**Supplementary Information**

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# Histology and Transcriptome Profiles of the Mammary Gland across Critical Windows of Development

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**Table S1. Mouse mammary gland transcriptome datasets used for comparison to rat mammary gland transcriptome**. The column 'Gene-Sets' refers to significantly 'UP' or 'DOWN' regulated genes between adjacent developmental stages made using the GEO2R tool in GEO at FDR 5%, fold change cutoff of 2. For example, 'Pub Preg DOWN Ron' indicates genes down-regulated from puberty to pregnancy in the Ron et al, 2007 dataset.

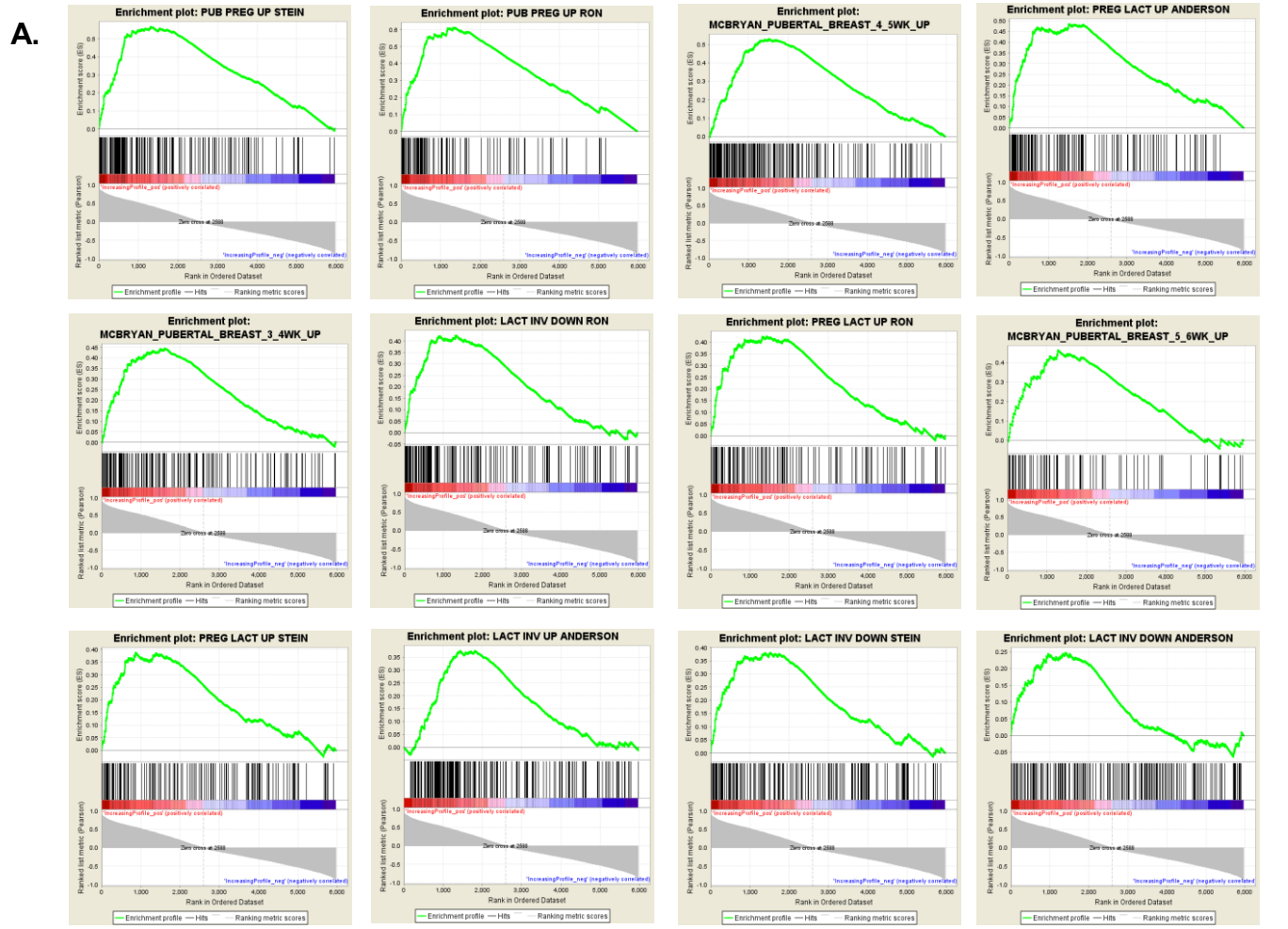
| Developmental Stages | Mouse Strain | Sample Size | Gene-Sets | GEO Series number | Reference |
|---|---|---|---|---|---|
| Puberty, Pregnancy, Lactation, Involution | C57BL/6J | Puberty (n=3), Pregnancy (n=2), Lactation (n=2), Involution (n=2); Total n=9 | Pub Preg DOWN Ron | GSE5831 | Ron et al, 2007 [17] |
| | | | Pub Preg UP Ron | | |
| | | | Preg Lact DOWN Ron | | |
| | | | Preg Lact UP Ron | | |
| | | | Lact Inv DOWN Ron | | |
| | | | Lact Inv UP Ron | | |
| Pregnancy, Lactation, Involution | FVB | Pregnancy (n=24), Lactation (n=12), Involution (n=4); Total n=40 | Preg Lact DOWN Anderson | GSE8191 | Anderson et al, 2007 [26] |
| | | | Preg Lact UP Anderson | | |
| | | | Lact Inv DOWN Anderson | | |
| | | | Lact Inv UP Anderson | | |
| Puberty, Pregnancy, Lactation, Involution | Balb/c | Puberty (n=9), Pregnancy (n=21), Lactation (n=9), Involution (n=15); Total n=54 | Pub Preg DOWN Stein | GSE12247 | Stein et al, 2004 [16] |
| | | | Pub Preg UP Stein | | |
| | | | Preg Lact DOWN Stein | | |
| | | | Preg Lact UP Stein | | |
| | | | Lact Inv DOWN Stein | | |
| | | | Lact Inv UP Stein | | |
| Puberty, 3-7 weeks* | CD1 | 3 weeks (n=3), 4 weeks (n=3), 5 weeks (n=2), 6 weeks (n=3), 7 | MCBRYAN_PUBERTAL_BREAST_3_4WK_DN | GSE6453 | McBryan et al, 2007 [13] |
| | | | MCBRYAN_PUBERTAL_BREAST_3_4WK_UP | | |
| | | | MCBRYAN_PUBERTAL_BREAST_4_5WK_DN | | |
| | | | MCBRYAN_PUBERTAL_BREAST_4_5WK_UP | | |

| | | | | | |
|---|---|---|---|---|---|
| | | weeks (n=3); Total n=14 | MCBRYAN_PUBERTAL_ BREAST_5_6WK_DN | | |
| | | | MCBRYAN_PUBERTAL_ BREAST_5_6WK_UP | | |
| | | | MCBRYAN_PUBERTAL_ BREAST_6_7WK_DN | | |
| | | | MCBRYAN_PUBERTAL_ BREAST_6_7WK_UP | | |

*McBryan gene-sets were directly downloaded from MSigDB [27].

**Table S2. Gene Set Enrichment Analysis of mouse mammary developmental gene-sets with SD rat mammary transcriptome across six windows of development.** A positive enrichment score (ES) indicates that the mouse gene-set is over-represented among genes showing increasing expression profile during rat mammary gland development, while a negative ES indicates that the mouse gene-set is over-represented among genes showing decreasing expression profile during rat mammary gland development. The normalized ES (NES) accounts for differences in gene-set size and in correlations between the gene-set and the expression dataset. FDR is a measure of the proportion of false positives corresponding to each NES.

| Gene-Set Name | Gene-Set Size | ES | NES | FDR |
|---|---|---|---|---|
| PUB PREG UP STEIN | 170 | 0.567 | 3.182 | 0.000 |
| PUB PREG UP RON | 95 | 0.612 | 3.163 | 0.000 |
| MCBRYAN_PUBERTAL_BREAST_4_5WK_UP | 198 | 0.531 | 3.116 | 0.000 |
| PREG LACT UP ANDERSON | 131 | 0.486 | 2.671 | 0.000 |
| MCBRYAN_PUBERTAL_BREAST_3_4WK_UP | 150 | 0.445 | 2.495 | 0.000 |
| LACT INV DOWN RON | 156 | 0.424 | 2.413 | 0.000 |
| PREG LACT UP RON | 131 | 0.425 | 2.365 | 0.000 |
| MCBRYAN_PUBERTAL_BREAST_5_6WK_UP | 72 | 0.463 | 2.260 | 0.000 |
| PREG LACT UP STEIN | 155 | 0.387 | 2.193 | 0.000 |
| LACT INV UP ANDERSON | 196 | 0.374 | 2.191 | 0.000 |
| LACT INV DOWN STEIN | 180 | 0.381 | 2.163 | 0.000 |
| LACT INV DOWN ANDERSON | 192 | 0.248 | 1.438 | 0.018 |
| MCBRYAN_PUBERTAL_BREAST_4_5WK_DN | 113 | -0.484 | -2.562 | 0.000 |
| PREG LACT DOWN STEIN | 272 | -0.337 | -2.036 | 0.000 |
| LACT INV UP STEIN | 243 | -0.324 | -1.947 | 0.000 |
| PUB PREG DOWN STEIN | 192 | -0.300 | -1.751 | 0.002 |
| MCBRYAN_PUBERTAL_BREAST_5_6WK_DN | 57 | -0.373 | -1.726 | 0.002 |
| PREG LACT DOWN ANDERSON | 230 | -0.244 | -1.445 | 0.034 |
| PUB PREG DOWN RON | 70 | -0.293 | -1.416 | 0.037 |
| PREG LACT DOWN RON | 235 | -0.234 | -1.395 | 0.039 |
| MCBRYAN_PUBERTAL_BREAST_6_7WK_DN | 49 | -0.306 | -1.359 | 0.048 |



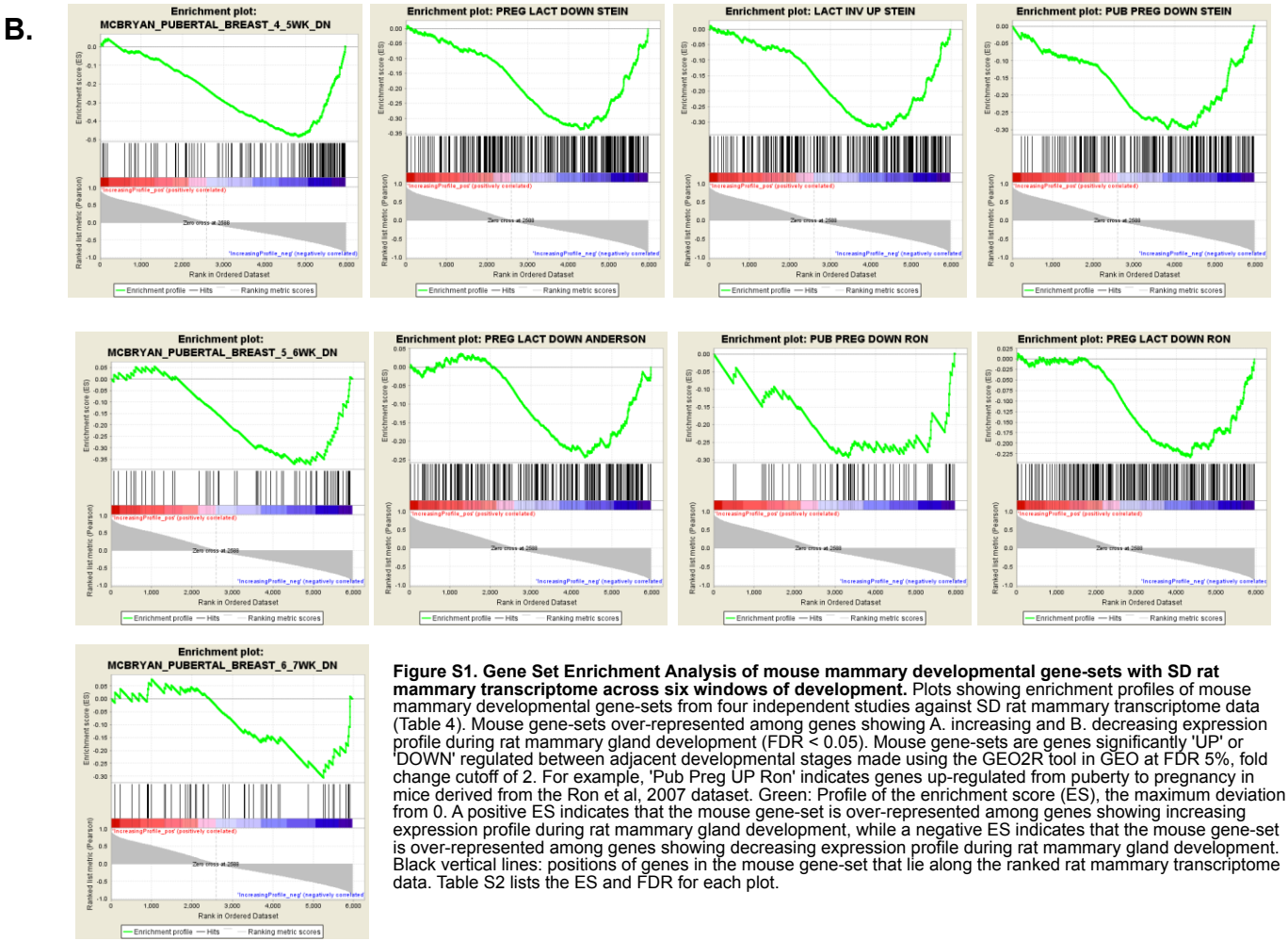




**Figure S1. Gene Set Enrichment Analysis of mouse mammary developmental gene-sets with SD rat mammary transcriptome across six windows of development.** Plots showing enrichment profiles of mouse mammary developmental gene-sets from four independent studies against SD rat mammary transcriptome data (Table 4). Mouse gene-sets over-represented among genes showing A. increasing and B. decreasing expression profile during rat mammary gland development (FDR < 0.05). Mouse gene-sets are genes significantly 'UP' or 'DOWN' regulated between adjacent developmental stages made using the GEO2R tool in GEO at FDR 5%, fold change cutoff of 2. For example, 'Pub Preg UP Ron' indicates genes up-regulated from puberty to pregnancy in mice derived from the Ron et al, 2007 dataset. Green: Profile of the enrichment score (ES), the maximum deviation from 0. A positive ES indicates that the mouse gene-set is over-represented among genes showing increasing expression profile during rat mammary gland development, while a negative ES indicates that the mouse gene-set is over-represented among genes showing decreasing expression profile during rat mammary gland development. Black vertical lines: positions of genes in the mouse gene-set that lie along the ranked rat mammary transcriptome data. Table S2 lists the ES and FDR for each plot.

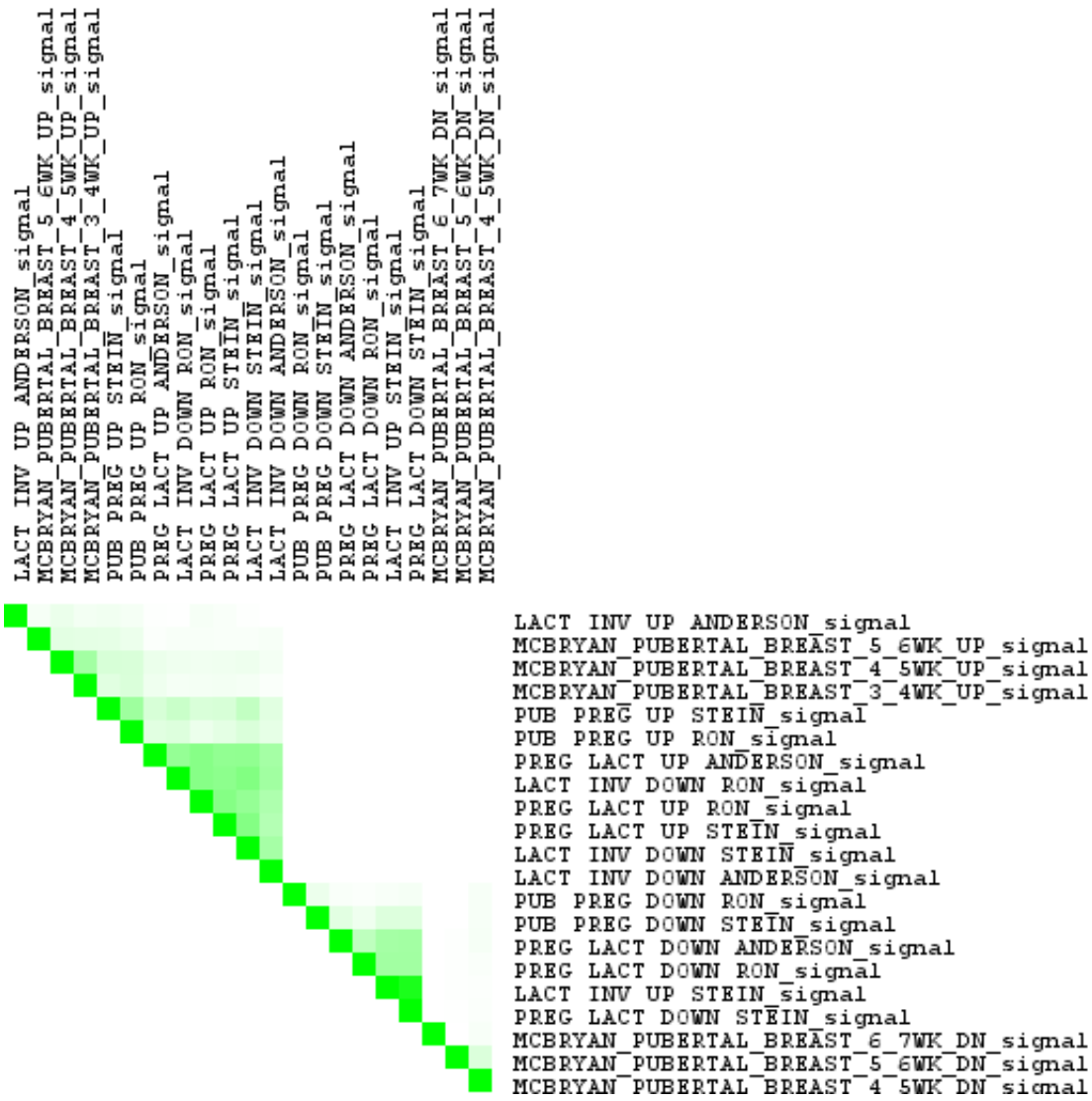



**Figure S2. Heatmap depicting overlap between mouse gene-sets used for gene set enrichment analysis of mouse mammary gland transcriptome with rat mammary gland transcriptome.** More the color intensity, greater the overlap between gene-sets**.**