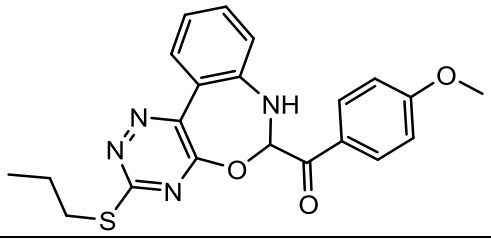
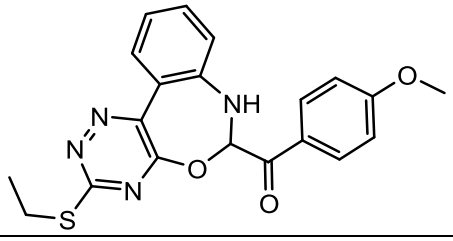
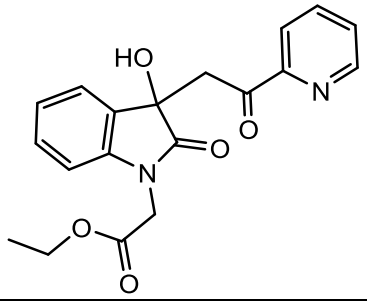
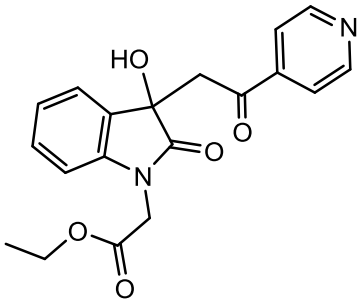
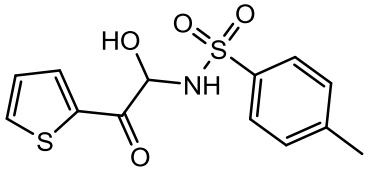
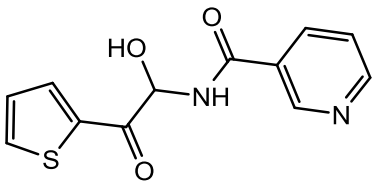
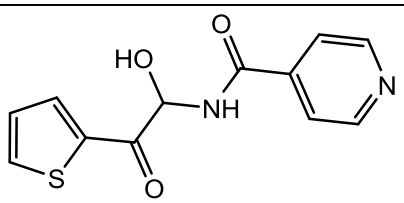
Supplementary Information
Supplementary table 1. Steps for high throughput screen

S. No.	Steps for screening	Compounds
1	In- vitro absorbance based kinetic screen using esterase assay	101,000
2	Compounds with >60% inhibition	436
3	Secondary screen by cherry-picking the initial hits	71
4	Validation of inhibitors using dehydrogenase assay	55
5	Structural classification of compounds	55
6	Testing specificity against ALDH1A1 and ALDH2	55
7	IC_{50} determination for selective inhibitors	2
8	Selective inhibitors	2

Figure S1 (A). Hits from ChemDiv Screen

		IC_{50} (μM)		
Compound	**Structure**	**ALDH1A1**	**ALDH2**	**ALDH3A1**
CD4		**21.2**	**1.4**	**2.5**
CD5		**8.2**	**1.2**	**1.5**
CD7		**0.7**	**NI**	**25.5**
CD8		**0.8**	**11.1**	**6.3**
CD10		**4.0**	**2.2**	**3.4**
CD11		**5.9**	**6.5**	**10.2**
CD12		**4.2**	**5.3**	**5.6**

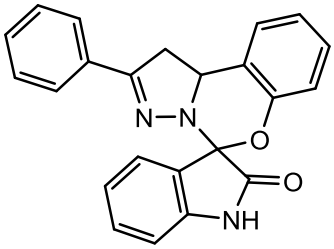
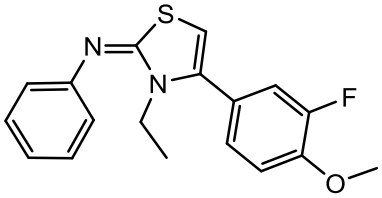
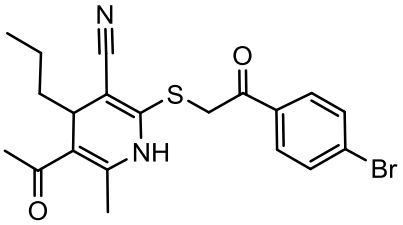
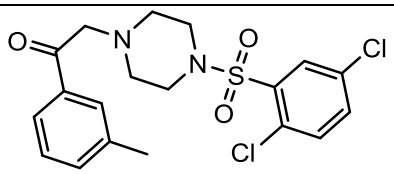
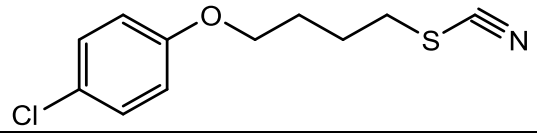
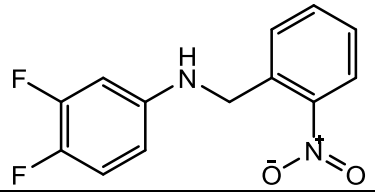
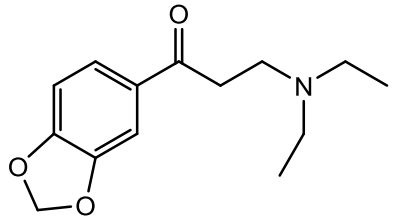
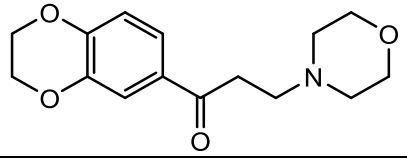
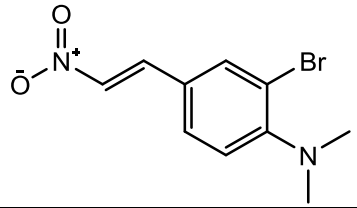
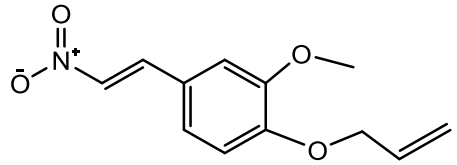
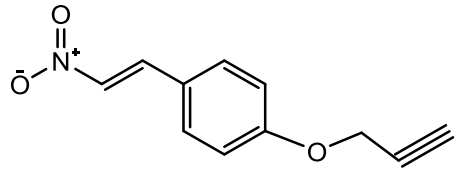
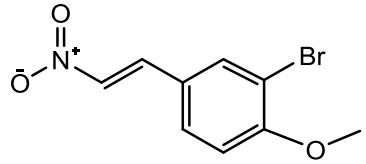
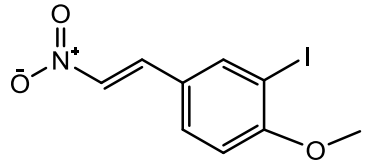
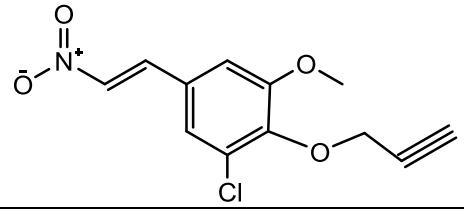
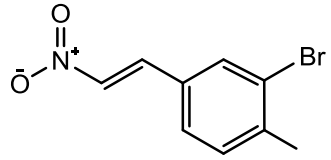
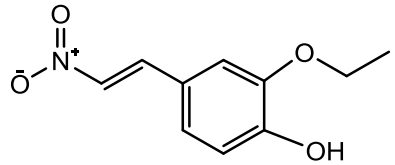
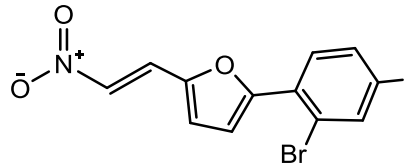
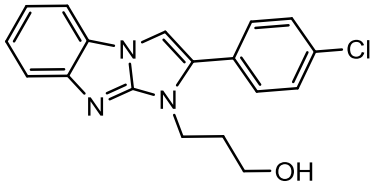
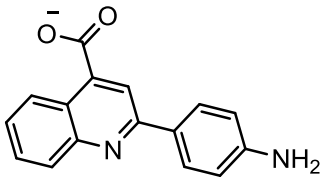
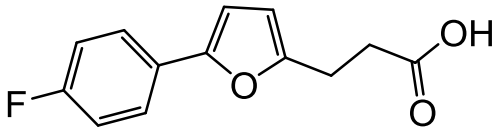
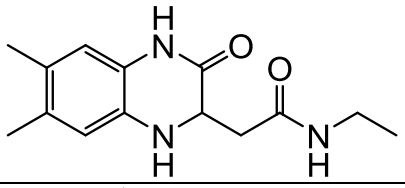
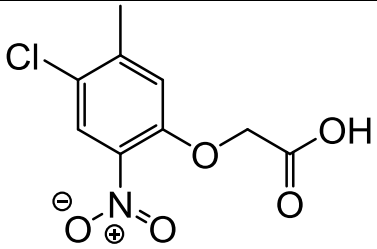
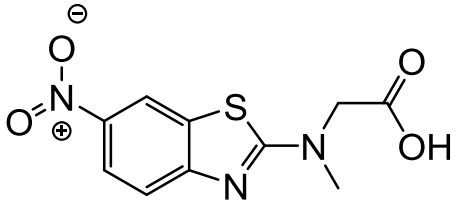
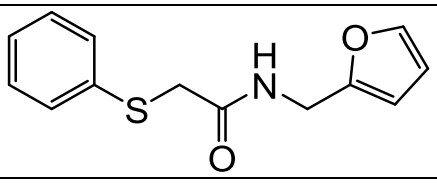
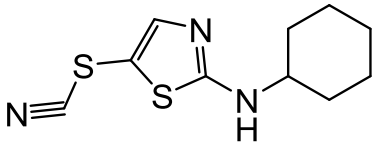
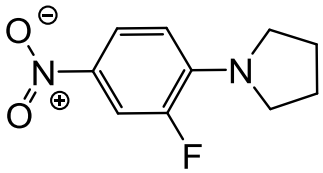
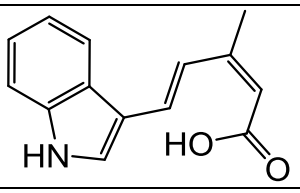
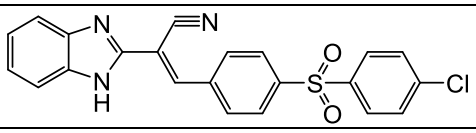
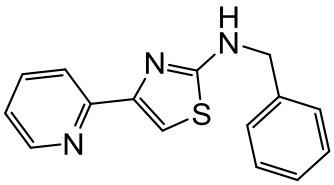
		IC_{50} (μM)		
Compound	**Structure**	**ALDH1A1**	**ALDH2**	**ALDH3A1**
CD3		**6.5**	**41.8**	**38.5**
CD13		**6.3**	**7.3**	**60**
CD14		**10.4**	**13.7**	**71.5**
CD20		**33**	**NI**	**41**

Figure S1 (B). Hits from ChemBridge Screen

		Inhibition at 10 μM concentration		
Compound	**Structure**	**ALDH1A1**	**ALDH2**	**ALDH3A1 IC_{50} (μM)**
CB1		**>50%**	**NI**	**3.7**
CB2		**<20%**	**NI**	**5.2**
CB12		**NI**	**>50%**	**3.2**
CB13		**<20%**	**NI**	**11.7**

		% activity left at 10 μM inhibitor concentration		
Compound	**Structure**	**ALDH1A1**	**ALDH2**	**ALDH3A1**
CB41		**100% (NI)**	**90%(NI)**	**45% (I)**
CB35		**100% (NI)**	**86%(NI)**	**46% (I)**
CB36		**93% (NI)**	**76%(NI)**	**30% (I)**	
CB38		**90% (NI)**	**83%(NI)**	**40% (I)**
CB40		**95% (NI)**	**67%(NI)**	**30% (I)**
CB42		**100% (NI)**	**74%(NI)**	**46% (I)**
CB37		**100% (NI)**	**83%(NI)**	**30% (I)**
CB26		**100% (NI)**	**88%(NI)**	**45% (I)**
CB39		**100% (NI)**	**82%(NI)**	**32% (I)**

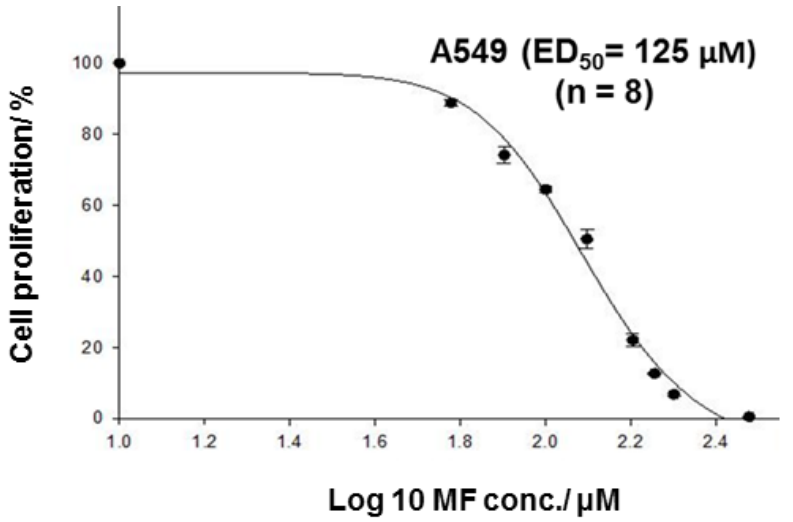
CB11		**100% (NI)**	**96%(NI)**	**61% (I)**
CB5		**107% (NI)**	**100%(NI)**	**34% (I)**
CB32		**100% (NI)**	**84%(NI)**	**36% (I)**
CB16		**100% (NI)**	**100%(NI)**	**50% (I)**
CB3		**71% (NI)**	**100%(NI)**	**55% (I)**
CB21		**104% (NI)**	**100%(NI)**	**58% (I)**
CB23		**110% (NI)**	**94%(NI)**	**65% (I)**
CB6		**112% (NI)**	**44%(NI)**	**6% (I)**
CB14		**91% (NI)**	**97%(NI)**	**47% (I)**
CB4		**71% (NI)**	**100%(NI)**	**60% (I)**

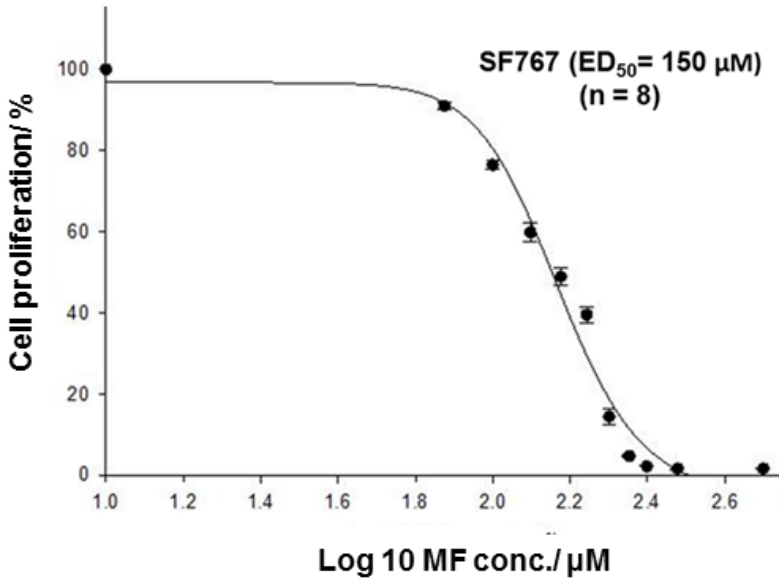
CB10		**110% (NI)**	**101%(NI)**	**58% (I)**
CB27		**138% (NI)**	**91%(NI)**	**43% (I)**

NI- No inhibition at 10 micromolar concentration

I - Inhibition at 10 micromolar concentration

Figure S2. Calculation of ED_{50} for A549, SF767 and CCD13Lu cell lines





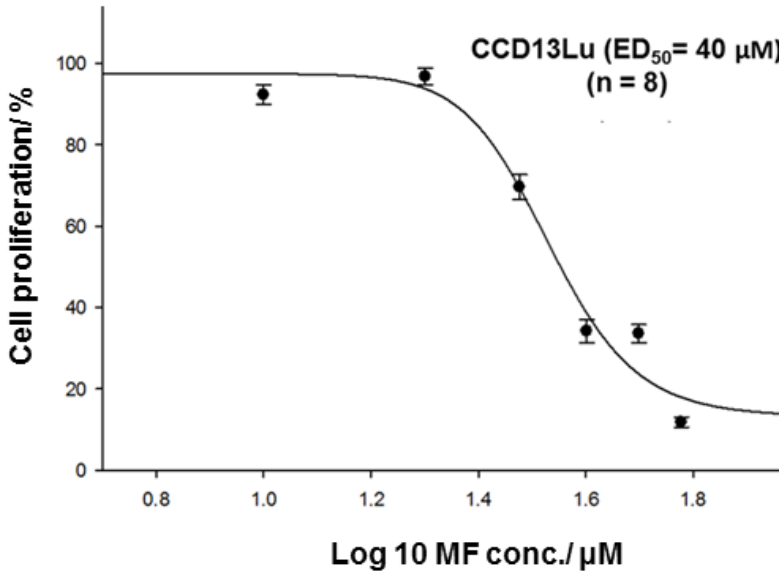


Figure S3 (A). Quantitation of ALDH1A1 expression in A549 cell line
Serial dilutions of A549 cell lysates (0.5 µg- 22.5 µg) were compared against serial dilutions of recombinantly purified ALDH1A1 (5 ng- 250 ng). Purified recombinant ALDH1A1 protein served as positive control and GAPDH served as a loading control.

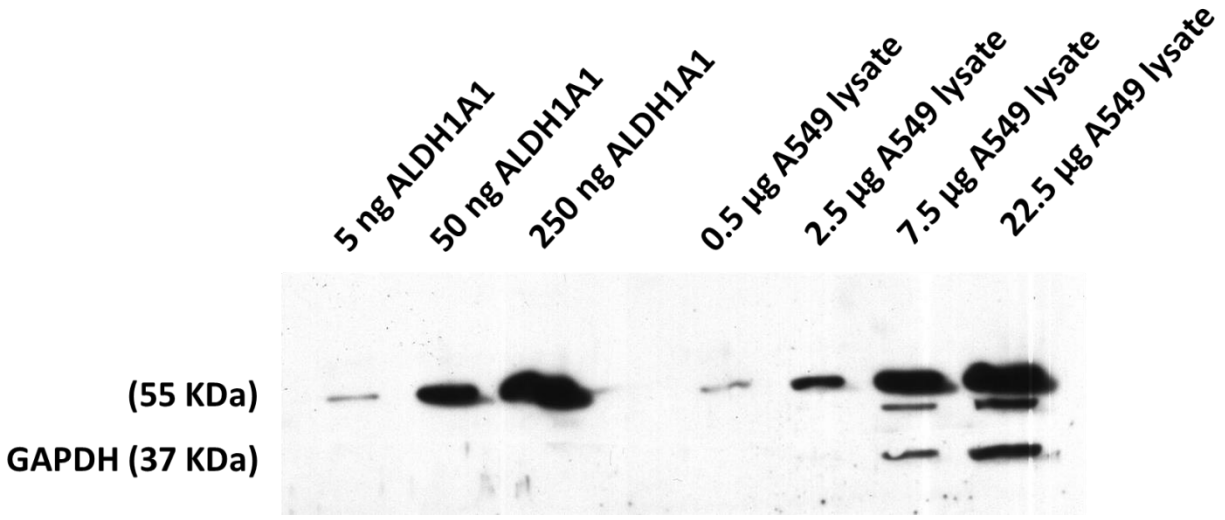


Figure S3 (B). Quantitation of ALDH3A1 expression in A549 cell line
Serial dilutions of A549 cell lysates (0.5 µg- 22.5 µg) were compared against serial dilutions of recombinantly purified ALDH1A1 (5 ng- 50 ng). Purified recombinant His-tagged ALDH3A1 protein served as positive control and GAPDH served as a loading control.

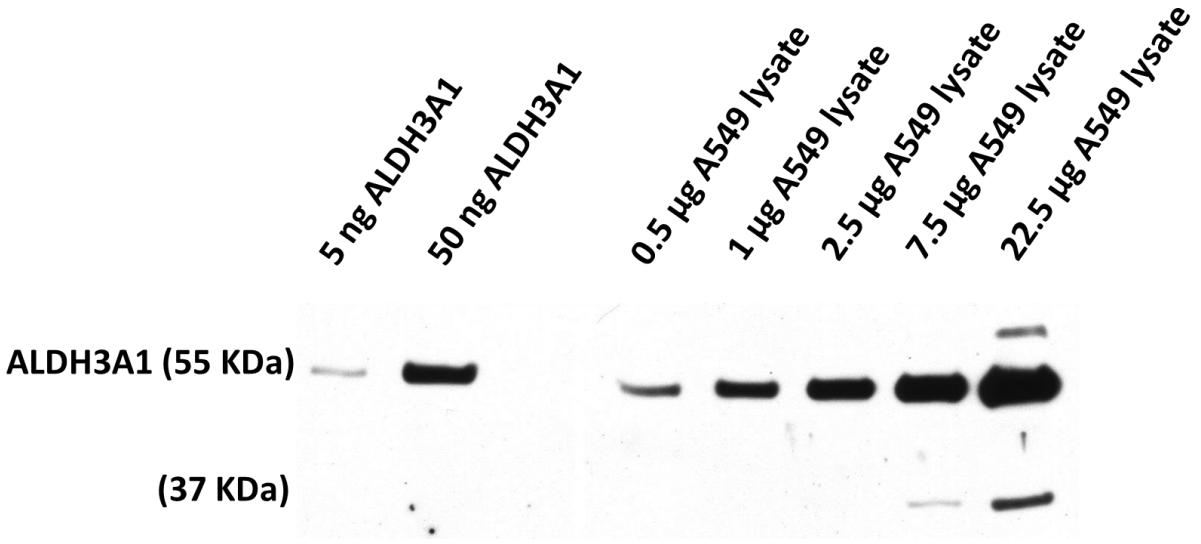


Figure S3 (C). Quantitation of ALDH3A1 expression in SF767 cell line
Serial dilutions of SF767 cell lysates (1 µg- 10 µg) were compared against serial dilutions of recombinantly purified ALDH3A1 (50 ng- 300 ng). Purified recombinant His-tagged ALDH3A1 protein served as positive control and GAPDH served as a loading control.