

Biological Basis Different Products



*Benjamin Sainsous**, *François Kelberine**,
*Alexandra Malgoyre***
*Antonia Alonso***, *Xavier Bigard***

**Clinique PPR-P, Aix en Provence, France*



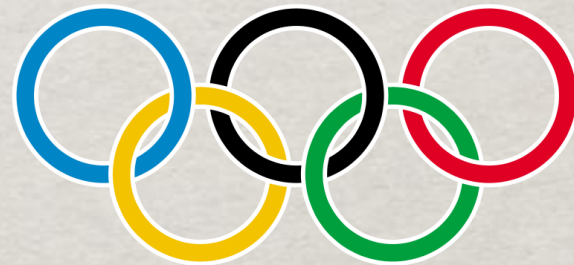
*** IRBA, SSA, Grenoble, France*



SFTS, Grenoble, Octobre 2012

Disclosure

- **No financial relationship with the companies involved in this study**
- **Financial Support / IOC Medical Committee**



Platelet - Rich Plasma

- Plasma with an amount of platelets largely above serum base line (from x 3 to x 8)

- Volume, blood cells, activation, viscosity (liquid, matrix),.....



- Physiological balance of GF

Eppley (2004), Marx (2004), Anitua (2005), Sanchez (2007AJSM)

- Cost

Commercial proposals.....

- Arthrex (ACP-DS)
- Biomet (GPS)
- BTI (PRGF)
- Curasan
- Regenlab
- Plateltex
- Vivostat

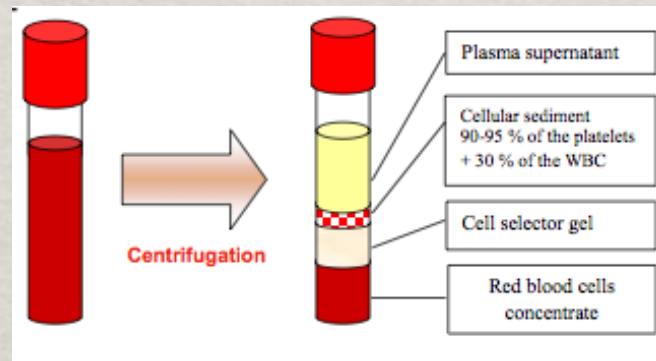
- Harvest Tech (SmartPRep)
- Cascade (Fibrinet)
- Medmetric (Magellan)
- Nahita

- Cytomedix
- Friadent
- Sequier
- Choukroun's PRF
- Genesis
- Ace

Material & Methods

- 6 volunteers for 7 techniques
 - Each individual serves as control for baseline
- Withdraw citrated blood
- Strict guidelines / each company protocol

- **Spinning**

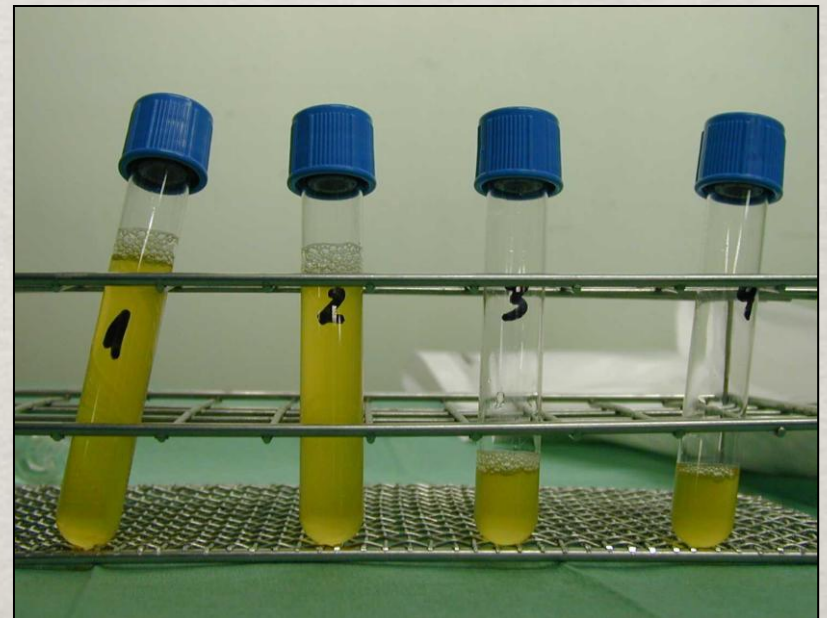


- Rolling to avoid aggregates < activation

Material & Methods

Independant labs

- Cells count pre and post spinning (SELARLAIX)
- GF after activation (Elisa kits) (IRBA)
- Comparison PRP with
 - Baseline & classic low spinning



Cells count

% age related to baseline +/- Standard Deviation

PLATELETS

Biomet 379,38% \pm 54,4 Large range++

BTI 184,78% \pm 13,1

Control T 142,99% \pm 7,59

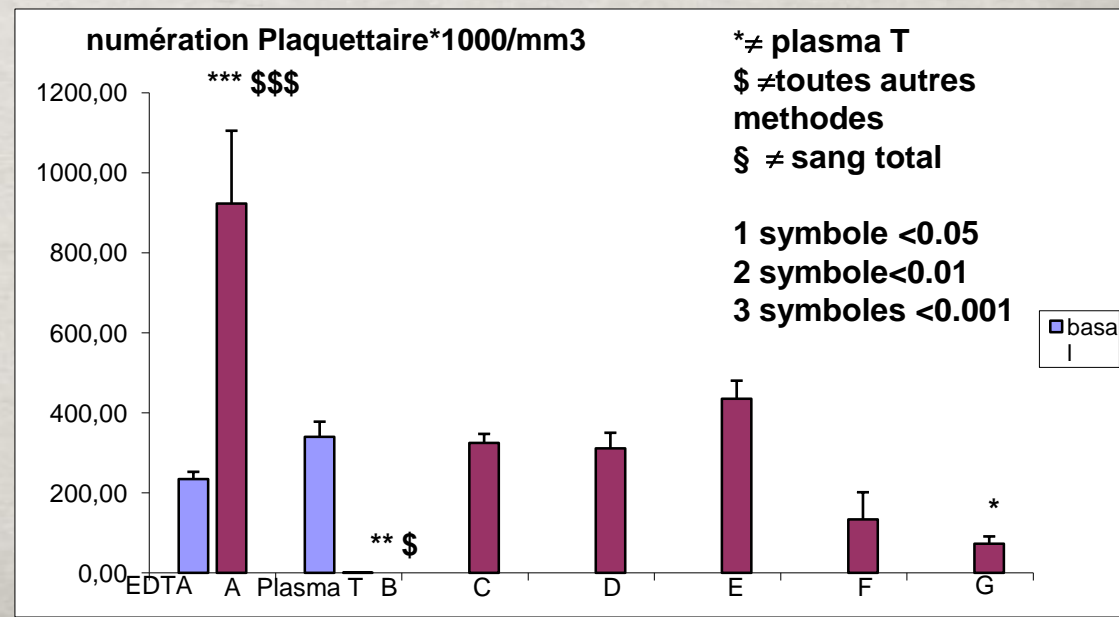
Regenlab 142,27% \pm 14,15

Arthrex 131,55% \pm 10,93

Vivostat 51,03% \pm 24,54 Large range++

Plateltex 30,26% \pm 6,36

Curasan no cells (GF only)



Cells count

% age related to baseline +/- Standard Deviation

RED CELLS

only Biomet 12,27 % \pm 3,19

WHITE CELLS

a) Concentration

Biomet 489,31 % \pm 43,78

Vivostat 288,96% \pm 73,21

b) Presence

Regenlab 59,74% \pm 9,55

Cells count

WHITE CELLS

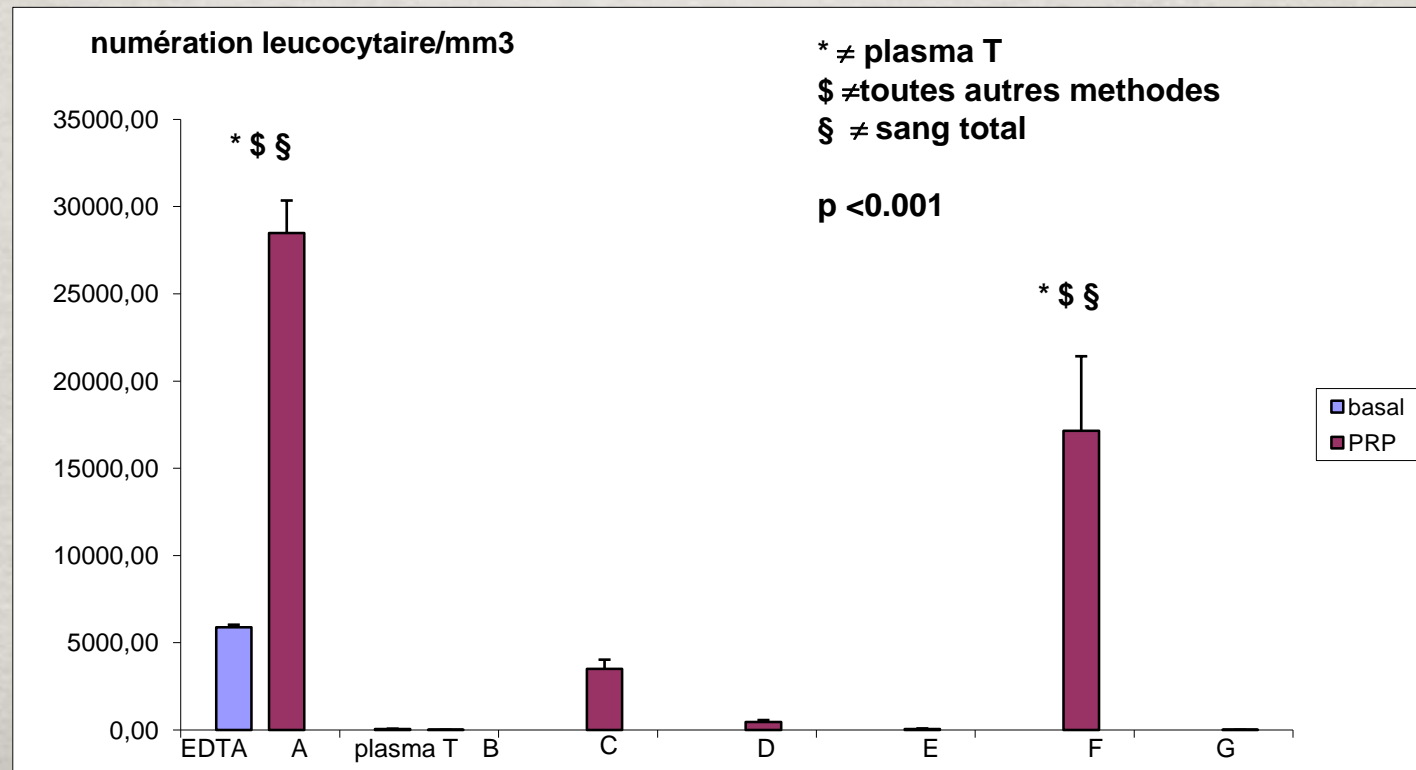
c) Few or Absence

Arthrex 7,95 % \pm 1,69

BTI 0,95% \pm 0,52

Plateltex 0,06% \pm 0,06

Curasan no cells (GF only)

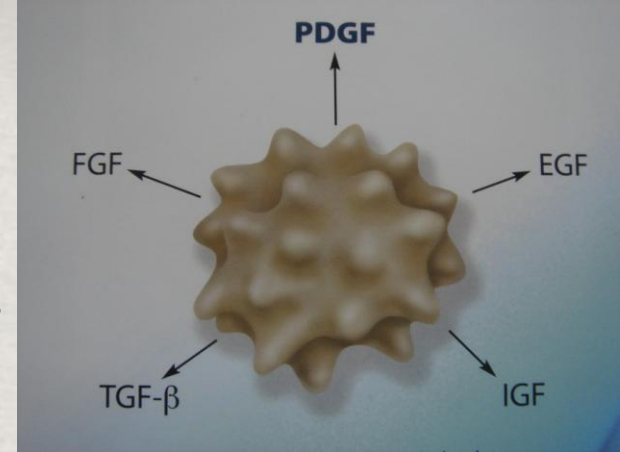


Summary /Cells

- Amount of PLT above baseline 1,3 to 4
(sometime under)
- Reproducibility from irregular to unpredictable
- Platelets < Leukocytes : negative ratio
 - Biomet (0,82) and Vivostat (0,38)
- Platelets > Leukocytes : positive ratio
 - Regenlab (2,54), Arthrex (21,77)
- No Leukocytes : BTI, Control, (Plateltex, Curasan)

Activation

- Critical, release GF from α -granules (degranulation)



- Calcium Chloride Thrombin

- Performed for analysis / in vitro study

- Assess the amount of GF available independantly of the kinetic of the release

PDGF, VEGF, TGFβ1, FGF, IGF-1

- 100% release after 1 hour

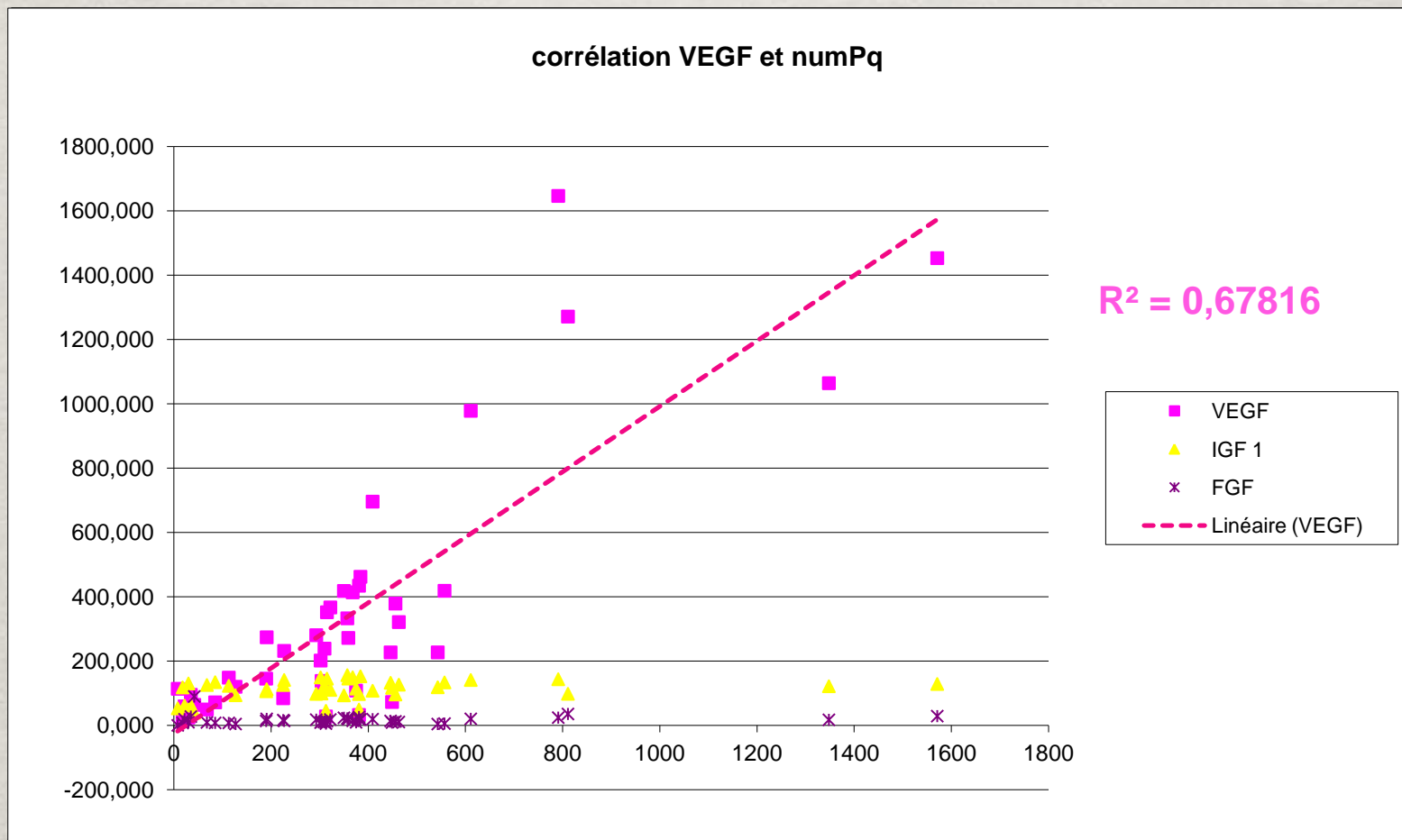
Marx J MaxilloF surg 2004

Fufa J MaxilloF surg 2008



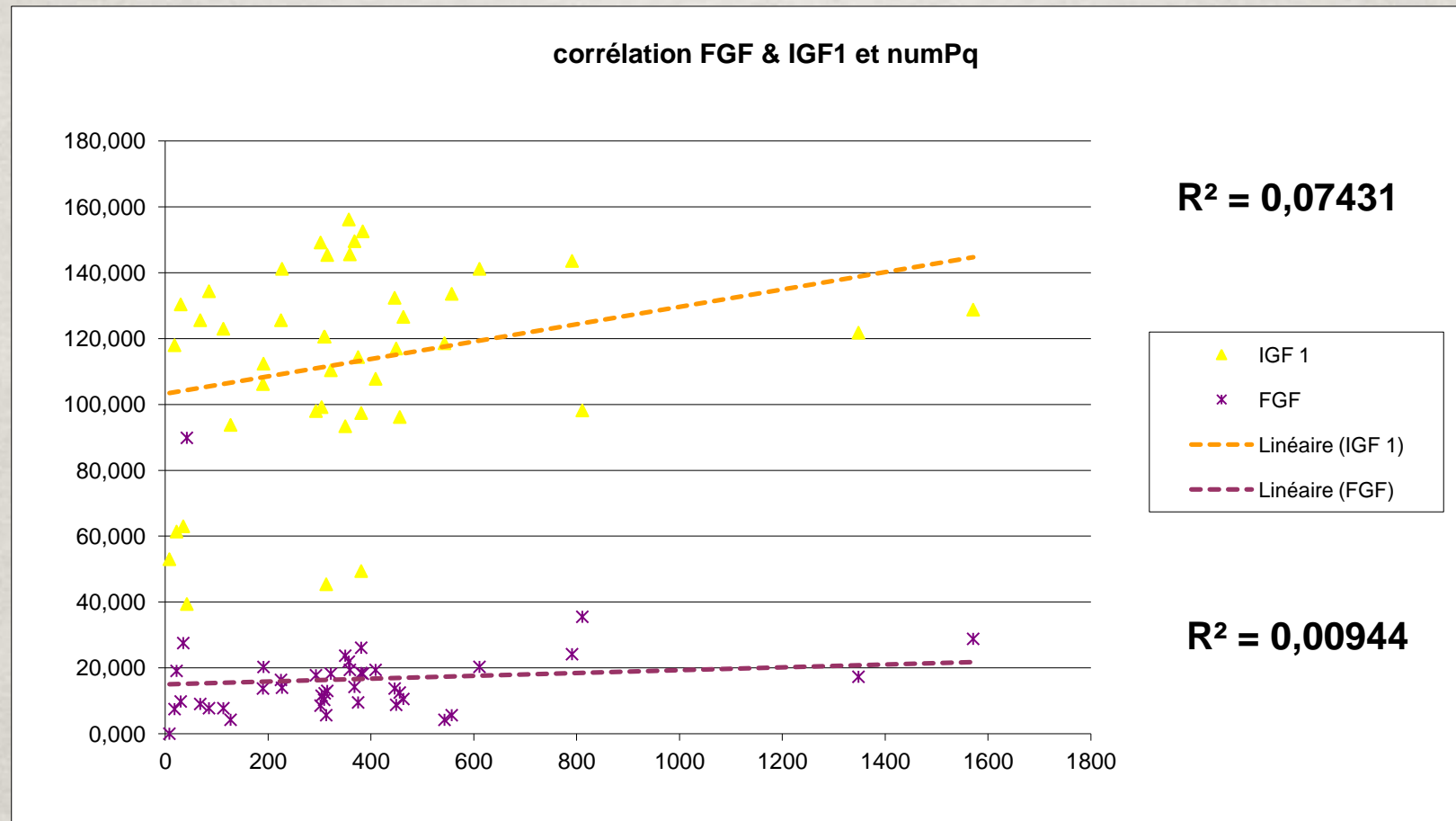
Growth Factors

PDGF, VEGF, TGF β 1 are correlated with degranulation



Growth factors

FGF, IGF 1 are NOT correlated with degranulation



Are they only circulating?

Amount of GF/Techniques

- 1) Biomet (but with all blood cells, leukocytes)
- 2) Arthrex, BTI, Standard centrifugation
- 3) Regenlab (leukocytes)
- 4) Plateltex, Vivostat = not PRP
- 5) Curasan=selective no IGF1, PDGF --, VEGF ++

- Not related to molecular weight
- Role of filter or washing buffer?



Take home messages

- PRP preparations are not similar and some are not PRP
- Cost consideration
- Be critical to company initiatives ++
- The concentration is not so high (up to 4)
- Physiological balance of GF?
- IGF1, FGF are poorly present in platelets
- Leucocytes
 - Are they beneficial or detrimental ?
 - Timeframe of use