

The Virtual Comparative Map tool at the Rat Genome Database facilitates comparative and translational studies

G Thomas Hayman¹, Jennifer R Smith¹, Stanley JF Lauderkind¹, Shur-Jen Wang¹, Mary L Kaldunski¹, Mahima Vedi¹, Monika Tutaj¹, Wendy M Demos¹, Marek A Tutaj¹, Jyothi Thota¹, Logan Lamers¹, Adam C Gibson¹, Akhilanand Kundurthi¹, Varun Reddy Gollapally¹, Kent C Brodie², Stacy Zacher³, Jeffrey L De Pons¹, Melinda R Dwinell¹, Anne E Kwitek¹

¹Rat Genome Database, Department of Physiology, ²Clinical and Translational Science Institute, ³Finance and Administration, Medical College of Wisconsin, Milwaukee, WI, USA

Abstract

The Rat Genome Database (RGD, <https://rgd.mcw.edu>), a cross-species knowledgebase and the premier online resource for rat genetic and physiologic data, has recently added an updated and expanded version of the Virtual Comparative Map tool (VCMMap) to its suite of innovative analysis tools. VCMMap was originally developed as a web application using rat and human radiation hybrid maps. An intermediate Java applet version included early genome assemblies of rat, mouse and human, and added agricultural species cow, pig, horse and chicken. The current version uses a synteny algorithm and multiple earlier and current genome assemblies of six species: rat, human, mouse, pig, bonobo and green monkey, with the addition of more species and genome assemblies in development. Substantial improvements have been made to performance and navigation. Examining syntenic regions across up to six species at the same time is possible, and comparing additional species, as well as comparing different assemblies of the same species will be possible in the future. A use case scenario is presented involving interspecies gene synteny determination and analysis. In addition to genes, tracks for data such as genomic variant densities can be added to the display. The improved and expanded VCMMap tool provides valuable functionality for researchers engaging in comparative genomics and translational medicine.