519.
2. Buenrostro JD, Wu B, Chang HY, Greenleaf WJ (2015): ATAC-seq: A Method for Assaying Chromatin Accessibility Genome-Wide. *Curr Protoc Mol Biol*. 109:21 29 21-29.