Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***sciencemusicvideos* Feedback, Animal Homeostasis, Student Learning Guide**

**Instructions:**

**Getting to the tutorials.**

* Go to [www.sciencemusicvideos.com](http://www.sciencemusicvideos.com); Use the College Bio, AP Bio, or Learning Guide Menus to find “Animal Developement”

**Tutorial 1: Key Concepts, Thermoregulation**

1. Read “Introduction: What is Homeostasis?” ☐

2. Read “Regulators and Conformers” ☐

3. Complete the Quiz: “Homeostasis, Regulating, and Conforming” ☐

**Mastering the Terms**

Write out definitions for

* Homeostasis:
* Regulator:
* Conformer:
* Ectotherm:
* Poikilotherm:
* Endotherm:

4. Read “Adaptations for Body Temperature Regulation.” ☐

Write brief descriptions of each of the following adaptations:

|  |  |  |
| --- | --- | --- |
| a. Insulation |  | |
| b. Evaporative Cooling | |  |
| c. Vasodilation and vasoconstriction | |  |
| d. Countercurrent exchange    Adapted from *All About Birds*, Cornell University | |  |

|  |  |
| --- | --- |
| e. Thermoregulation related to surface area |  |
| f. Behaviors for thermoregulation |  |

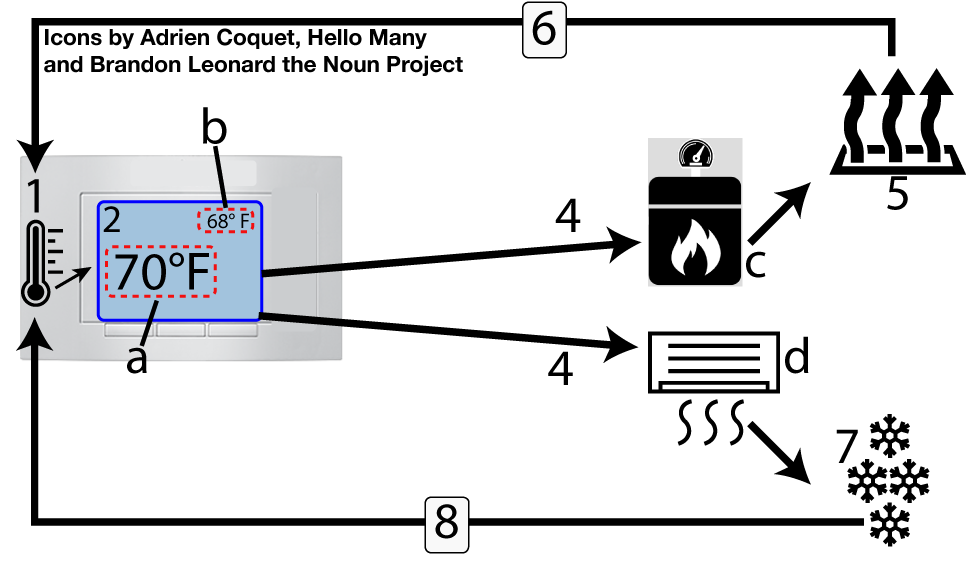
5. Read “Body Temperature...is Regulated by Negative Feedback.” ☐

6. Take the quiz, “Homeostasis, Negative Feedback, and Thermoregulation.” ☐

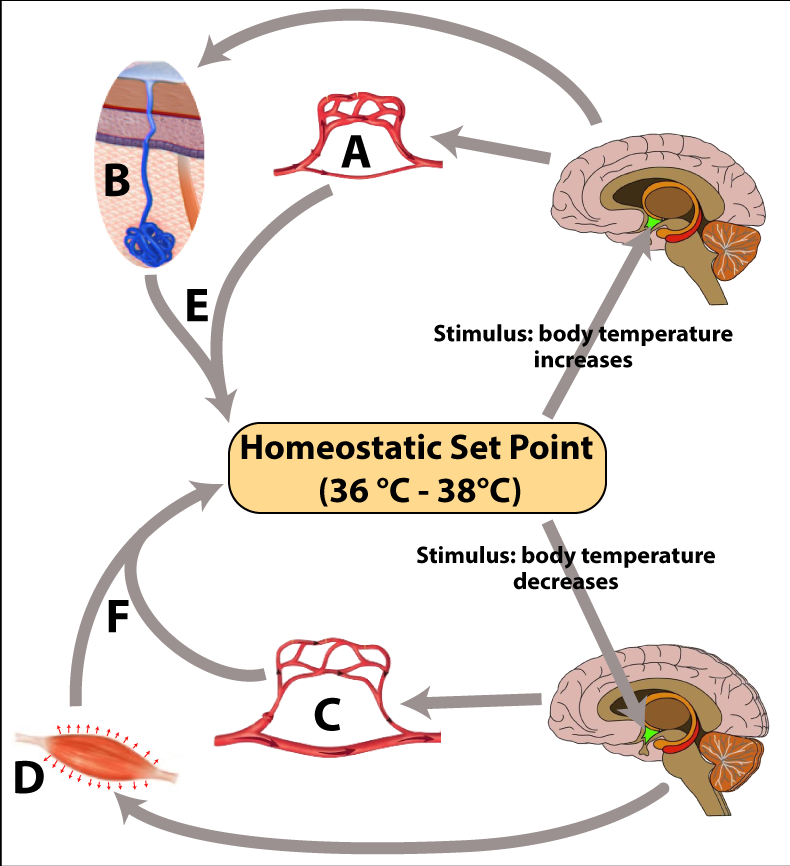
7. Read “Positive Feedback...” ☐

**Checking Understanding**

a. As a way of demonstrating your understanding about negative feedback and antagonistic effectors, explain how a home heating/cooling system works to maintain a constant temperature. Cover all letters and numbers in the diagram.



b. Now, explain how the hypothalamus can use heating and cooling mechanisms to maintain body temperature at a homeostatic set point in homeotherms like birds and mammals. Include all parts in the diagram below (even the ones that don’t have a letter, such as the hypothalamus).



Click the link to continue to the next tutorial.

**Tutorial 2: Blood Glucose Regulation**

1. Read the introduction: “Regulating Blood Glucose.” ☐

2. Read “Glucose Regulation: Setting the Context.” ☐

**Checking Understanding**

1. What’s a normal range for blood glucose concentration?

2. What organ controls blood glucose concentration?

3. Most of the pancreas is \_\_\_\_\_\_\_\_\_\_\_\_ tissue, the function of which is to

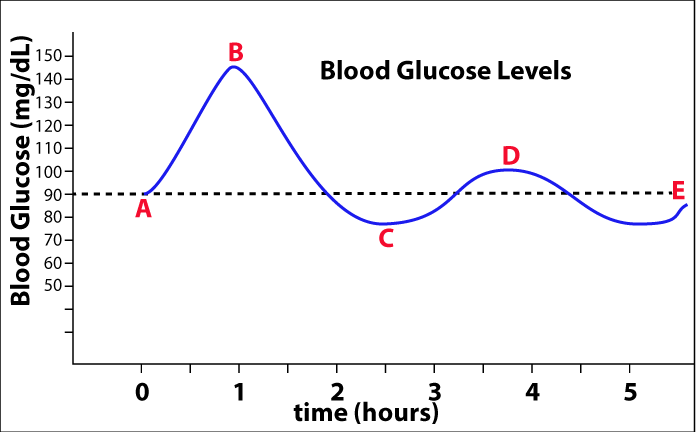
3. The Beta cells are found in the \_\_\_\_\_\_\_\_\_\_ of \_\_\_\_\_\_\_\_\_\_\_\_. Their function is is to release \_\_\_\_\_\_\_\_\_\_\_, which...

4. The alpha cells release \_\_\_\_\_\_\_\_\_\_\_\_\_\_, which ...

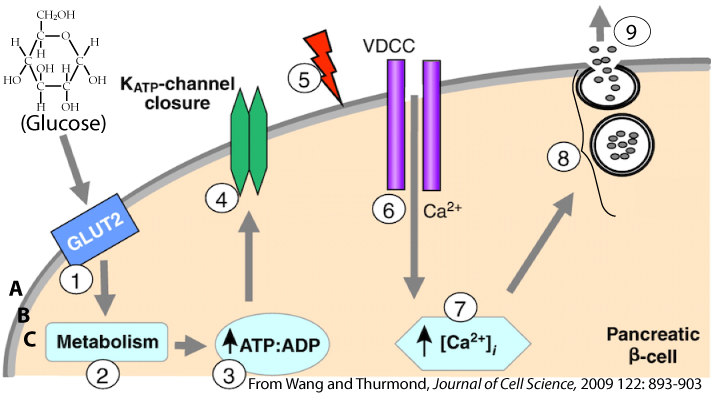
3. Read “Insulin,” including the two subsections, “3a, Control of Insulin Release,” and “3b, Insulin’s Effect...” ☐

4. Take the quiz, “Insulin, Checking Understanding.” ☐  
**Checking Understanding**

*TASK 1:* Predict what hormones would be released at points B, C, and D in the graph below. Justify your prediction.



*TASK 2:* Explain what’s happening in steps 1-8 of the diagram below.



*TASK 3:* Write a paragraph explaining how insulin effects its target cells. Be sure to explain each part of the diagram (a – j). Write small.

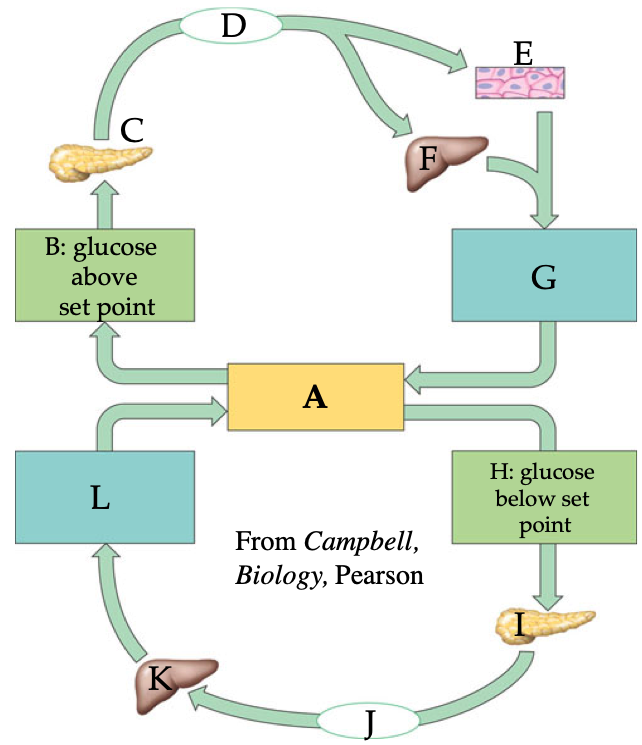


5. Read “Glucagon.” ☐

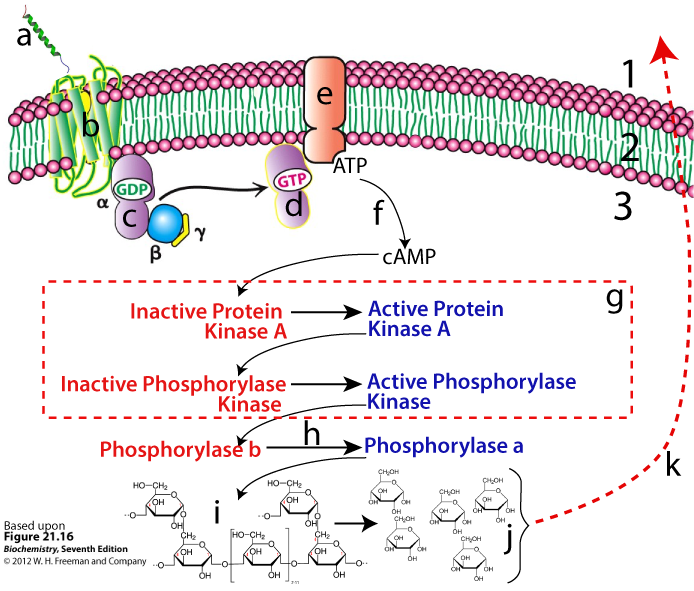
6. Take the “Insulin and Glucagon” quiz. ☐

**Checking Understanding**

*TASK 1:*  Use the space to the right of and below the following diagram to explain how the pancreas uses insulin and glucagon to maintain blood glucose homeostasis.



*TASK 2*: Use the space to the right and below the diagram to explain how glucagon works upon its target cells. Write small.

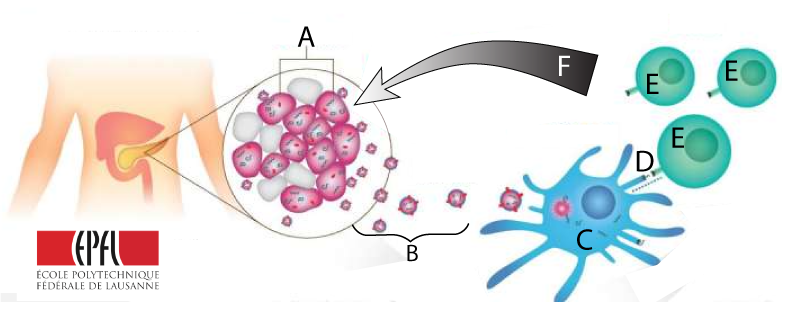


7. Read “Understanding Diabetes.” ☐

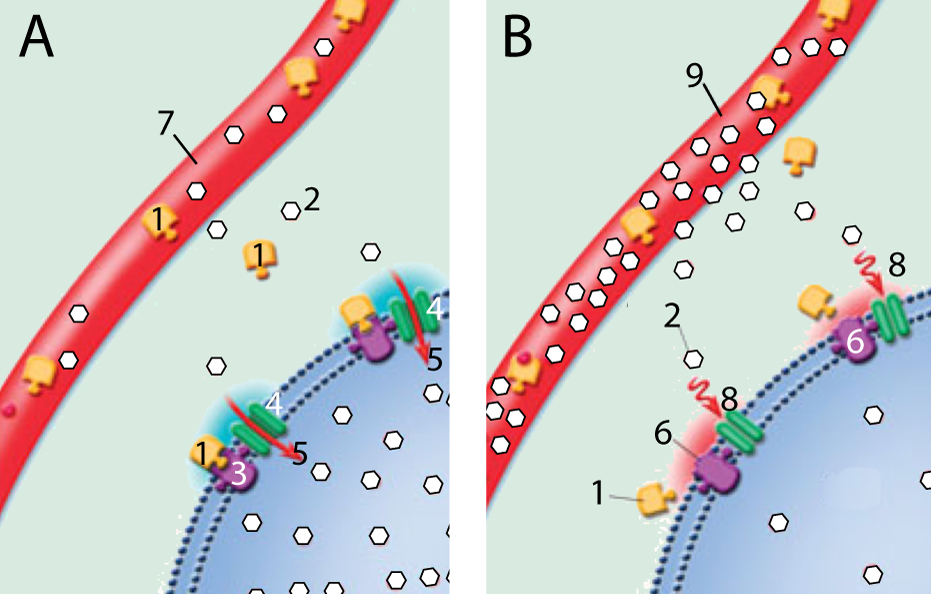
8. Take the “Diabetes (and Related Topics)” Quiz ☐

**APPLYING WHAT YOU’VE LEARNED**

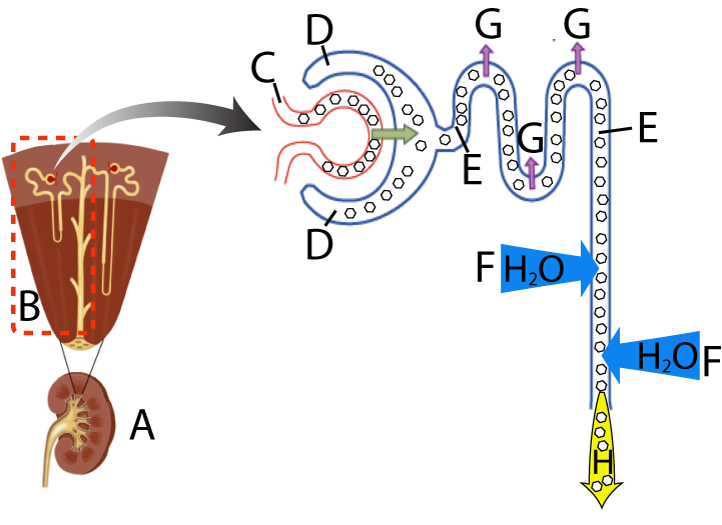
*TASK 1* : Imagine that your six year old cousin has just been diagnosed with juvenile diabetes. Talk him or her through the diagram below to explain what happened.:



*TASK 2*: Imagine that your 45 year old uncle or aunt has just been diagnosed with type 2 diabetes. Their biology has become a bit hazy, so sit down with them and walk them through the diagram below.



*TASK 3:* You overhear some friends talking about how a mutual acquaintance was just diagnosed with diabetes (type 1). One friend says, “I’ve never understood why being a diabetic makes you urinate so much. “ Explain it. Write small.



Follow the link to the next tutorial

**Tutorial 3: ADH and Osmoregulation**

1. Read “ Introduction:: Animal Bodies Need to Provide...”☐

2. Read “Osmoregulation is Controlled by the =...” ☐

**CHECKING UNDERSTANDING:** You drink a big glass of water. How does that affect your blood’s osmolarity. Explain.

3. Read “ADH Reduces Loss of Water in the Nephron’s Collecting Duct” ☐

4. Take the quiz “ADH and the Nephron Tubule”

**Checking Understanding**

*TASK 1:* Create a key for the diagram below.

|  |  |
| --- | --- |
|  | 1.  2.  3.  4.  5.  6. |

*TASK 2:* Create a key for this diagram

|  |  |
| --- | --- |
|  | A.  B.  C.  D.  1.  2.  3.  4. |

*TASK 3:* Using the diagram above, explain how ADH 1) stops blood osmolarity from decreasing, and 2) creates a concentrated, darker urine.

5. Read “Some Final Points about OsmoregulationL Aquaporins, and Thirst.” ☐

6. Take the quiz “ADH and Osmoregulation”

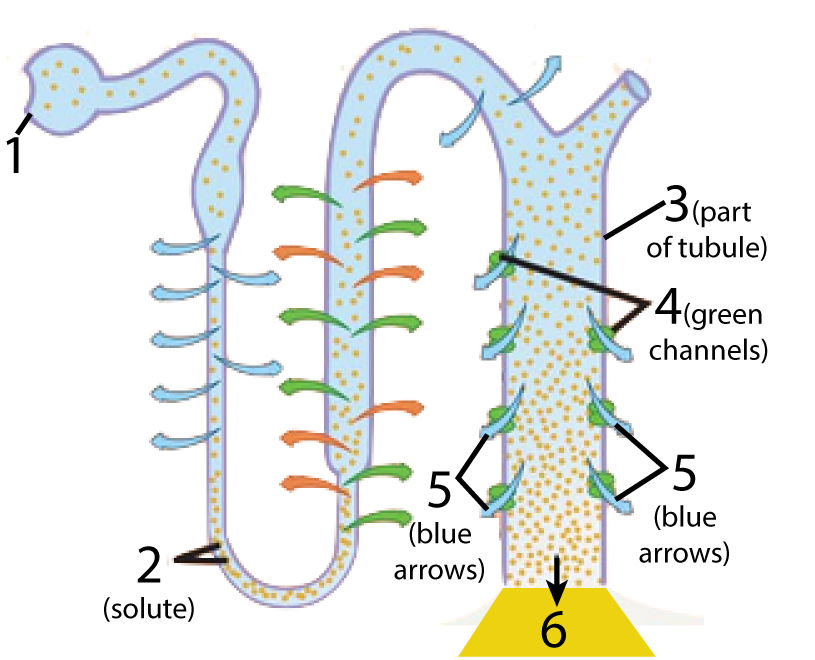
**Checking Understanding**

*TASK 1:* Make a key to the diagram below

|  |  |
| --- | --- |
|  | a.  b.  c.  d.  e.  f.  g.  h. |

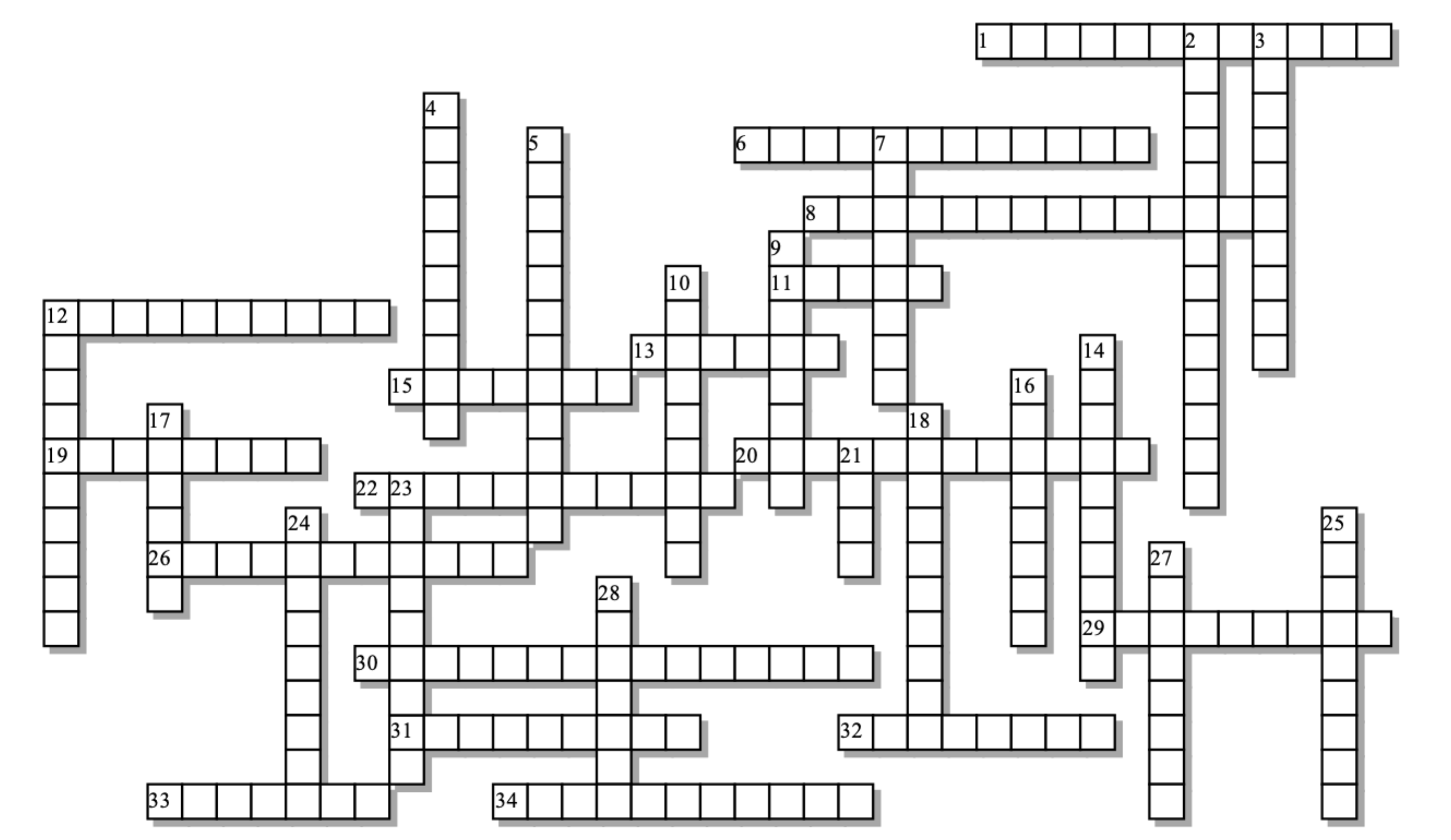
*TASK 2:* Using the diagram above, predict what would happen to the volume and color of your urine if you ate a very salty meal. Justify your explanation.

*TASK 3:* Explain how aquaporins work to alter your blood osmolarity and urine:



|  |  |
| --- | --- |
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**Animal Homeostasis: Thermoregulation, Blood Sugar, Osmoregulation**



|  |  |
| --- | --- |
| **Across:** | **Down:** |
| 1 - A body temperature conformer.  6 - When blood is allowed to flow close to the skin, allowing heat from the blood to radiate out of the body  8 - How arteries and veins are organized to minimize heat loss.  11 - The primary organ that stores glucose as glycogen.  12 - The type 1 form of this sugar-related disease is brought about by an \_\_\_\_\_\_\_\_\_\_\_ reaction.  13 - When you eat this polysaccharide, insulin is released.  15 - The hormone that lowers blood glucose levels.  19 - In this kind of feedback system, the output of the system amplifies the system's activity.  20 - One effect of ADH is to create more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ urine, which preserves the body's water.  22 - These capillaries reabsorb water from the nephron tubule.  26 - Sweat and panting are forms of \_\_\_\_\_\_\_\_\_\_\_\_\_\_ cooling.  29 - An organism that, for a specific physiological variable, works to keep that variable within a narrow, constant range.  30 - This type of cascade mobilizes enzymes in liver cells to convert glycogen to glucose  31 - In the type 2 form of this disease, cells become insulin \_\_\_\_\_\_\_\_\_\_\_\_.  32 - An organ that's both a digestive gland and an endocrine gland that controls blood glucose levels.  33 - The functional unit of the kidney  34 - Maintaining internal stability, even in the face of external change | 2 - The general term for maintenance of the composition of body fluids, especially blood  3 - When your blood is too \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, ADH is released.  4 - ADH acts by increasing reabsorption from the nephron's \_\_\_\_\_\_\_\_\_\_\_ duct  5 - A part of the brain that senses and controls many homeostatic variables, including temperature and osmolarity.  7 - A substance that increases the flow of urine  9 - The hormone that increases blood glucose levels  10 - This gland releases many hormones, including one that acts upon the kidneys for osmoregulation  12 - Protein channels that allow for osmosis  14 - A body temperature regulator  16 - An inability to control blood glucose levels  17 - The key osmoregulatory organ  18 - Blubber and fur are both examples of  21 - Whereas glucagon is the ligand, this is the second messenger.  23 - An organism whose body heat comes from the outside environment  24 - An organism that, for a specific physiological variable, allows that variable to fluctuate with the external environment.  25 - An organism whose body heat is generated internally, from cellular respiration  27 - In this kind of feedback system, the output of the system works to turn the system down (or off).  28 - Elephant and jackrabbit ears provide lots of this kind of area, allowing for effective radiative cooling |

**Possible Answers:** Surface, aquaporins, autoimmune, cAMP, collecting, concentrated, conformer, countercurrent, diabetes, diuretic, ectotherm, endotherm, evaporative, glucagon, homeostasis, homeotherm, hypertonic, hypothalamus, insulation, insulin, kidney, liver, negative, nephron, osmoregulation, pancreas, peritubular, phosphorylation, pituitary, poikilotherm, positive, regulator, resistant, starch, vasodilation