

3. To investigate whether red blood cells of animals lose the ability to take in glucose from their environment as they age, scientists collected red blood cells from guinea pigs that ranged in age from one day old to seven months old. Scientists incubated an equal number of red blood cells in separate culture dishes that contained a 300 nM solution of radioactively labeled glucose. The amount of radioactively labeled glucose present inside the red blood cells of each group was measured over time.

- (a) **Describe** a difference between passive transport and active transport.
- (b) **Justify** why the scientists used an equal number of red blood cells in each culture dish as a control.
- (c) Glucose transporters are required for the facilitated diffusion of glucose into red blood cells. The scientists claim that the expression of the gene encoding these transporters decreases as guinea pigs age. If the scientists' claim is supported by experimental data, **predict** the effect of increased age on the amount of radioactively labeled glucose present inside the cells of each group.
- (d) **Justify** your prediction in part (c).

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**Write your responses to this question only on the designated pages in the separate Free Response booklet.**

**If there are multiple parts to this question, write the part letter with your response.**