Script for Phenotypes and Models Portal Intro Video

This video will introduce the Rat Genome Database Phenotypes and Models Portal (http://rgd.mcw.edu/wg/physiology). The Phenotypes and Models Portal was created to house strain and phenotype data along with tools to integrate rat genomic and phenotypic datasets. These provide researchers with access to the wealth of physiological data for the rat that characterizes disease models and assists researchers in identification of rat models for the study of complex diseases.

To access the Phenotypes and Models portal, go to the RGD home page at rgd.mcw.edu and click either the tab or the button labeled "Phenotypes & Models".

In addition to convenient links to outside websites, the Phenotypes and Models home page provides one-click access to the portal's four sections: Phenotypes, Strains and Models, the PhenoMiner data mining tool and the Strain Medical Records. We will look at each of these segments individually.

The Phenotypes section of the portal provides summary data for a wide range of phenotypes including cardiovascular, pulmonary, vascular, morphological, blood chemistry, and behavioral. For each phenotype several sets of data are available. For instance, if you click the link for "blood pressure", you can see that there are datasets from both the PhysGen Program for Genomic Applications at the Medical College of Wisconsin (PGA) and from the National BioResource Project for the Rat in Japan (NBRP-Rat). In addition, the PGA data includes values for blood pressure taken under a variety of conditions and taken using different research protocols. Data for commonly used strains are presented to provide the “normal” range of measurements in a variety of strains. Details on assay types, suitable equipment for accurate measurements, and resources for other supplies needed to perform these studies are provided to assist investigators with little experience with performing these studies in their own laboratories.

For a subset of physiological measurements, detailed phenotyping protocols are provided. In this case, both direct and indirect methods of measuring blood pressure are included along with links to sources for blood pressure monitors, blood pressure altering drugs, and so forth.

The Strains and Models portion of the portal includes information on strain availability, disease models and animal husbandry as well as providing a search function for RGD strains.

This is the strain search page. It allows users to query by strain name or symbol, the type or origin of the strain, an RGD ID, or an associated disease or phenotype. For example, a search for "SHR" returns the parent strain, its substrains and related congenics.

The strain availability page in the portal contains a chart of commercial and investigator sources of parental strains. Clicking on the symbol for the parent strain (e.g. ACI) will take you a page with information on substrains and related congenics. In this chart, "RGD" links to the RGD Strain Report page for more information about that strain. The links under "Others" give access to outside information about these strains and how to obtain them.

The disease models section of the portal identifies rat strains that are reported to be good models for some commonly studied diseases. These are grouped and presented by disease type, for example cardiovascular disease and mammary cancer. Data includes information on the commonly used strains as well as, in some cases, transgenic strains which can be used as models for these diseases.

The Animal Husbandry section provides helpful information for initiating and maintaining rat breeding colonies such as information on identification, genotyping and colony management software.

Going back to the Phenotypes and Models front page, the third major section of the portal is a link to the PhenoMiner phenotype database and data mining tool. This tool will be covered in more detail in a future video. For now, we'll just mention that the PhenoMiner tool was designed to integrate data collected from different rat strains, using a variety of measurement methods, under differing experimental conditions, and for many phenotypes. Users can limit their queries by selecting subsets of each category or, if no limits are

imposed for a particular data type, can retrieve a more complete summary. The tool is extremely flexible in that you can start your query with any of the four data categories and proceed through the categories in any order. A tally of the results that would be obtained at each step of the process of building the query is provided.

The Rat Strain Medical Records section of the portal is a source for detailed information on particular strains. Currently, ten commonly used strains are included. Each medical record includes information on growth/development, physical features, and phenotype data. Links are provided to available SNP, QTL and microarray data.

A new feature on the RGD website which is related to the Phenotypes and Models portal is the PhysGen Knockout page. This page can be accessed by clicking the PhysGen Knockout tab or logo at the top of each RGD page. The PhysGen Knockout program aims to knock out a large number of genes nominated by genome wide association studies, combine them with hypertensive and normotensive strains, and phenotypically characterize the resulting strains. The PhysGen Knockout page includes a list of the researchers involved in the program as well as the current list of nominated genes. The development of each knockout rat strain from gene selection through the development of the knockout strain, phenotyping, and strain availability can be tracked using the "Strain Development Progress" table. As each stage is reached, an entry is made in the table so that researchers interested in a particular gene can watch its progression through the process. Once a knockout strain has been phenotyped, that data will be made available in the PhenoMiner tool. Finally, researchers can nominate genes involved in the development of hypertension and renal disease for knockout strain development by contacting a PhysGen Knockout team member.

FOR MORE INFORMATION:

The Rat Genome Database:
http://rgd.mcw.edu

The RGD Phenotypes and Models Portal
http://rgd.mcw.edu/wg/physiology

The PhysGen Knockout Program:
http://rgd.mcw.edu/wg/physgenknockouts

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