SUPPRESSION OF PLATELET AGGREGATION CAUSED BY GLUCOSAMINE SUPPLEMENT

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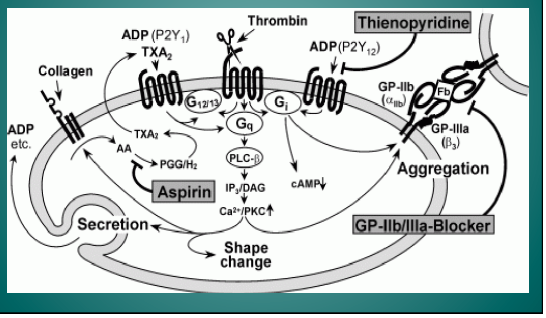
INTRODUCTION

- A healthy 47-year old Hispanic female has donated blood for several years to provide normal platelet aggregometry controls in our facility in aspirin response studies.
- Aggregation results were consistently predictable. The donor was not **knowingly** taking any NSAIDS or other medications or supplements that would affect platelet function.
- On two subsequent donations one month apart the platelet aggregation results were abnormal.

INTRODUCTION

- What was the problem?
- She reported she had begun taking a daily dose of 1500 mg of glucosamine with 1500 mg celadrin supplement approximately 4 weeks prior to first testing.
- A literature search generated one article using humans that demonstrated that glucosamine suppressed platelet ADP receptors, but not collagen or thrombin receptors.
- Two other articles using guinea pigs and dogs also showed the effect of glucosamine on platelet function.

Mechanism of Action of ASA: Inhibits the prostaglandin-producing enzyme cyclooxygenase which converts arachidonic acid into prostaglandins.



MATERIALS AND METHODS

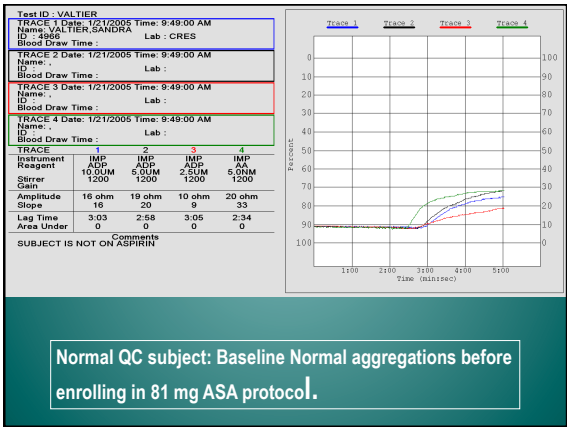
- Platelet aggregations were performed on a Chrono-Log 570 VS using both optical and impedance aggregometry using ADP, Collagen and Arachidonic Acid as agonists.
- Studies were performed on the PFA-100 using the ADP/ Collagen and EPI/Collagen cartridges.
- The Accumetrics system was used to detect a response for the presence of aspirin and Plavix using individual cartridges.
- A CBC with platelets was performed on an ADVIA 120 hematology analyzer.
- All platelet function testing was performed on 3.2% Citrated whole blood

RESULTS

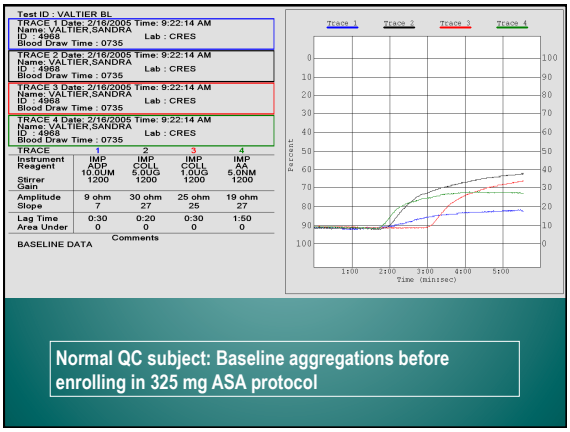
Platelet Aggregations	Normal: >60.0%	Normal: >8.0 ohms	Normal: >8.0 ohms	Normal: >8.0 ohms	Normal: >8.0 ohms
Dates	Optical (%)	Impedance Ohms	Impedance Ohms	Impedance Ohms	Impedance Ohms
	ADP 20.0 uM	ADP 10.0 uM	ADP 5.0 uM	Collagen 1.0 uG	Arachidonic acid 0.5 nM
02.16.05		9.0	30	25	19
07.10.08	51.0	0	0		
08.08.08	43.0	0	5		
09.23.08	79.0	8	1		

RESULTS

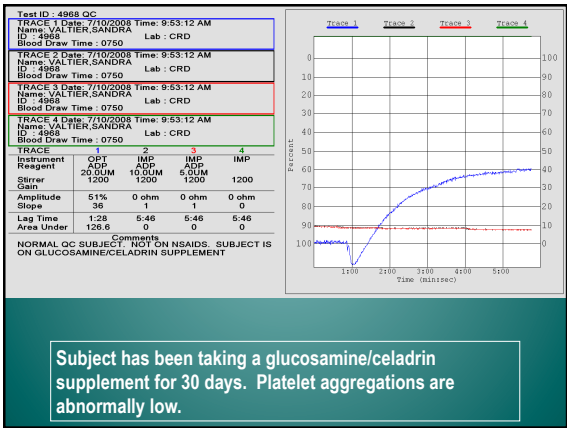
	PFA - ADP/COLL <145 sec.	PFA-EPI/ COLL <175 sec.	Accumetrics -ASA <550 ARU	Accumetrics -P2Y12 <20.0%
Dates				
07.10.08	112	148	660	3.0
08.08.08	129	108	662	13.0
09.23.08	76	138	610	4.0



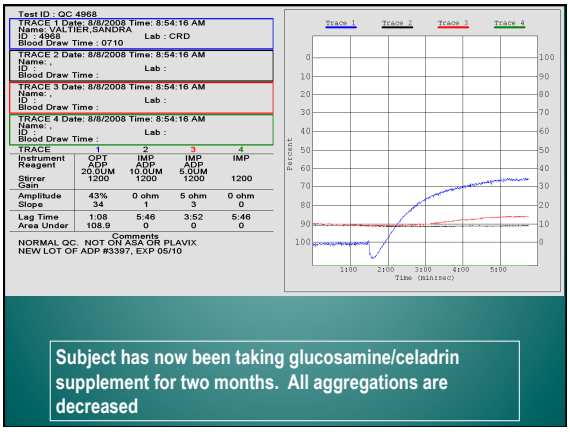
Normal QC subject: Baseline Normal aggregations before enrolling in 81 mg ASA protocol.



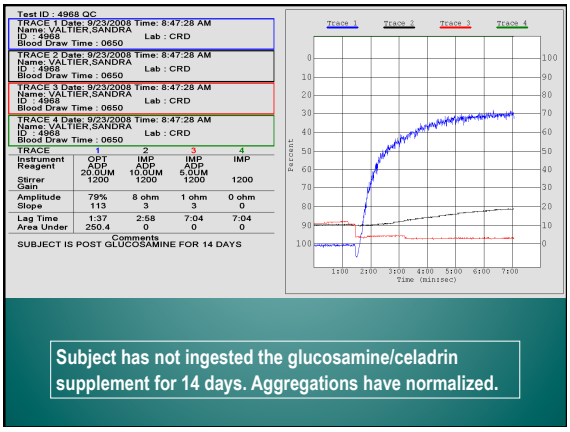
Normal QC subject: Baseline aggregations before enrolling in 325 mg ASA protocol



Subject has been taking a glucosamine/celadrin supplement for 30 days. Platelet aggregations are abnormally low.



Subject has now been taking glucosamine/celadrin supplement for two months. All aggregations are decreased



Subject has not ingested the glucosamine/celadrin supplement for 14 days. Aggregations have normalized.

DISCUSSION

- The subject discontinued the supplement and the platelet aggregations returned to normal limits.
- Only the ADP optical and whole blood platelet aggregations curves were affected by the supplement.
- The PFA-100 closure times were all within normal limits.
- The Accumetrics P2Y12 cartridges which are specific for that ADP receptor were all within normal limits.

DISCUSSION

- This case study shows that one assay may not give investigators enough information in analyzing abnormal platelet function.
- We concluded the supplement suppressed ADP-induced platelet aggregation.
- A population study may help establish risk for glucosamine supplements in individuals taking anti-platelet function drugs such as Plavix or aspirin.

REFERENCES

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- Bertram J, Ragatz BH, Baldwin W, Iatrides PG. The effects of glucosamine on platelet aggregation. Thrombosis Research 1981;301-307.