THE DIABETES PORTAL AT THE RAT GENOME DATABASE

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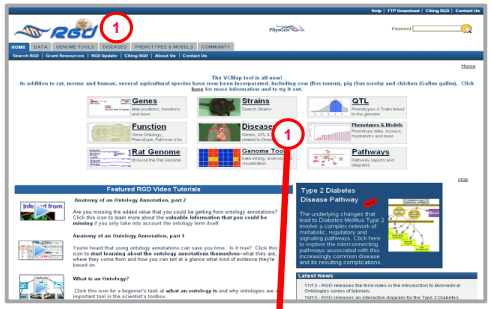
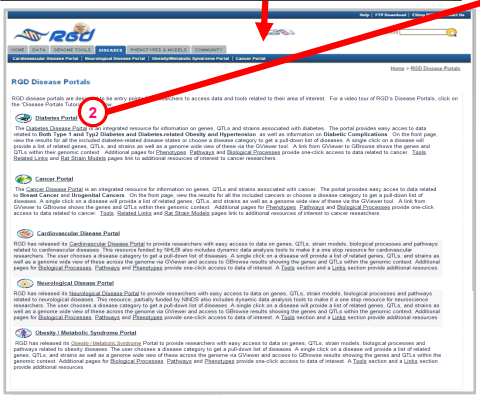
Abstract:
The Diabetes Portal is the fifth comprehensive platform for physiological genomics discovery supplied by the Rat Genome Database (RGD), joining the Cancer, Cardiovascular Disease, Neurological Disease and Obesity/Metabolic Syndrome Portals. These initiatives are designed to highlight genetic and genomic data generated from disease-related rat research for the broad community of users served by the RGD who often have specific disease research interests. As with the others, this newest portal provides ready access for both the novice and experienced user to a comprehensive, integrated knowledge base, essential for diabetes research, that can be tailored to the specific interests of the user. These portals additionally help define the scope and focus for data acquisition and curation projects at the RGD. Current and upcoming components of the portal include 1) comprehensive human, rat and mouse gene sets associated with related, categorized diseases, phenotypes, biological processes and pathways using multiple ontologies; 2) all rat QTLs related to diabetes, including associated mouse and human QTLs; 3) comparative maps of diabetes-related regions; 4) annotation of function and cellular localization of gene products; 5) relevant references; 6) rat strains used as models to study diabetes; 7) genome mining and analysis tools, such as Gviewer, enabling genome-wide display and study of diabetes-related genes and QTLs. Portals to be deployed in the future will include digestive, immune and musculoskeletal systems. The Rat Genome Database is funded by the National Heart Lung and Blood Institute grant (HL64541).

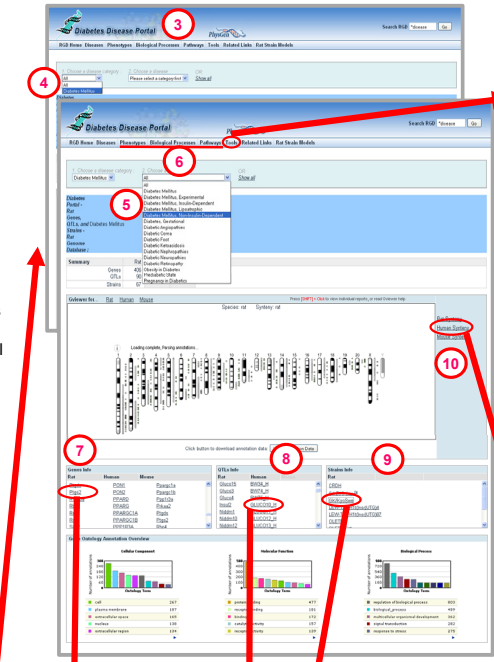
1. From the RGD homepage, select Diseases via the tab or panel to access any of the five Disease Portals.



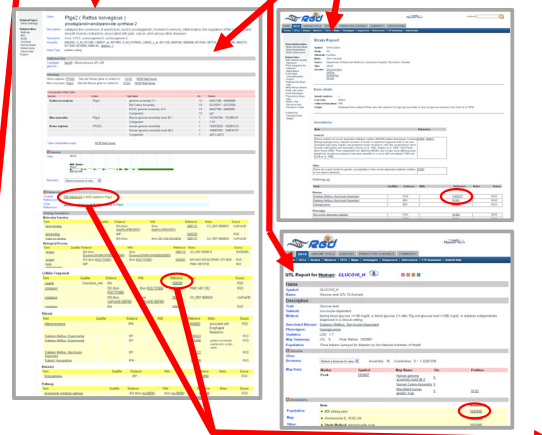
2. The Diabetes Portal is the newest of the five RGD Disease Portals, which provide convenient access to and consolidation of disease-related data.



3. The RGD Diabetes Portal page provides easily obtained and condensed diabetes-related data. Drop-down lists allow the user to choose a broader view of the complete set of data **(4)** or to narrow their search to a specific disease **(5)**. Tabs across the top of the page **(6)** facilitate similar access to diabetes-related phenotypes, biological processes and pathways.



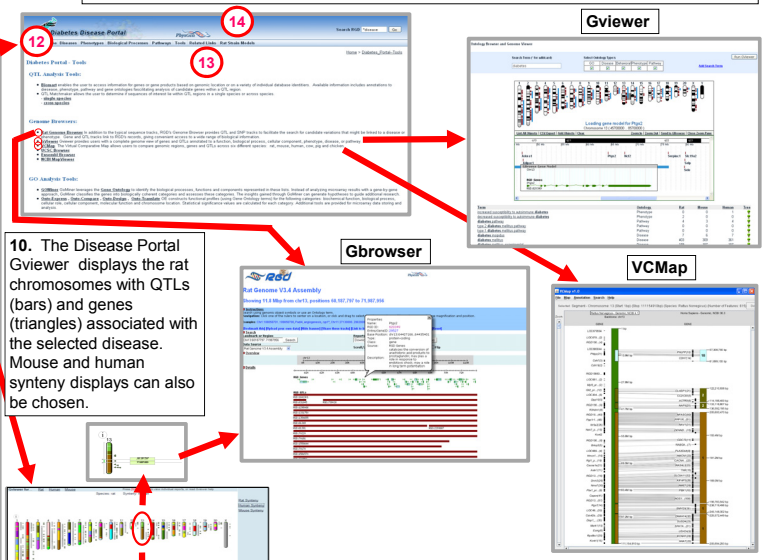
7. The Diabetes Portal page features lists of genes, QTLs and strains which are annotated to the selected disease, phenotype, pathway or biological process terms. Symbols link to the respective object report pages for genes **(7)**, QTLs **(8)** and strains **(9)**, providing simplified navigation between the collected data in the portals and the more specific and detailed data on the report pages. All three report pages contain links to references; an example from the gene report page is shown.



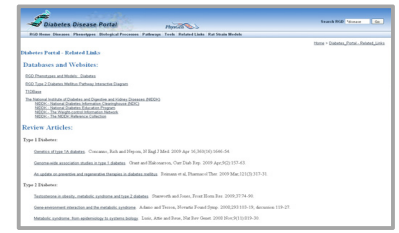
10. The Disease Portal Gviewer displays the rat chromosomes with QTLs (bars) and genes (triangles) associated with the selected disease. Mouse and human synteny displays can also be chosen.

11. Clicking on a chromosome will isolate it. Mousing over a gene or QTL icon displays the symbol and position information for that object. Shift+click the icon to access the corresponding detailed gene or QTL report page. Clicking on user-defined boundaries to the left of the chromosome displays the region in more detail in the Gbrowser.

12. Clicking the Tools tab displays links to many useful genome analysis tools, including an updated, expanded version of Gviewer, which provides a genome-wide view of genes with annotations for gene function/ process/location, disease, pathway and phenotype, and QTLs with annotations for phenotype and disease; Gbrowser, which provides numerous tracks including genes, QTLs and SNPs, allowing data export, to facilitate searches for disease- or phenotype-linked variants; and VCMap, which compares genomic regions, genes and QTLs across six species.



13. The Related Links tab leads to numerous database and website links related to diabetes, as well as links to an ample collection of reviews on the topic; samples are shown below.



14. The Rat Strain Models tab leads to information on rat strains used as models for diabetes, such as the table below.