Platelet Aggregation Suppression by Glucosame Supplement

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GLUCOSAMINE SUPPRESSES PLATELET AGGREGATION

• A healthy 47-year old Hispanic ♀ has donated blood for several years to provide normal platelet aggregometry controls in our facility for aspirin response studies

• Her aggregation results were consistent
She reported taking no NSAIDS or other medications or supplements that would affect platelet function

• On two consecutive donations one month apart the platelet aggregation results were suppressed

• She reported she had begun a daily dose of 1500 mg of glucosamine with 1500 mg celadrin ~4 weeks prior to the first suppressed aggregation result
• A literature search generated one article that demonstrated glucosamine suppressed human platelet ADP receptors, but not collagen or thrombin receptors

•Two additional articles using guinea pigs and dogs also showed the effect of glucosamine on platelet function

MATERIALS AND METHODS

• Both light transmittance (LTA) and whole blood impedance platelet aggregometry (WBA) were performed using a Chrono-Log 570 VS
- Agonists: ADP, collagen, arachidonic acid (AA)

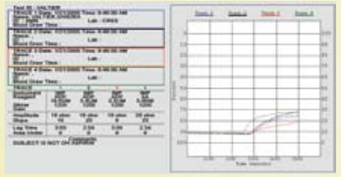
• PFA-100 studies were performed using ADP/collagen (CADP) and EPI/collagen (CEPI) cartridges

• The Accumetrics system and specific VerifyNow cartridges were used to detect aspirin and Plavix response

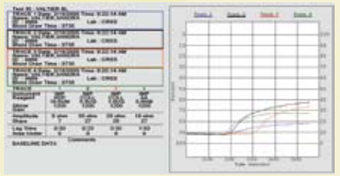
• Complete blood counts including platelet counts were performed on an ADVIA 120 hematology analyzer

• All platelet function testing employed 3.2% citrated whole blood

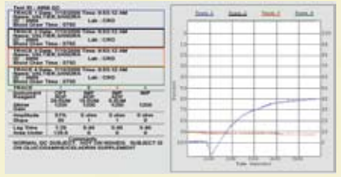
RESULTS



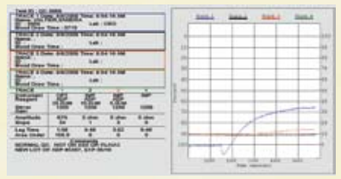
Normal controls: Baselines before enrolling in 81 mg ASA protocol



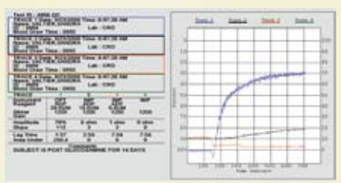
Normal controls: Baselines before enrolling in 325 mg ASA protocol



Subject has been taking a glucosamine/celadrin since 6/11/2008 (30 days).
Platelet aggregations are suppressed.



Subject has been taking glucosamine/celadrin two months.
All aggregations are suppressed.



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

Date of Platelet Aggregometry	20 µM ADP LTA	10 µM ADP WBA	5 µM ADP WBA	1.0 µg Collagen WBA	0.5ηM AA WBA
02.16.05		9Ω	30Ω	25Ω	19Ω
07.10.08	51%	0Ω	0Ω		
08.08.08	43%	0Ω	5Ω		
09.23.08	79%	8Ω	1Ω		
Normal	> 60%	> 8Ω	> 5Ω	> 8Ω	> 8Ω

Date of Platelet Assay	PFA CAPD	PFA CEPI	Accumetrics ASA	Accumetrics $P2Y_{12}$
07.10.08	112 sec	148 sec	660 ARU	3%
08.08.08	129 sec	108 sec	662 ARU	13%
09.23.08	76 sec	138 sec	610 ARU	4%
Normal	< 145 sec	< 175 sec	< 550 ARU	< 20%

ARU = aspirin resistance units

DISCUSSION

• The subject discontinued glucosamine/celadrin and the platelet aggregations returned to normal limits
• The ADP LTA alone, but all WBA curves were suppressed by the supplement
PFA-100 closure times were all within normal limits
• The Accumetrics P2Y12 cartridge results, which are specific for that ADP receptor, were all within normal limits

• A single assay may not give investigators enough information to analyze abnormal platelet function
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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