

Researcher's name: \_\_\_\_\_ Date: \_\_\_\_\_ Class: \_\_\_\_\_

## Osteopontin Research Activity **Answer Key**

Your research team has successfully developed a new prescription medication called “**Outstandix**,” which is designed to slow or stop the process of inflammation that causes pain in patients for a variety of reasons. Animal testing has gone smoothly and seems to provide relief from inflammatory pain. So far, no negative side effects have been seen in the animals, but this drug has been shown to drastically reduce the levels of a protein called **Osteopontin** in the blood, urine and joint (synovial) fluid.

Although no side effects have been seen in the test animals, it is important to research all effects of Outstandix before beginning human testing. Today, we will research what others have already learned about Osteopontin. Read the following article excerpts and take notes on the effects of Osteopontin in the body.

### **Notes:**

**Answers (notes) will vary by student, but make sure that students are taking accurate notes from the appropriate section of the article.**

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We are going to focus on the effect that Osteopontin has on inhibiting the precipitation of calcium salts out of solution in three areas of the body: the blood, urine and joint fluid.

Your first step is to observe what this actually means. Although we cannot observe this directly since we cannot obtain Osteopontin for experimentation, we can observe what it looks like when calcium salts precipitate out of solution and apply our observations to our understanding of the human body.

1. Mix the solution of calcium chloride with the solution of potassium phosphate. Record your observations:

**When the two solutions were mixed, a white powder developed that sank to the bottom of the beaker. This powder was solid calcium phosphate.**

2. Record class discussion and explanation of this phenomenon

**When the two solutions were mixed, a double replacement reaction took place forming potassium chloride, which dissolved in the water, and calcium phosphate, which cannot dissolve (unless an inhibitor such as Osteopontin is present).**

3. Record your research and class discussion of calcium phosphate deposition in the following body fluids. Make sure to record common diseases and symptoms associated with each.

**Blood:**

**Calcium phosphate crystals that form in the blood can cause a pulmonary embolism causing immediate death. Smaller crystal formations can lead to vascular calcification, which can cause problems later in life including vessel rupture from stiff walls.**

**Urine:**

**Calcium phosphate crystals that form in urine often lead to kidney stone formation.**

**Synovial (joint) fluid:**

**Crystals in synovial fluid can lead to joint problems and severe joint pain.**

4. Is this drug ready for human testing? Why or why not?

**No. The rare but deadly reaction involving pulmonary embolism shows that more research should have been conducted prior to human testing for this drug. Possible changes could have been made to the drug before human trials were started.**