Finding a rat model for researching human disease using RGD resources

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Model organism research is essential for discovering the mechanisms of many human diseases by defining biologically meaningful gene-to-disease relationships. The Rat Genome Database (RGD, https://rgd.mcw.edu) is a cross-species knowledgebase and comprehensive online resource for rat genetic and physiologic data. Decades of targeted breeding as well as developments in genome editing in the rat have provided researchers with the ability to produce strains that develop abnormal conditions which recapitulate the phenotypic and genomic profile of traits and diseases in humans. These strains control for genetic background and allow for reproducible molecular, cellular, and whole animal phenotyping. RGD's primary goal is to curate, compile and organize data to provide a resource with common vocabularies/ontologies for comparative genomics research.

Searching for a rat model using the Find Rat Models tool facilitates finding a relevant rat strain and its report page, which serves as a primary point of access for related data. Using an example of Wilson disease and its primary human gene of *ATP7B*, we demonstrate the utility of Disease Portals, strain and gene report pages and integration of multiple affected species for this monogenic disease. Rat strain genetic models for obesity and obesity-related conditions are further examples of complex human disease recapitulated in rat strains.

This robust compilation of data for rat strains and other species, with the analysis tools to efficiently leverage data, gives researchers an excellent resource for discovering precision models for their disease and/or genes of interest. The foremost utility of RGD is as a cross-species knowledgebase to help drive discoveries that have the potential to improve human health by empowering the search for appropriate research models.

Commented [SJ1]: Atp7b for rat or mouse, or ATP7B for human, dog, pig, etc.

Commented [SJ2]: Saying "even" kind of makes it sound like you are surprised that we have integration of multiple affected species.