MausDB: the phenotype- and mouse management system of the German Mouse Clinic

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The German Mouse Clinic (GMC, http://www.mouseclinic.de) offers standardized and comprehensive phenotype analysis of mutant mouse lines in order to identify potential new mouse models of human diseases. In the GMC, mouse cohorts are analysed in 14 different screening modules in a strictly defined workflow in the course of primary screening where several hundred phenotyping parameters per mouse are measured. Mouse cohorts are either imported from external or internal collaboration partners or bred from ES cell derived chimeras on site. Generation, breeding and subsequent screening of these cohorts in multi-parallel workflows as well as management of phenotyping data is a logistical challenge and requires appropriate IT support and well-defined data infrastructure.

We developed a web-based database application – MausDB – for the GMC that serves as a central data platform accessible by all GMC users. MausDB offers mouse management functions such as standard mouse husbandry, facility management, health monitoring, breeding statistics, accounting of housing costs as well as management and reporting of experimental licenses. MausDB also supports scheduling of mouse lines to the phenotyping pipelines using work list management functions. Following phenotyping, result data can be uploaded to MausDB for central storage and further analysis. Using a custom-built web interface to the free statistical computing system R, visualisation and statistical analysis of phenotyping data can be done on the MausDB web user interface, not requiring any R programming skills on the user side. Thus, MausDB integrates phenotype data with line information, genotype data and other metadata on the individual mouse level. For the GMC, this is a prerequisite for cross-line data analysis, data mining and data exchange within international phenotyping projects. In the GMC, MausDB is part of an integrated software package that also includes a cryopreservation workflow management system (CryoWorkDB) and a cryo sample tracking system (CryoSampleDB), but all systems are not dependent on each other and can each be run separately.

Although primarily developed for the GMC, MausDB also proved to be useful for several other mouse facilities due to its general purpose design and intuitive user interface. As of August 2011, MausDB has been in productive use for over five years and is currently being used by 6 Helmholtz institutes and a dozen of facilities worldwide. MausDB is freely available for the mouse community as open source software under the terms of the GNU General Public License.

References:
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