

RGD's Physiological Pathway Diagrams Tutorial

RGD's Physiological Pathway Diagrams can be a helpful study/research tool for those interested in a systems-level view of a variety of physiological processes. Here are a few basic things that should help you get started.

The first question that you may find yourself asking is simply: “What can I do?” The most basic answer would be that you can easily view the relationships between genes, biomolecules, tissues, and systems. Let’s take a look at one of the diagrams as an example.

The systems pathway diagrams can be accessed from [RGD’s “Pathways” section](#). Just click on the “Physiological Pathways” link, then click on a pathway to view it (this tutorial uses the [renal fluid reabsorption pathway](#) as an example).

There are a couple of icons that you might want to notice before we continue, as they will be in all of the pathways. First, there’s the “show legend” button, which toggles the display of a small chart showing the meaning behind the various arrows in the pathways (which you may note are of differing colors and styles). Simply click the button again to make the legend disappear.

If you don’t wish to view each of the information bubbles one at a time, then you can click on the “show callouts” box. This then displays all of the pathway information at once. Once again, you click “show callouts” and all of these disappear so that you can view them one at a time again.

Also, you can click on “toggle screen” to choose whether you want to view the program in your normal browser window or wish to view it full screen. The printer icon in the top-left prints the current diagram using your default printer settings.

The systems pathway diagrams are the most generalized pathways that you can view. Major pathway organs are displayed. These pathway diagrams are made for you to start at the green star and end at the red target—hovering your mouse over the center of the pathway line will display information on that particular section of the pathway in a speech bubble (arrows indicate processes such as activation and molecular transport). Using this process of hovering, you can discover the specifics of a pathway one reaction at a time. For example, the renal pathway starts with low blood volume. Going to the next arrow shows us that there is a receptor activation, which can be read about just below the blue title. After the heart, we see that there is information on the resulting nerve stimulation, and so forth. Continuing to read all of the information on the pathway will lead us to the kidney, which becomes three dimensional when the mouse hovers over it. This means that it is an icon that links to more information—click on a three-dimensional organ to zoom into a tissue-level view.

This gives you a view of the applicable processes within that tissue. Much like the systems view, you can follow the pathway from start to finish by hovering over the arrows. Clicking the orange cellular pathway icon leads you to the diagram of the molecular pathway. All of the icons in this diagram are clickable and leads to more information about that gene, pathway or small molecule. Going back to the molecular pathway diagram itself, you can access a full report by looking for the “go to full report page” button in the upper right-hand corner. This has a legend, a written

description of the pathway, a list of genes that are associated with that particular pathway, and even more.

Let's go back to that tissue level diagram that we were looking at before by selecting the backwards arrow at the top left-hand corner of the page using the "previous" arrow (never use the "back" button on your browser). Some icons on the tissue level represent things such as protein channels and, like the organs in the system level, become three-dimensional when you hover the mouse over them. Clicking on the channels leads to a report on the gene that is translated in order to make them. Click on as the "previous" button, then the "system level" button to get back to the systems view.

You may see tabs in the top left-hand corner of some of the physiological pathways. The physiology tab is what is automatically selected when you enter a diagram. Clicking the physiology tab will display a basic physiology of a particular pathway, in other words, the default system view. Clicking pathology will display information on the pathology of the pathway, or information about diseases that affect the pathway. Notice that that pathway lines have changed in color and type. Just like the physiological view, you can hover over the pathway to get specifics on it, although now the information will be on the diseased pathway. You can also click on certain tissues to get a tissue level view of the affected pathway, and go back in the same way that you did before. Displayed in the upper left hand corner are the diseases that you can learn in connection with this pathway. Clicking on individual tissues will direct you to the smaller-scale piece of the pathology associated with that particular organ. The pharmacology tab will display information on the drugs that are used in the treatment of certain diseases (the same ones that appear under the "Pathology" tab). Under this tab, the same options are still available, though the information will again be changed for the pharmacological responses.

Now you should have a better idea of how to use these Physiological Pathway Diagrams to view the connections between several different physiological processes. For more information on rat physiology and genes, visit the [Rat Genome Database](#). If you have any questions, please don't hesitate to [contact us](#). Thank you for watching this presentation.