

WORKSHOP: Finding Addiction Resources Practical worksheet.

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Please contact joanne.berghout@jax.org with any questions. Answers can be found on the back page.

Use **Mouse Genome Informatics** (<http://www.informatics.jax.org/>) to answer below:

1. Which mouse chromosome is *Slc29a1* on?
 - a. Chr 1
 - b. Chr 5
 - c. Chr 17
 - d. Chr X
2. Which allele of *Slc29a1* has been annotated to a human disease, and which diseases was it annotated to?
 - a. *Slc29a1*^{Gt(OST35222)Lex} annotated to *cocaine dependence*
 - b. *Slc29a1*^{tm1Msg} annotated to *alcohol dependence*
 - c. *Slc29a1*^{tm2b(NCOM)Mfjgc} annotated to *alcohol dependence*
 - d. *Slc29a1*^{tm1Msg} annotated to *ataxia*
3. What is the full genotype of *Slc29a1*^{tm1Msg} mice that have been described as a human disease model?
 - a. *Slc29a1*^{tm1Msg}/*Slc29a1*^{tm1Msg} on a 129X1/SvJ*C57BL/6J background
 - b. *Slc29a1*^{tm1Msg}/+ on a 129X1/SvJ*C57BL/6J background
 - c. *Slc29a1*^{tm1Msg}/*Slc29a1*^{tm1Msg} on a C57BL/6J background
 - d. *Slc29a1*^{tm1Msg}/*Slc29a1*^{tm1Msg} and Tg(Adora2a-cre)2MDkde on a 129X1/SvJ*C57BL/6J background.
4. Does *Slc29a1* have any “nervous system” phenotypes annotated? What are they?
 - a. no
 - b. yes, alcohol preference
 - c. yes, abnormal excitatory postsynaptic currents
 - d. yes, abnormal dopamine level
5. Which reference was used to make the annotation between *Slc29a1*^{tm1Msg} and alcohol dependence?
 - a. J:92100, Choi et al., 2004, Nature Neuroscience
 - b. J:65172, Choi et al., 2000, Biochem Biophys Res Commun.
 - c. J:200814, Toronto Center for Phenogenomics, 2013, MGI direct submission
 - d. J:204233, Zhang et al., 2013, PLoS One
6. Are mice carrying the *Slc29a1*^{tm1Msg} allele available for sale?
 - a. no
 - b. no, but you may be able to obtain mice by contacting Dr. Robert O Messing
 - c. yes, as live mice from Riken BioResource Center (RBRC)
 - d. yes, as cryopreserved embryos from The Jackson Laboratory (JAX)

7. Use the **Phenotypes, Alleles and Diseases Query** (see “Search” menu or “Phenotypes & Mutant Alleles” page). How many quantitative trait loci (QTLs) have been described in MGI for “addiction”? Hint: QTL is listed as an option under “Generation method” and count appears above the results table on the right.
 - a. 105 entries
 - b. 110 entries
 - c. 275 entries
 - d. 93 entries

8. Use MouseMine (see “Batch Data & Access tools” or go directly using <http://www.mousemine.org/mousemine/begin.do>). Find the “Coordinates to Features” template in the Popular Queries and search Chr12:100000000-120000000. How many protein-coding genes are in this locus?
Hint: use the bar graph column in the header row to view column summaries and apply filters.
 - a. 28 protein-coding genes
 - b. 48 protein-coding genes
 - c. 8 protein-coding genes
 - d. 1 protein-coding gene

9. Use the Create/Add to List button above the filtered results table to save a list of sequence features. A link to your new list should appear at the top of the page, or go to the “Lists” tab to find it there. Open your list and scroll down to the section labeled “Phenotype”. Execute the Gene/Features->Phenotypes (MP terms) by clicking on the text. Which of the following statements applies to these results?
 - a. Msgn1 is the only protein-coding gene in this locus with phenotype data annotated
 - b. Msgn1 mutant mice exhibit abnormal fetal growth/weight/body size
 - c. Msgn1 mutant mice were described in publication PMID: 11124811
 - d. all of the above are true

Use the **International Mouse Phenotyping Consortium** database (<http://www.mousephenotype.org/>) to answer below:

10. Have reagents been generated by the IMPC for gene *Cnr1*?
 - a. yes, ES cells
 - b. yes, ES cells and mice but no phenotype data exists
 - c. yes, ES cells, mice and phenotype data are available
 - d. no

11. Which significant top level *post-QC* phenotype associations have been made for this allele?
 - a. mortality/aging
 - b. behavior/neurological
 - c. cardiovascular system
 - d. vision/eye phenotype

12. Looking at *pre-QC* data, which of the following behavioral/neurological system phenotypes have preliminary associations for this allele?
 - a. abnormal gait

- b. open field: distance travelled
 - c. abnormal startle reflex
 - d. increased aggression
13. Find the raw data associated with the phenotype “open field: distance traveled – total”. How do male *Cnr1* mutant mice compare to male wild type mice in this test?
- a. they are identical
 - b. male mutant mice travel less distance than WT
 - c. male mutant mice have a mean 7997 +/- 2011cm traveled while male WT mice have a mean 4890 +/- 1009cm traveled
 - d. male mice travel 3087cm in this test
14. Which of the following statements is most accurate about *Cnr1* mutant mice within the vision/eye phenotypic system?
- a. *Cnr1* mutant mice have no vision/eye phenotype data in the IMPC
 - b. *Cnr1* mutant mice have had several vision/eye phenotype parameters measured and none were significantly different from WT
 - c. *Cnr1* mutant mice have abnormal cornea morphology
 - d. Homozygote *Cnr1* mutant mice are blind, while heterozygote mutant mice are normal in all vision/eye parameters

Use the **Mouse Phenome Database** (<http://phenome.jax.org/>) to answer below:

15. Navigate from Interventions > Cocaine > Phenotype strain survey data. Which strain in the Tarantino1 dataset had the highest baseline rearing episodes activity?
- a. NOD/ShiLtJ
 - b. C57BL/6J
 - c. 129S1/SvImJ
 - d. SM/J
16. Which strain had the greatest difference in rearing activity when retested following 20mg/kg cocaine administration?
- a. NOD/ShiLtJ
 - b. C57BL/6J
 - c. 129S1/SvImJ
 - d. SM/J
17. Use the Apply tools button on the left, sticking with the Tarantino1 dataset. Is there a significant correlation ($p < 0.0001$) between “difference in rearing episodes” following cocaine administration and “difference in ambulatory episodes” following cocaine administration across the strains investigated? Use the correlation matrix after choosing your measurements.
- a. Yes, significant and positively correlated $r^2 = 0.74$, $p < 0.0001$
 - b. Yes, significant and negatively correlated $r^2 = -0.74$, $p < 0.0001$
 - c. Not significant at this cut-off, suggestive positive correlation, $r^2 = 0.68$, $p = 0.0448$
 - d. Not significant at this cut-off, suggestive negative correlation, $r^2 = -0.30$, $p = 0.0480$

18. Leave the previous section of MPD and find the strain detail page for C3H/HeJ. Does this strain exhibit erratic gait 10 minutes after injection with 3.0g/kg ethanol?
- Yes, strain score 1.25 in females, 2.25 in males using the Metten1 dataset
 - Yes, strain score 2.00 in females, 0.750 in males using the Metten1 dataset
 - No, strain score of 0.00 in females, 0.00 in males using the Metten1 dataset
 - No, this strain was not tested for this phenotype

See also the Mouse Phenome Database Self Guided Tutorial & Answers uploaded in Canvas for more functions in MPD, and for web-based tutorials in the other resources.

Answers:

- c. Chr17
- b. *Slc29a1^{tm1Msg}* annotated to alcohol dependence
- a. *Slc29a1^{tm1Msg}/Slc29a1^{tm1Msg}* on a 129X1/SvJ*C57BL/6J background
- c. yes, abnormal excitatory postsynaptic currents
- a. J:92100, Choi et al., 2004, Nature Neuroscience
- d. yes, as cryopreserved embryos from The Jackson Laboratory
- a. 105 entries
- c. 8 protein-coding genes (be sure to filter after retrieving your results)
- d. all of the above are true
- c. yes, ES cells, mice and phenotype data are available
- a. mortality/aging
- b. open field: distance traveled
- c. male mutant mice have a mean 7997 +/- 2911cm traveled while male WT mice have a mean 4890 +/- 1009cm traveled
- b. *Cnr1* mutant mice have had several vision/eye parameters measured, and none were significantly different from wild type
- a. NOD/ShiLtJ
- d. SM/J
- d. Not significant at this cut-off, suggestive negative correlation $r^2 = -0.30$, $p = 0.0480$
- a. Yes, strain score 1.25 in females, 2.25 in males using the Metten1 dataset