

# New approaches to platelet function testing in clinical situations

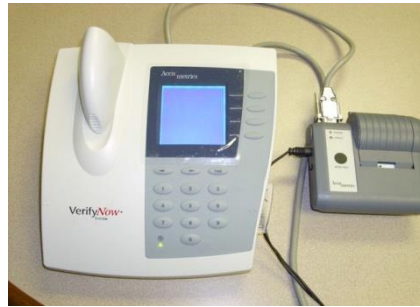
Stan Heptinstall

University of Nottingham, UK

# Comparison of several different modern approaches to determine efficacy of inhibition of platelet function by aspirin and by P2Y<sub>12</sub> antagonists



AggRam



VerifyNow



Multiplate



Biocytex VASP  
(P2Y<sub>12</sub> only)



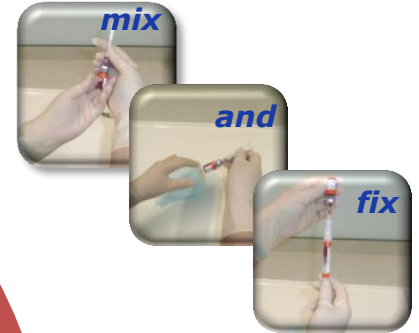
Platelet Solutions – P-selectin

# Platelet Solutions - P-selectin test



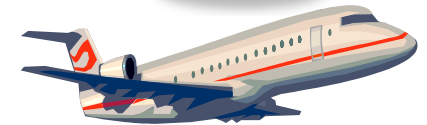
Blood sample is collected at patient's bedside, doctor's surgery, or in the home

Blood is processed using a kit designed to assess aspirin or P2Y<sub>12</sub> therapy

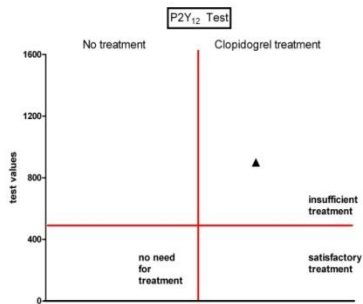
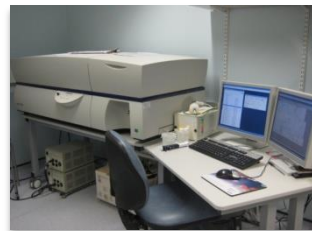


Report based on the analysis is prepared

The fixed samples are transported to a central laboratory

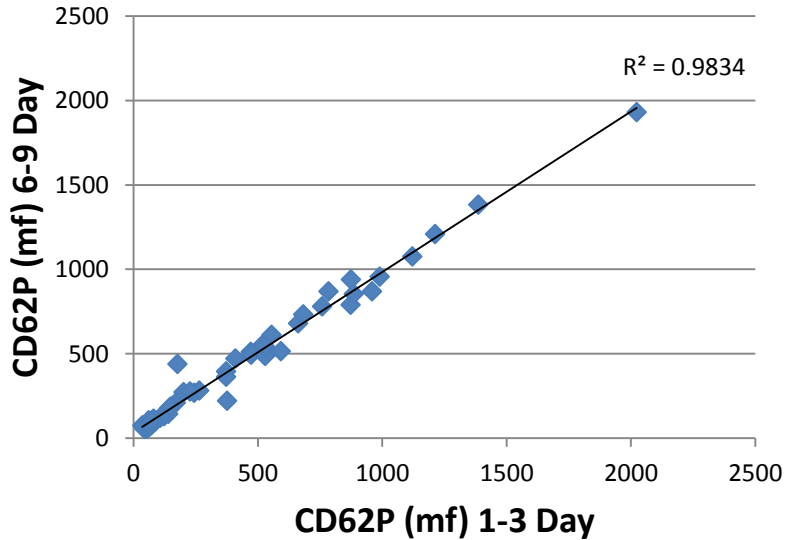


P-selectin analysed by flow cytometry



# Fixed samples are stable during transport and storage

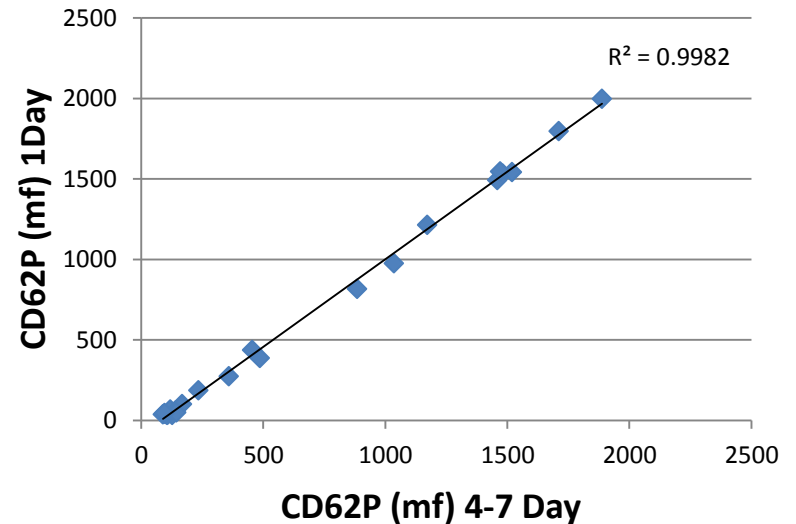
## Sample Stability (Storage)



- Tests were performed using latest kit samples which are fixed and stored in monovette tubes
- Samples were analysed 1-3 days after fixation and analysis repeated 6-9 days after fixation
- Samples analysed before and after transportation using royal mail postage boxes remained stable



## Sample Stability (Transport)



Platelet function testing was performed in blood from 10 healthy donors and 10 patients with ACS

**Healthy donors:**

- no drug
- addition of cangrelor (100nM) *in vitro*
- addition of aspirin (100μM) *in vitro*
- addition of cangrelor and aspirin *in vitro*

**Patients:**

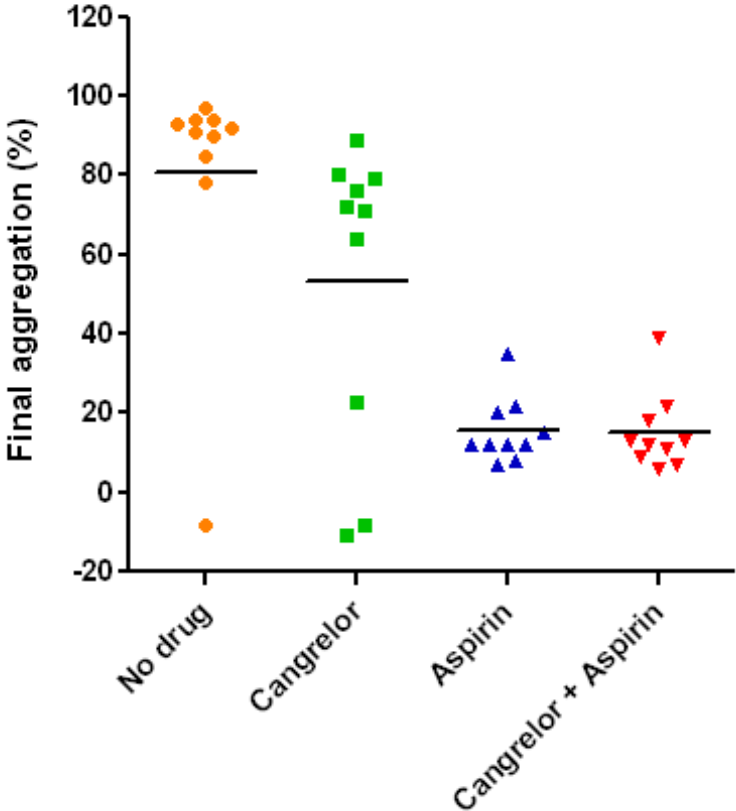
- all were being treated with clopidogrel and aspirin

Aspirin tests and P2Y<sub>12</sub> tests were performed using 4/5 different approaches

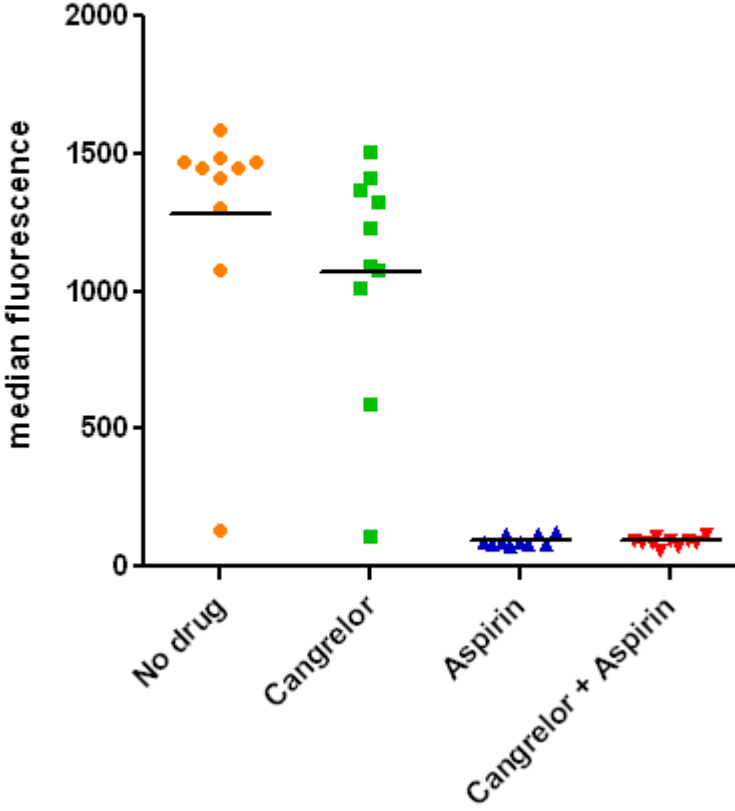
# Aspirin Test

Healthy donors

### AggRAM: 0.5mg/ml AA



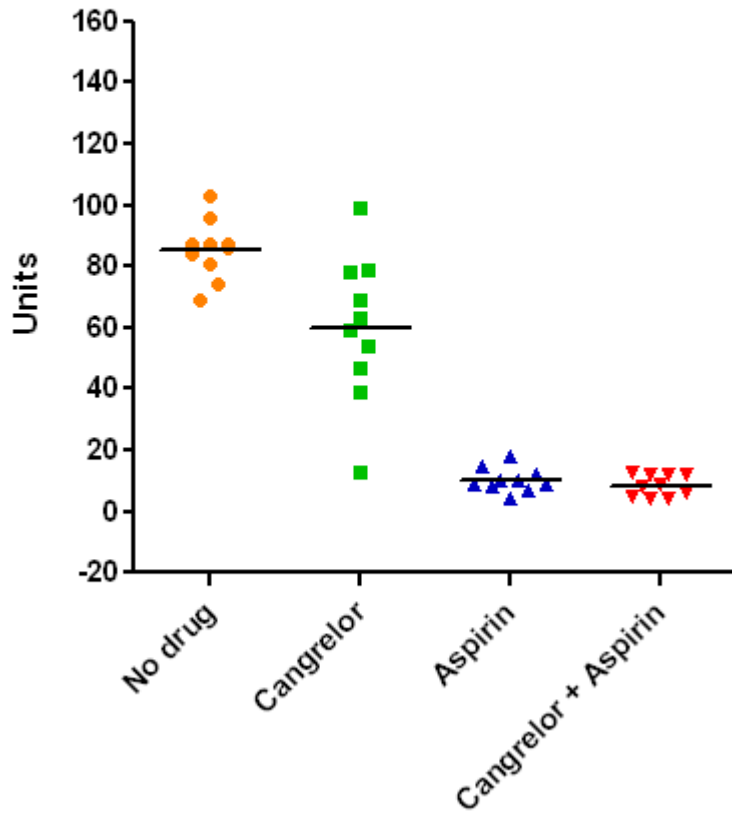
### P-selectin: Aspirin Test



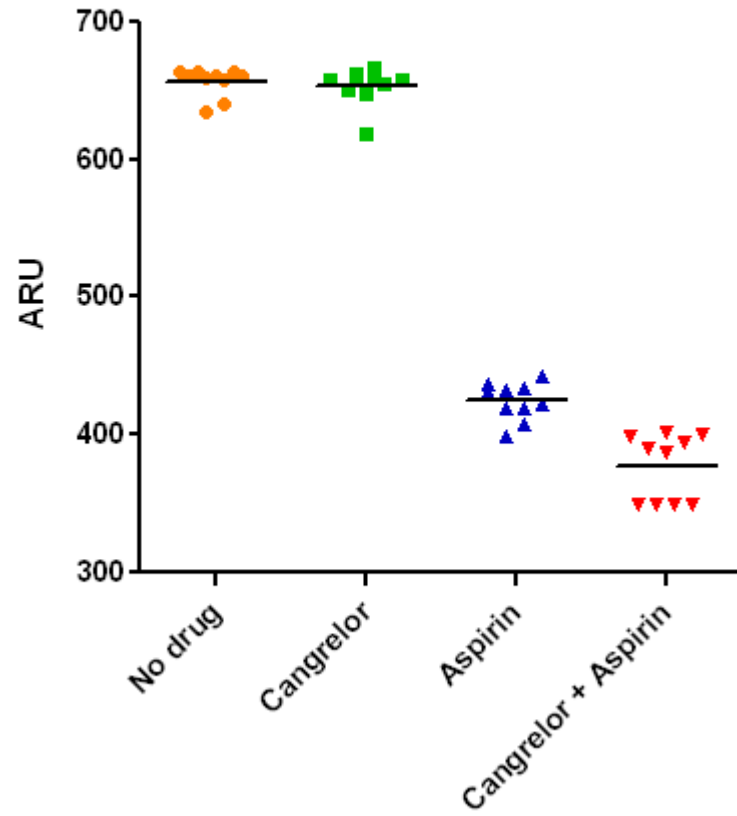
# Aspirin Test

Healthy donors

### Multiplate: Aspirin Test



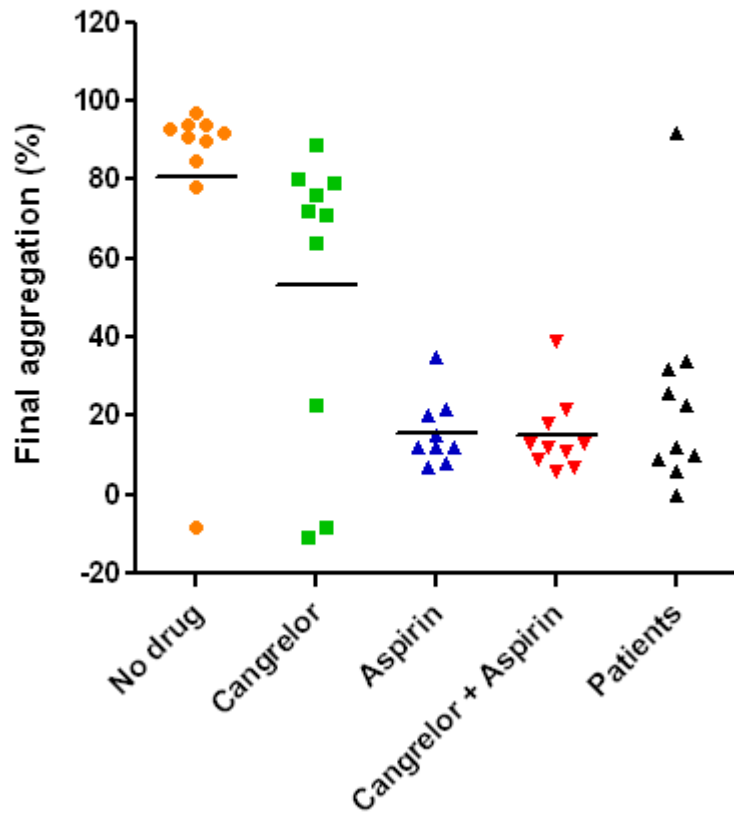
### Verify Now: Aspirin Test



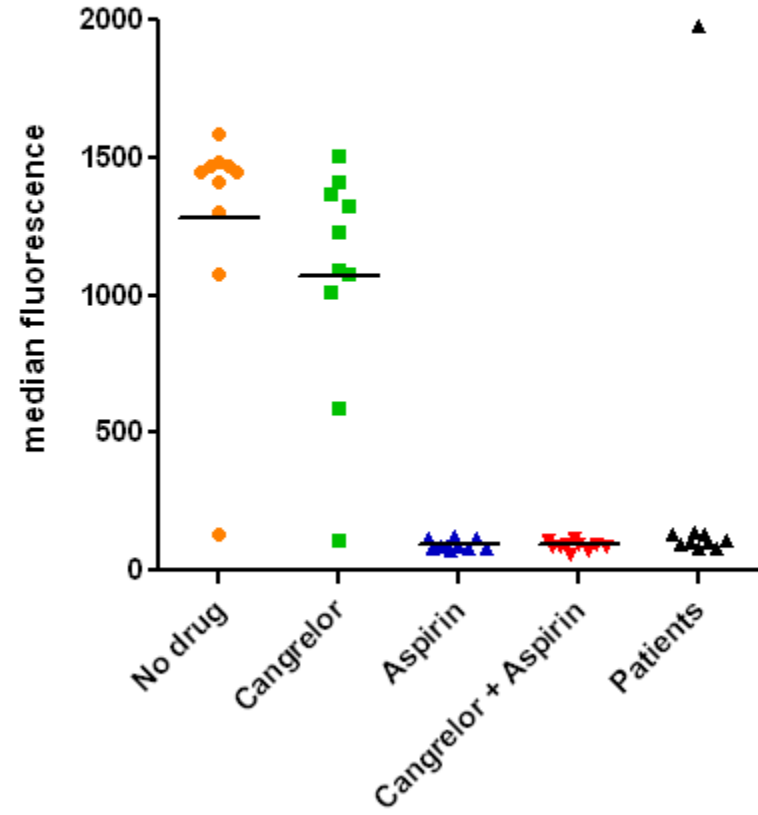
# Aspirin Test

Healthy donors and patients

AggRAM: 0.5mg/ml AA



P-selectin: Aspirin Test

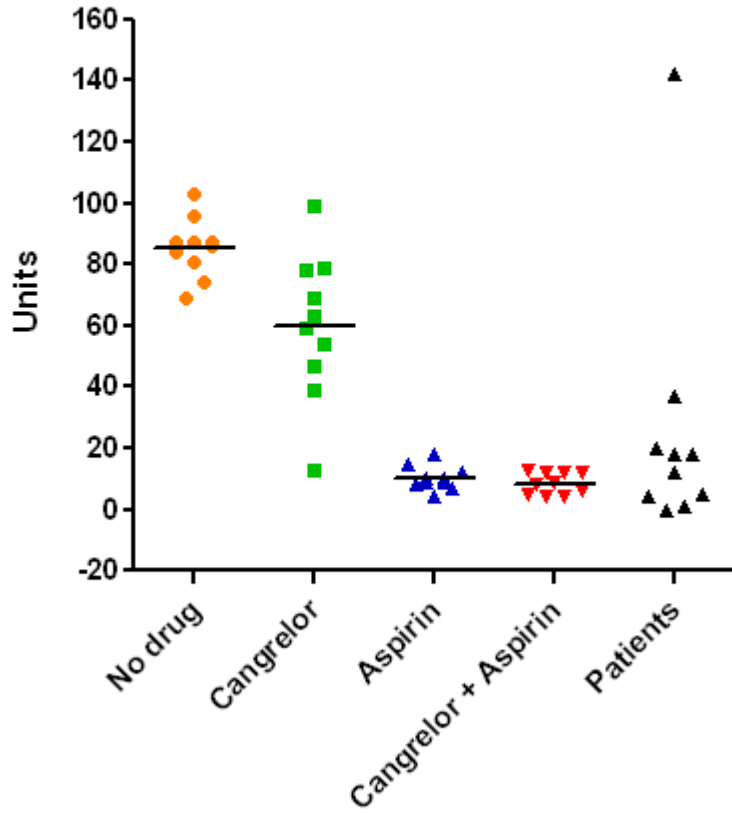




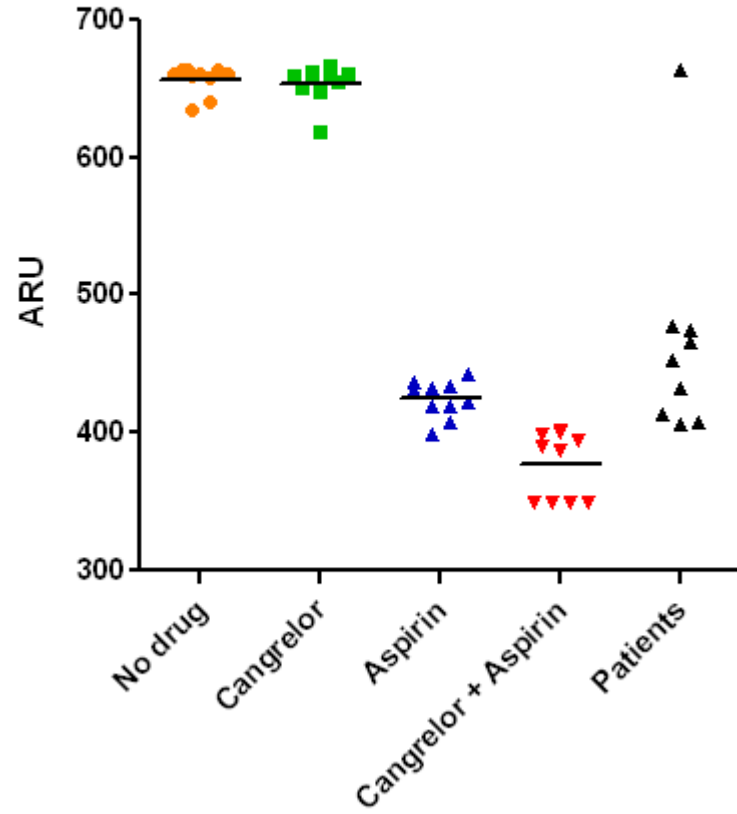
# Aspirin Test

Healthy donors and patients

### Multiplate: Aspirin Test



### Verify Now: Aspirin Test



# New approaches to platelet function testing - conclusions

- Aspirin Test

All tests demonstrated good inhibition of platelet function by aspirin *in vitro*

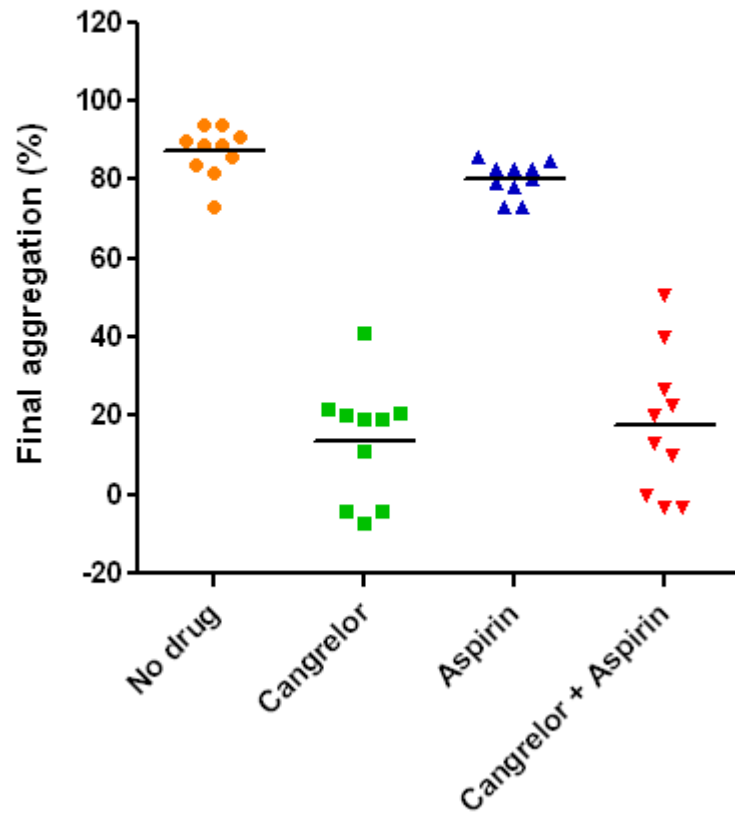
All tests demonstrated good inhibition of platelet function by aspirin in all but one patient with ACS *ex vivo*

All tests identified the 1 non-responder to aspirin

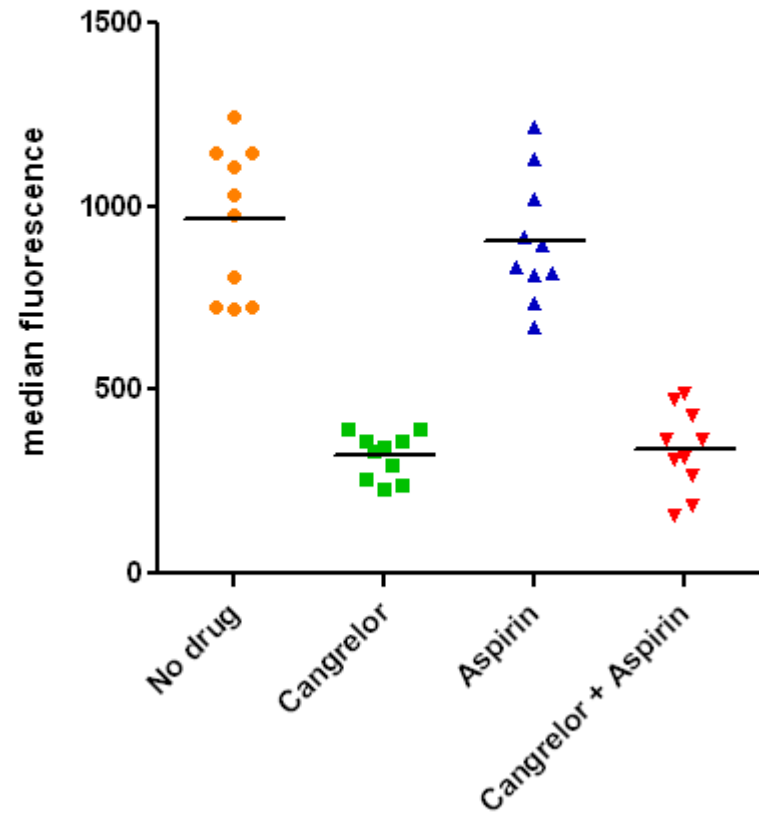
# P2Y<sub>12</sub> Test

Healthy donors

AggRAM: 20μM ADP



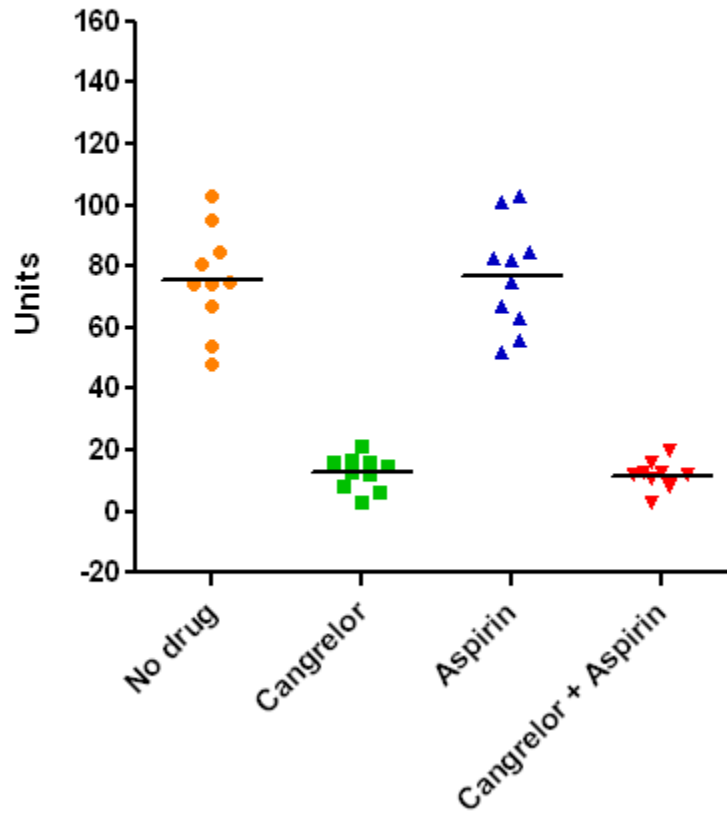
P-selectin: P2Y<sub>12</sub> Test



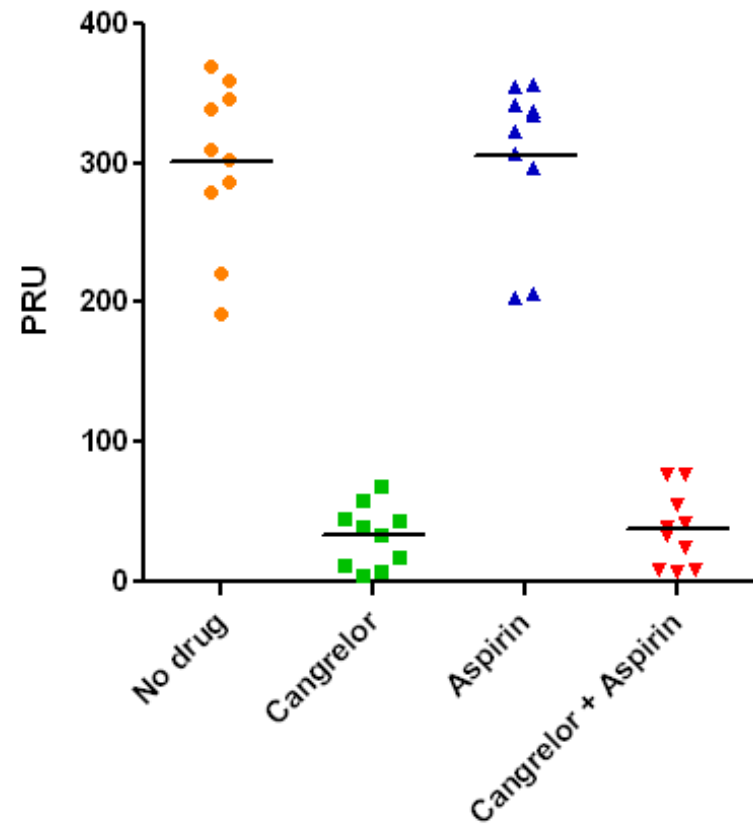
# P2Y<sub>12</sub> Test

Healthy donors

### Multiplate: P2Y12 Test



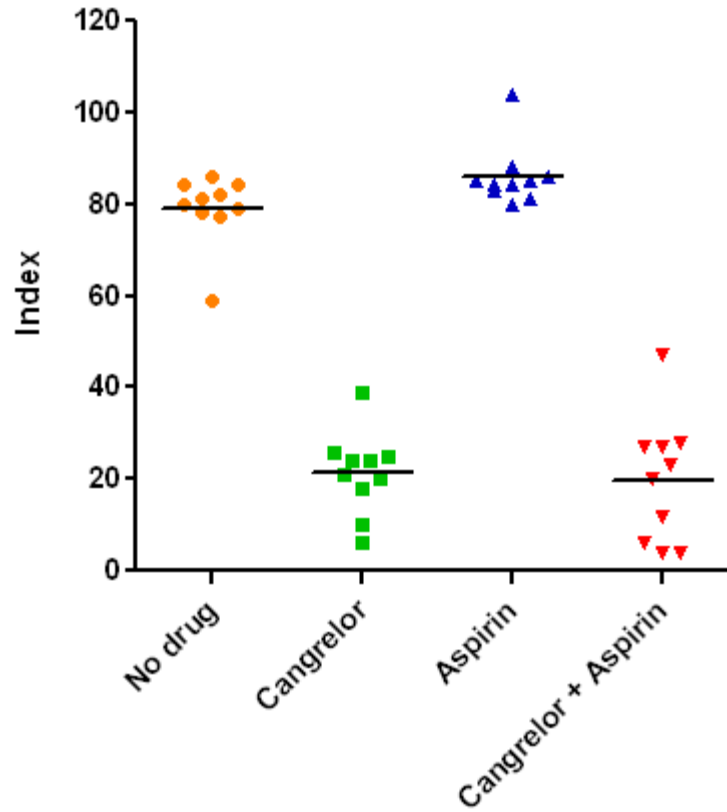
### Verify Now: P2Y12 Test



# P2Y<sub>12</sub> Test

Healthy donors

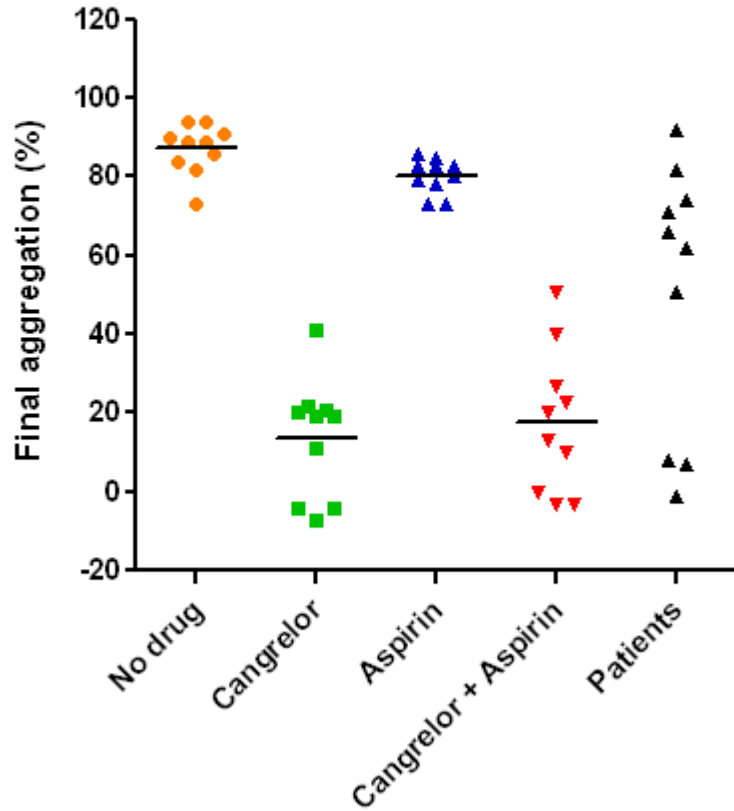
## Biocytex



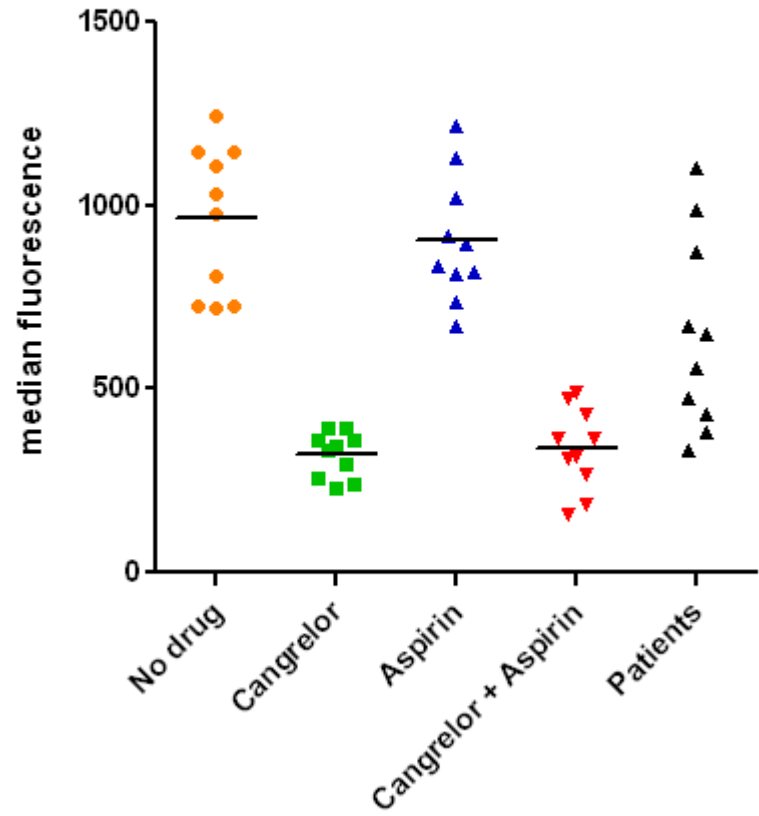
# P2Y<sub>12</sub> Test

Healthy donors and patients

### AggRAM: 20 $\mu$ M ADP



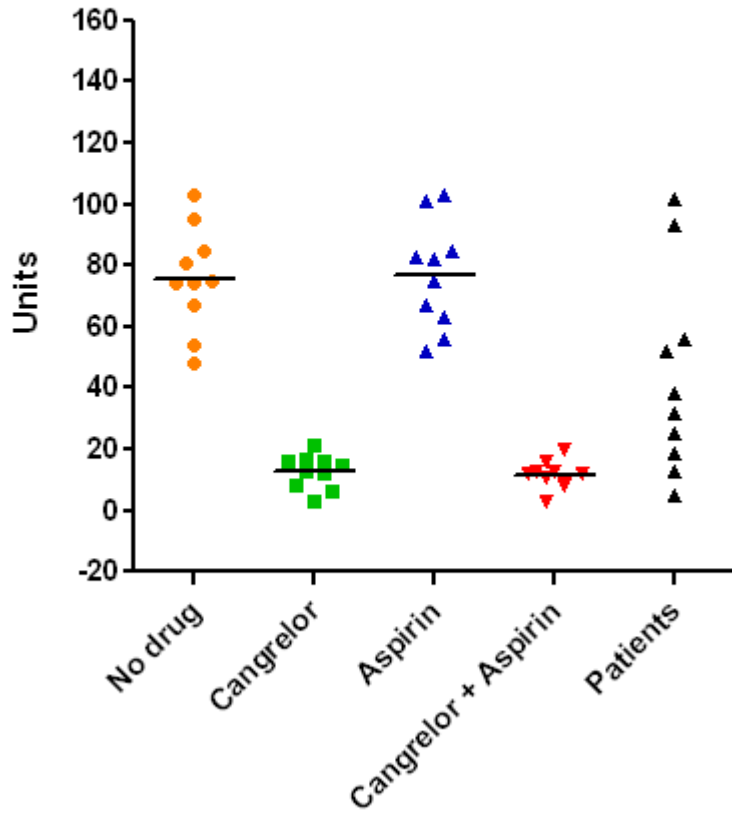
### P-selectin: P2Y<sub>12</sub> Test



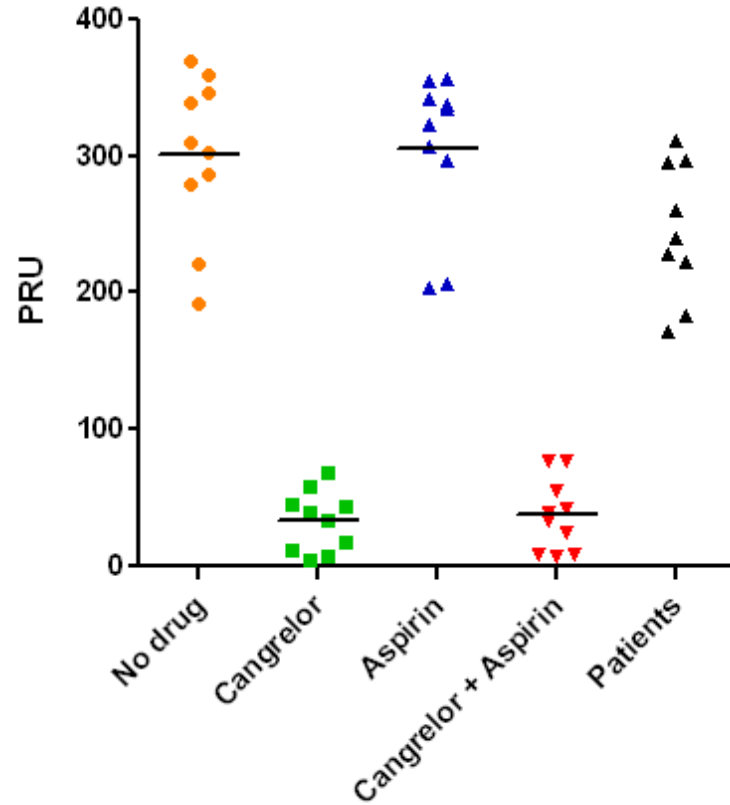
# P2Y<sub>12</sub> Test

Healthy donors and patients

### Multiplate: P2Y<sub>12</sub> Test

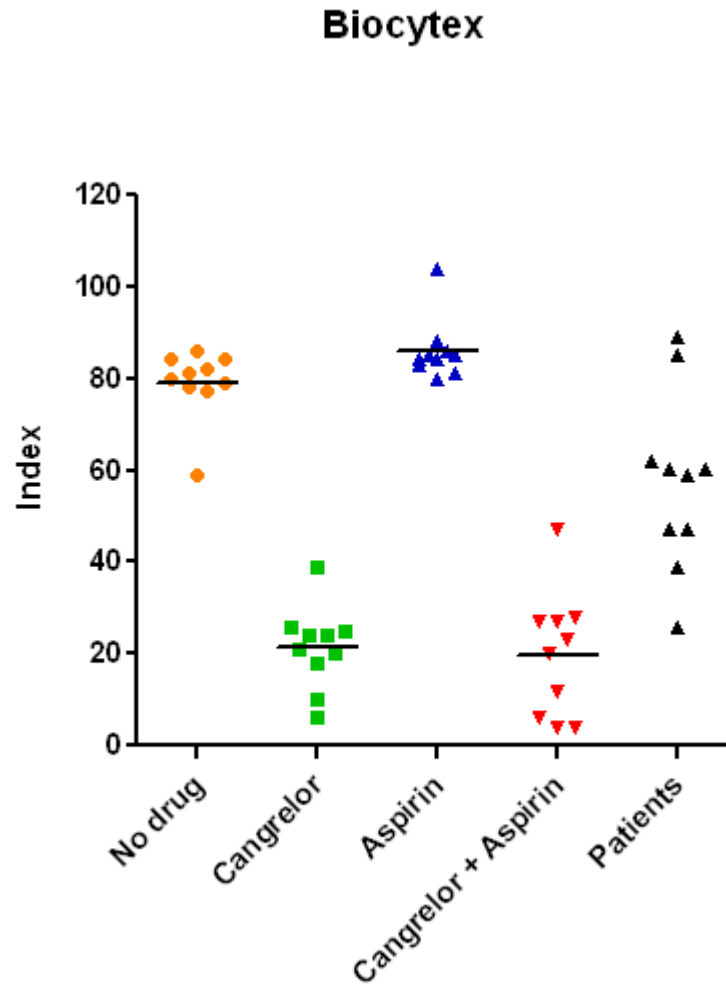


### Verify Now: P2Y<sub>12</sub> Test



# P2Y<sub>12</sub> Test

Healthy donors and patients





# New approaches to platelet function testing - conclusions

- Aspirin Test

All tests demonstrated good inhibition of platelet function by aspirin *in vitro*

All tests demonstrated good inhibition of platelet function by aspirin in all but one patient with ACS *ex vivo*

All tests identified the 1 non-responder to aspirin

- P2Y<sub>12</sub> Test

All tests demonstrated good inhibition of platelet function by cangrelor *in vitro*

All tests demonstrated variable inhibition of platelet function by clopidogrel in patients with ACS *ex vivo*



## Colour Correlation

### Patients

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

### Aspirin Test

AggRam

Multiplate

P-selectin

VerifyNow-Aspirin

GPIIb/IIIa

		FAIL							

Good response to agonist
Partial response to agonist
No/low response to agonist

## Colour Correlation

### Patients

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

### P2Y12 Test

	GPIIb/IIIa									
AggRam										
Multiplate										
P-selectin										
Verify Now-P2Y12			FAIL							
BioCytex										

Good response to agonist
Partial response to agonist
No/low response to agonist