

Vitamin K, Vitamin E, & Aspirin: The Effectiveness of Preventing Blood Clots

PRESENTERS: Nora DeKemper, Endiyah Cuff, & Paige Jankowski

BACKGROUND: Blood clotting is the process of blood clumping together to prevent excessive bleeding in damaged vessels. However too much clotting can be a cause for concern. There are supplements that prevent excessive clotting, a popular anticoagulant is low dose Aspirin, but there has been research to show that vitamins E and K can also aid in preventing blood clotting. In the experiment vitamin K, vitamin E, & low-dose aspirin were compared to determine the most effective clot preventing every-day treatment.

METHODS:

- Whole blood w/ 0.9% NaCl 5mM Sodium Phosphate buffer control for → whole blood w/ 250 mg/ml low-dose aspirin solution
- Whole blood w/ acetone control for → whole blood w/ 500 mg/ml vitamin K solution & whole blood w/ 648.4 mg/ml vitamin E solution
- Treatment: 1 ml blood + anticoagulant supplement + thrombin (each treatment done in triplicate)
- Quantitative measurements:
 - Measured time from coagulant addition until first clot appearance in a 5 minute trial (time for sample to clot)
 - Measured number of clots observed in 5 minute trial (number of clots)
- Qualitative:
 - Observed strength of clots based on thickness and length (strength of clots)

RESULTS:

- Low-dose aspirin took 1.6x & 1.7x longer to begin clotting than vitamin E & vitamin K (respectively)
- Blood treated with aspirin took significantly longer to clot than its saline control.
- Aspirin showed 59.4% & 58.5% fewer clots in the coagulation test compared to vitamin K & control w/ saline (respectively)
- The observed data supports the hypothesized outcome.

Low dose aspirin was effective in preventing blood clotting while vitamin E and vitamin K were not.

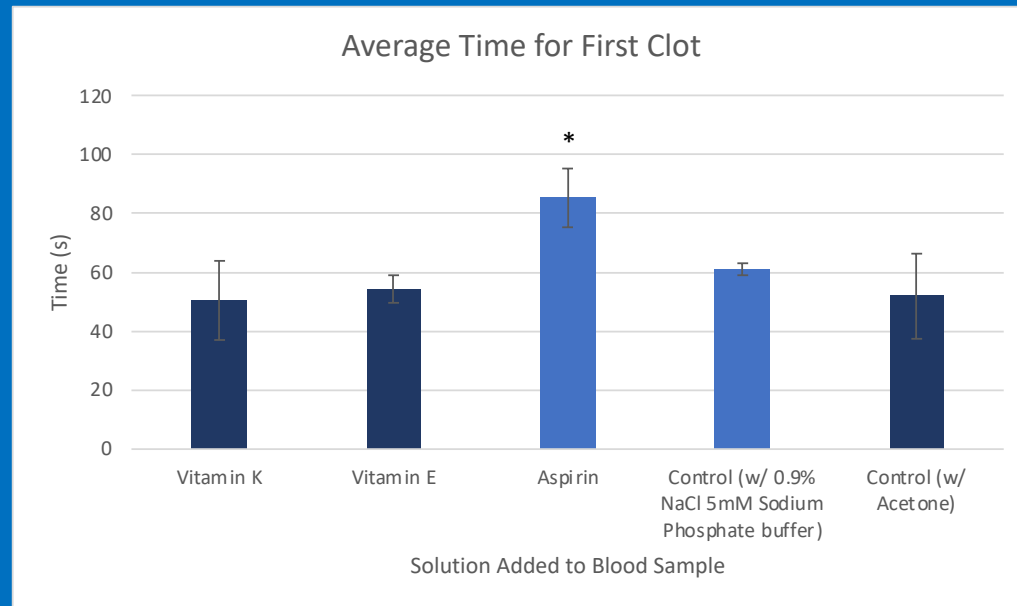


Figure 1: Average time recorded before first clot was observed during the slide method coagulation test. Bars are standard deviation. *signifies that $p < 0.05$ compared to its control per a student T-test

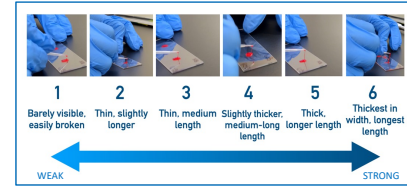


Figure 2 (above): Characteristics (width & length) standard during slide method coagulation test.

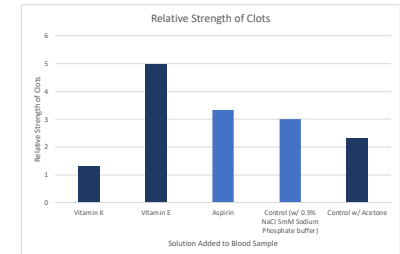


Figure 3 (above): Qualities of clots in coagulation test (slide method). Ranking the average clot characteristics based on length and thickness. Thicker and longer clot indicates stronger coagulation.

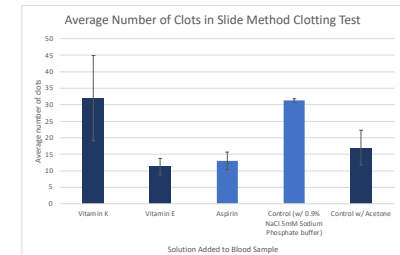


Figure 4 (above): Average number of clots per 5 minute coagulation test (slide method). Bars are standard deviation.

Limitations of experiment: the need for two controls & anticoagulant solutions were not equal concentrations

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