

Glucose Uptake

Glucose, an important energy source for animals, is transported into cells by facilitated diffusion using protein carriers. Researchers incubated guinea pig red blood cells in a 300 mM (millimolar) radioactive glucose solution at pH 7.4 at 25°C. Every 10 or 15 minutes, they removed a sample of cells and measured the concentration of radioactive glucose inside those cells. The cells came from either a 15-day-old or a 1-month-old guinea pig. The data are graphed in Figure 1.

Glucose Uptake over Time in Guinea Pig Red Blood Cells

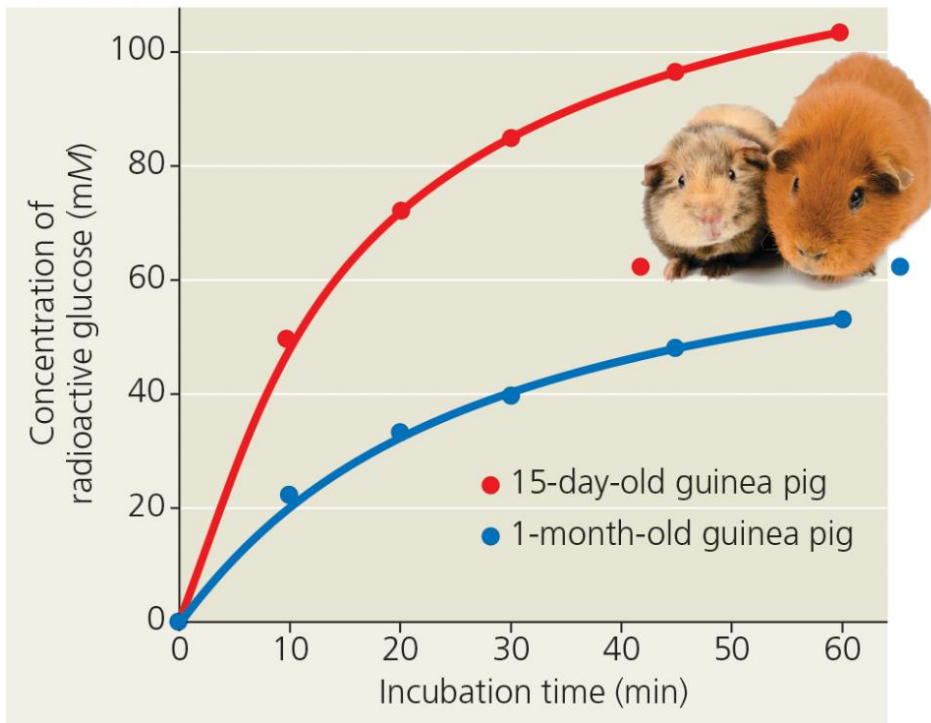


Figure 1 Glucose uptake in two guinea pigs

1. [SP 3] State the question you think the researchers were investigating.
2. [SP 4, SP 5] a) Identify the independent and dependent variables.
b) Identify what is represented by the red and blue dots.
3. [SP 5, SP 6] a) Based on the graph, make a conclusion about glucose uptake.
b) From the data in the graph, state the relationship between glucose uptake in red blood cells from 15-day-old and 1-month-old guinea pigs.
4. [SP 3] Propose a hypothesis to explain the difference between glucose uptake in red blood cells from 15-day-old and 1-month-old guinea pigs. (Think about how glucose gets into cells.)
5. [SP 4] Design an experiment to test your hypothesis.