



Screening for Preeclampsia

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2014



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1st Trimester-Screening

- early diagnosis of fetal anomalies
- early diagnosis of pregnancy-associated diseases

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Multivariable risk algorithm for 1st trimester screening

- IUGR
- early onset preeclampsia
- late onset preeclampsia
- preterm delivery
- fetal anomalies

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Multivariable risk algorithm for 1st trimester, cutoffs

Cutoffs

- IUGR 1:150
- early onset preeclampsia 1:200
- fetal chromosomal anomalies 1:300

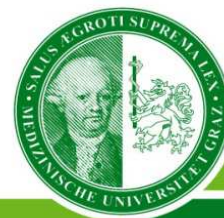
Detection rate

- IUGR 55%
- early onset preeclampsia 95 %
- fetal chromosomal anomalies 95 %

Maternal data included in multivariable risk algorithm for 1st trimester screening

- chronic hypertension
- history of preeclampsia, IUGR, preterm delivery
- associated diseases (diabetes, immunological, renal, thrombophilia)

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Biophysical measurements included in multivariable risk algorithm for 1st trimester

- blood pressure
- Doppler measurements of uterine arteries
- cervical length
- fetal 1st trimester sonography

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Screening for Preeclampsia

1st Trimester

Prediction of early onset **pre-eclampsia**,
multivariable risk
algorithm:
maternal factors,
biophysical and
biochemical markers
(PAPP-A, PIGF)

2nd Trimester

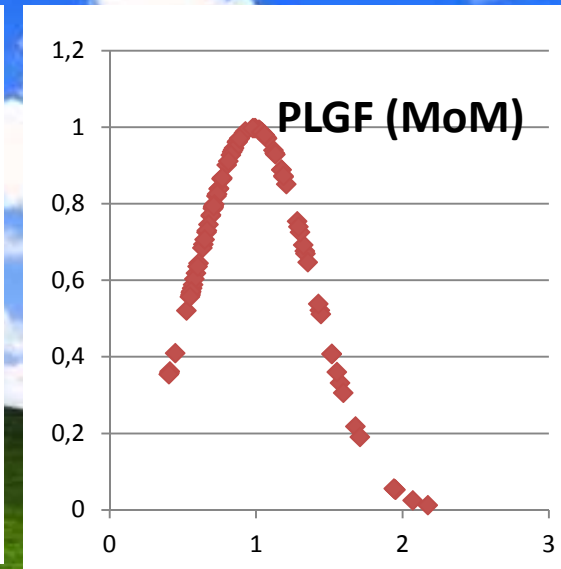
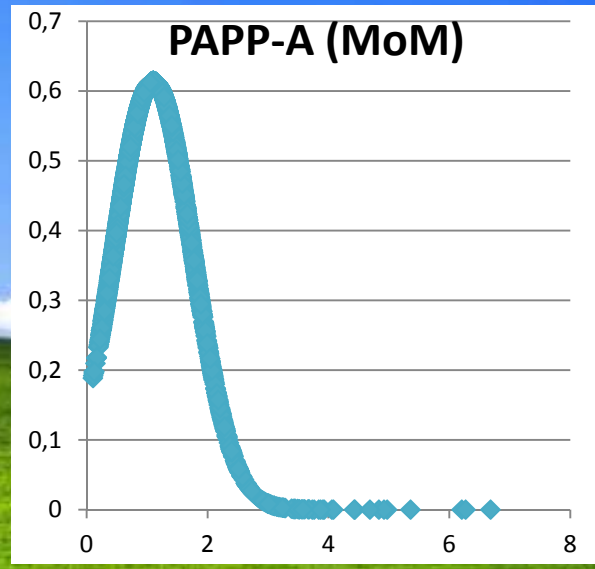
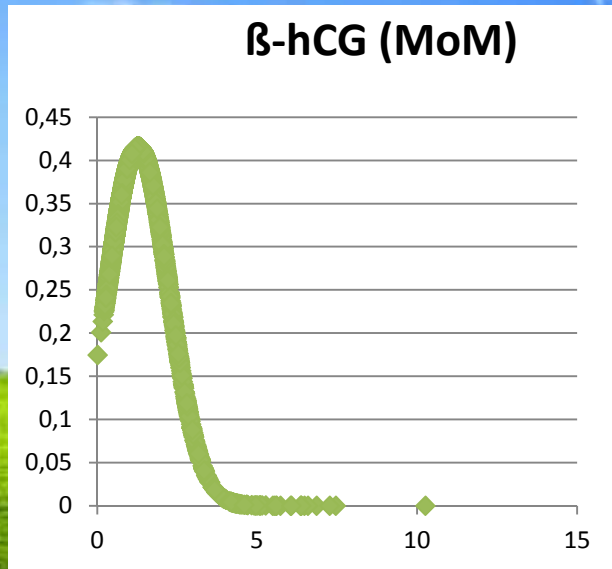
Prediction for **adverse
pregnancy outcome**:
sFlt-1/PIGF, prediction
time 4-5 weeks before
onset of disease

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Biochemical parameters included in multivariable risk algorithm for 1st trimester



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Ätiologie

early onset

- **< 34. SSW**
- **severe**

late onset

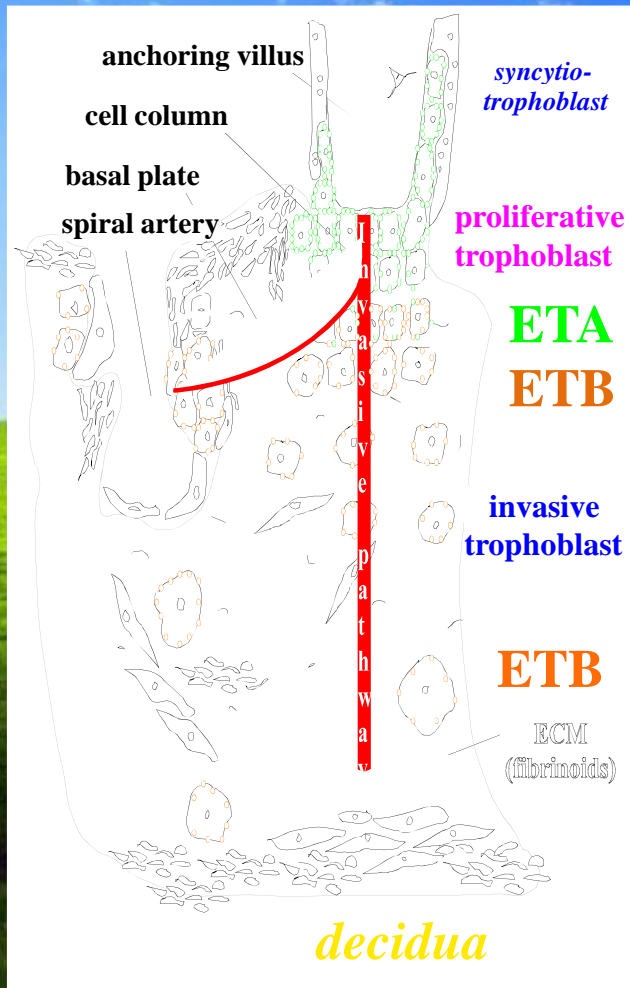
- **> 34. SSW**
- **mild**



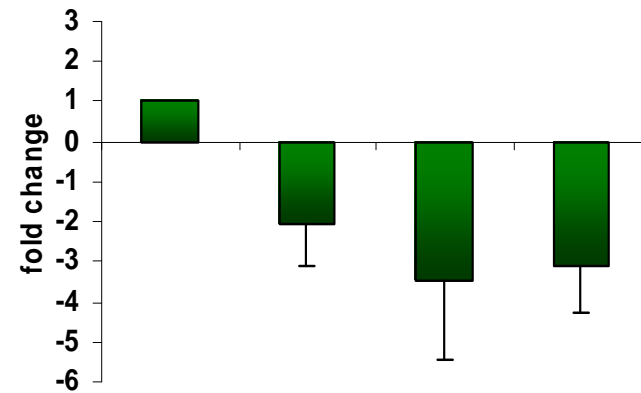
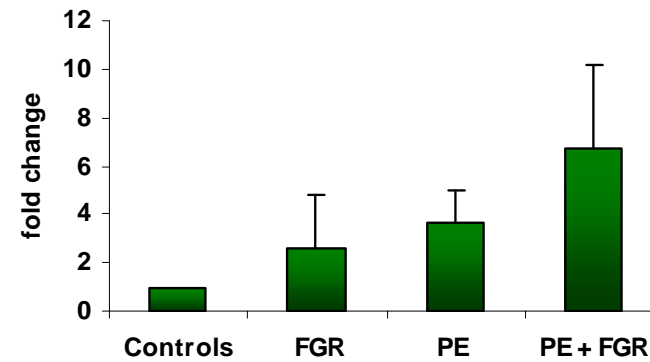
JCEM, Aug. 2011

Life Sci, 2011

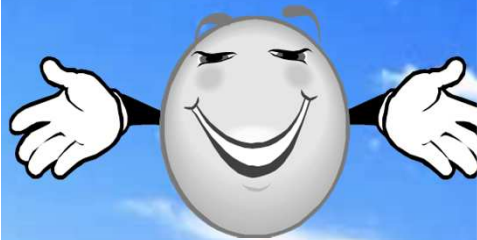
ET-1 in 1. Trimester



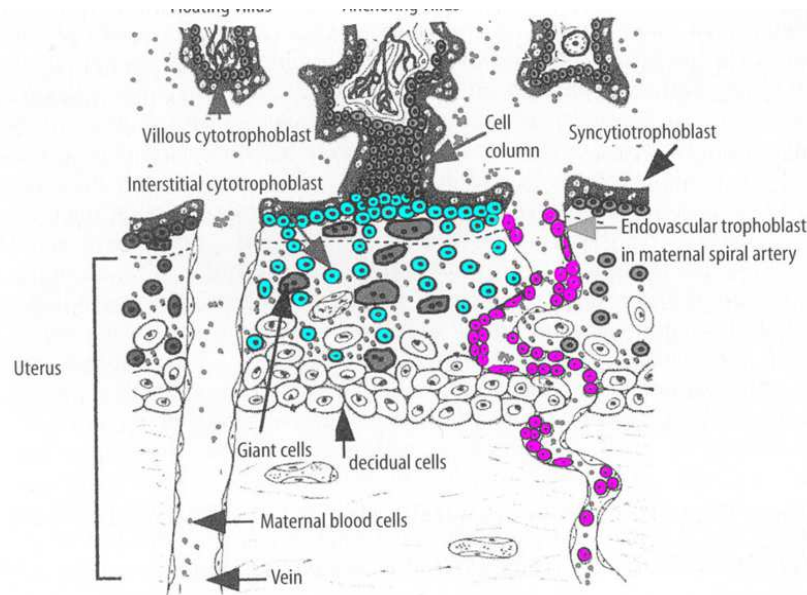
ET-1 in early third trimester placenta



ET-1 in late third trimester placenta

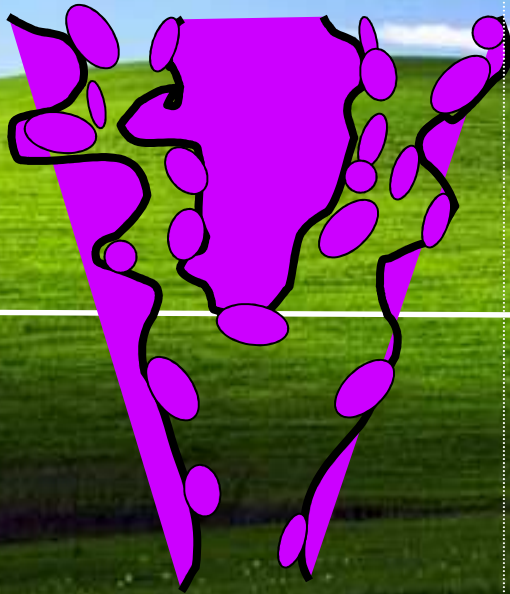


Healthy



**Präeklampsie
IUGR**

Dezidua



I Trimester



Termin

Myometrium



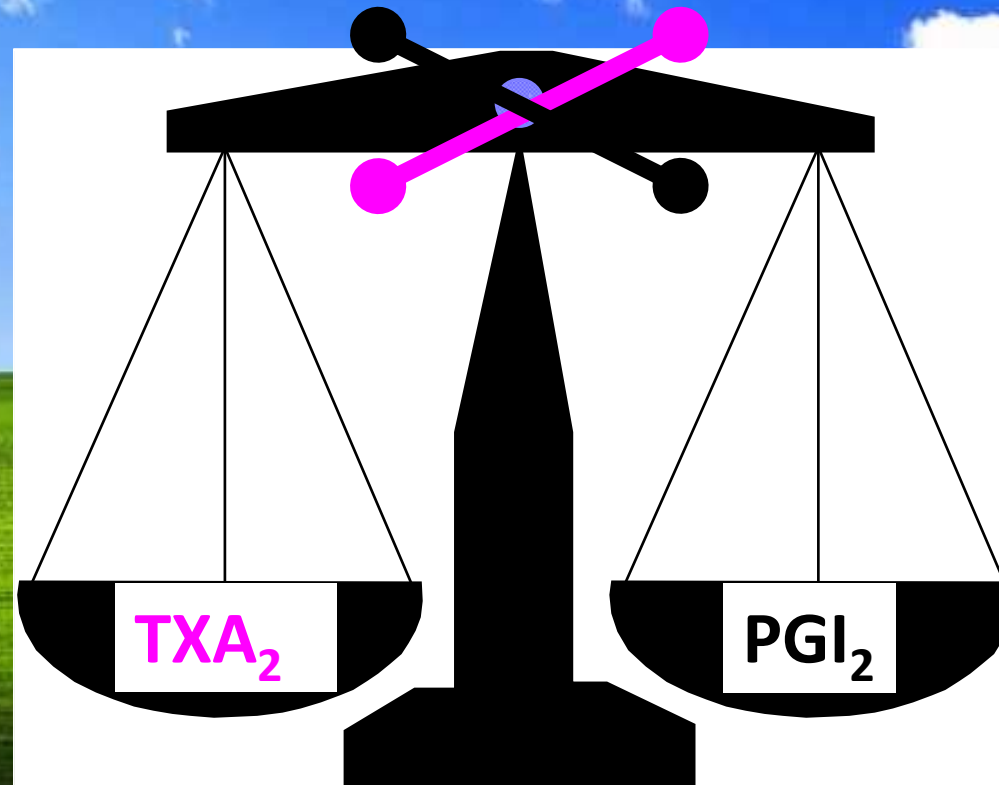
I Trimester



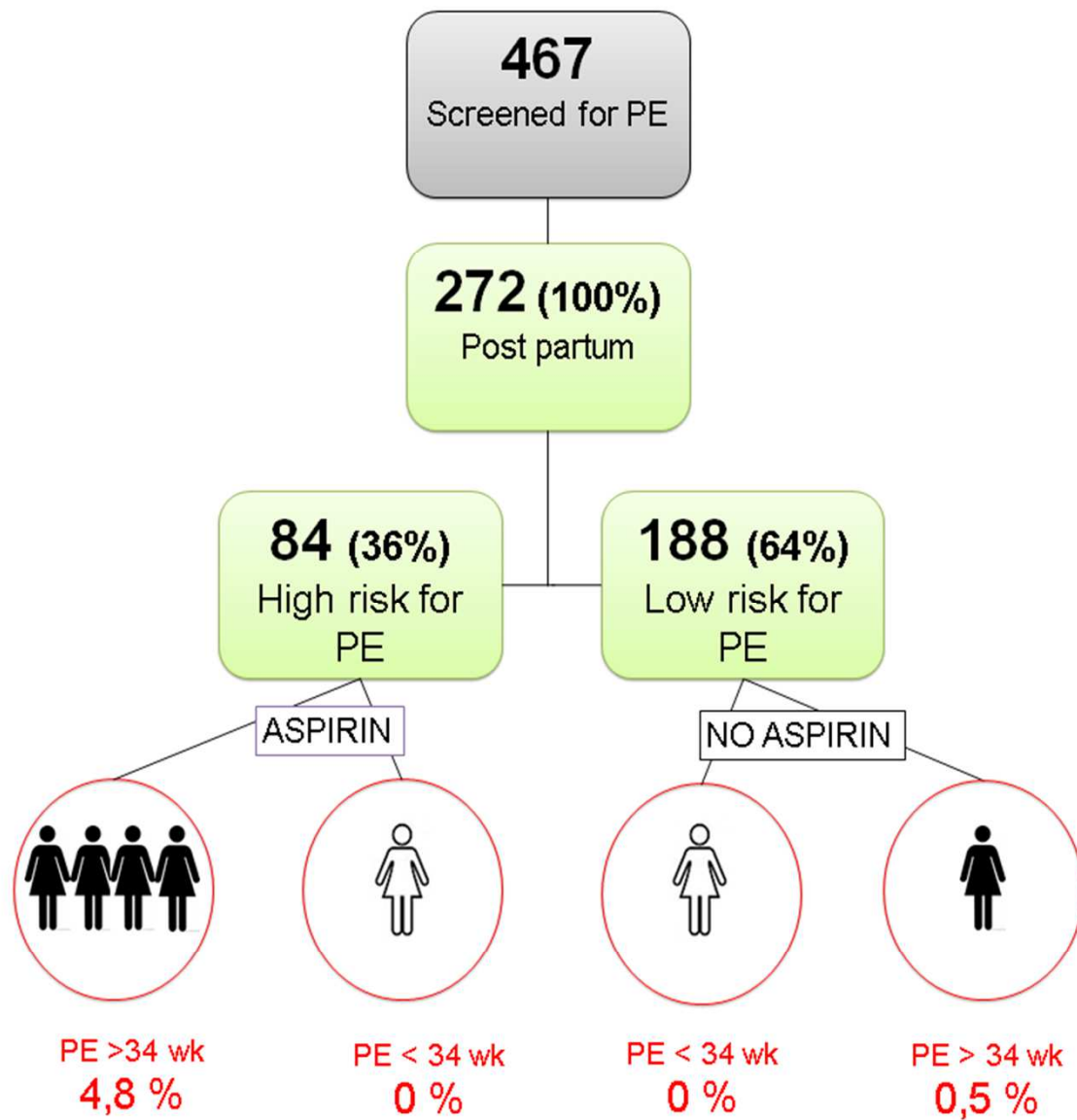
Termin



Nelson DM, Walsh SW AJOG 1987



Aspirin (100 mg)



1st Trimester Screening

Effect of Aspirin Use After positive First Trimester Screening on the Onset of Preeclampsia

I. Lakovschek, B. Csapo, V. Kolovetsiou-Kreiner, K. Mayer-Pickel, C. Stern, D. Ulrich, U. Lang, M. Cervar-Zivkovic

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Placenta associated adverse pregnancy outcome

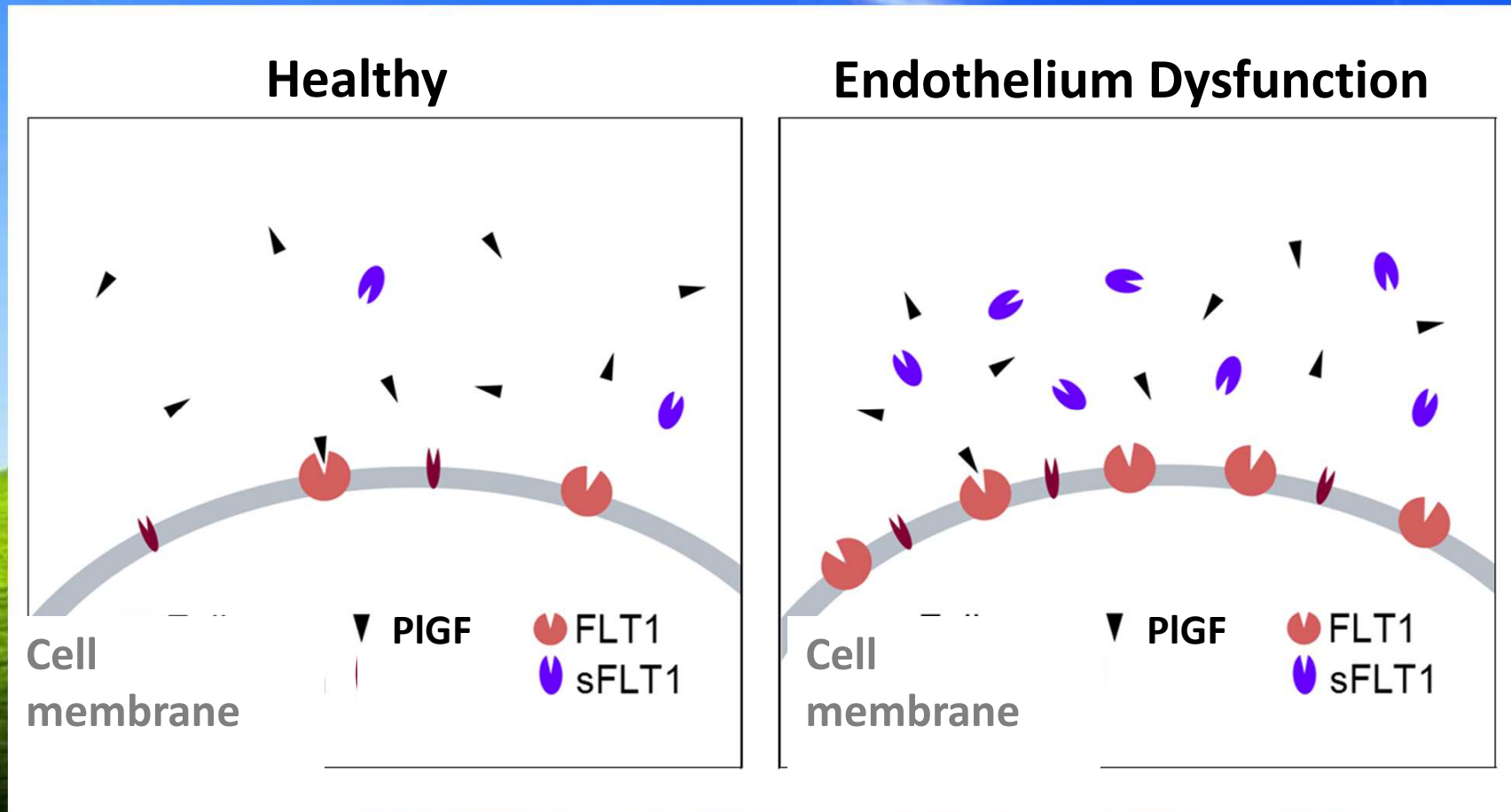
Biomarkers

- PIGF
- sFLT-1

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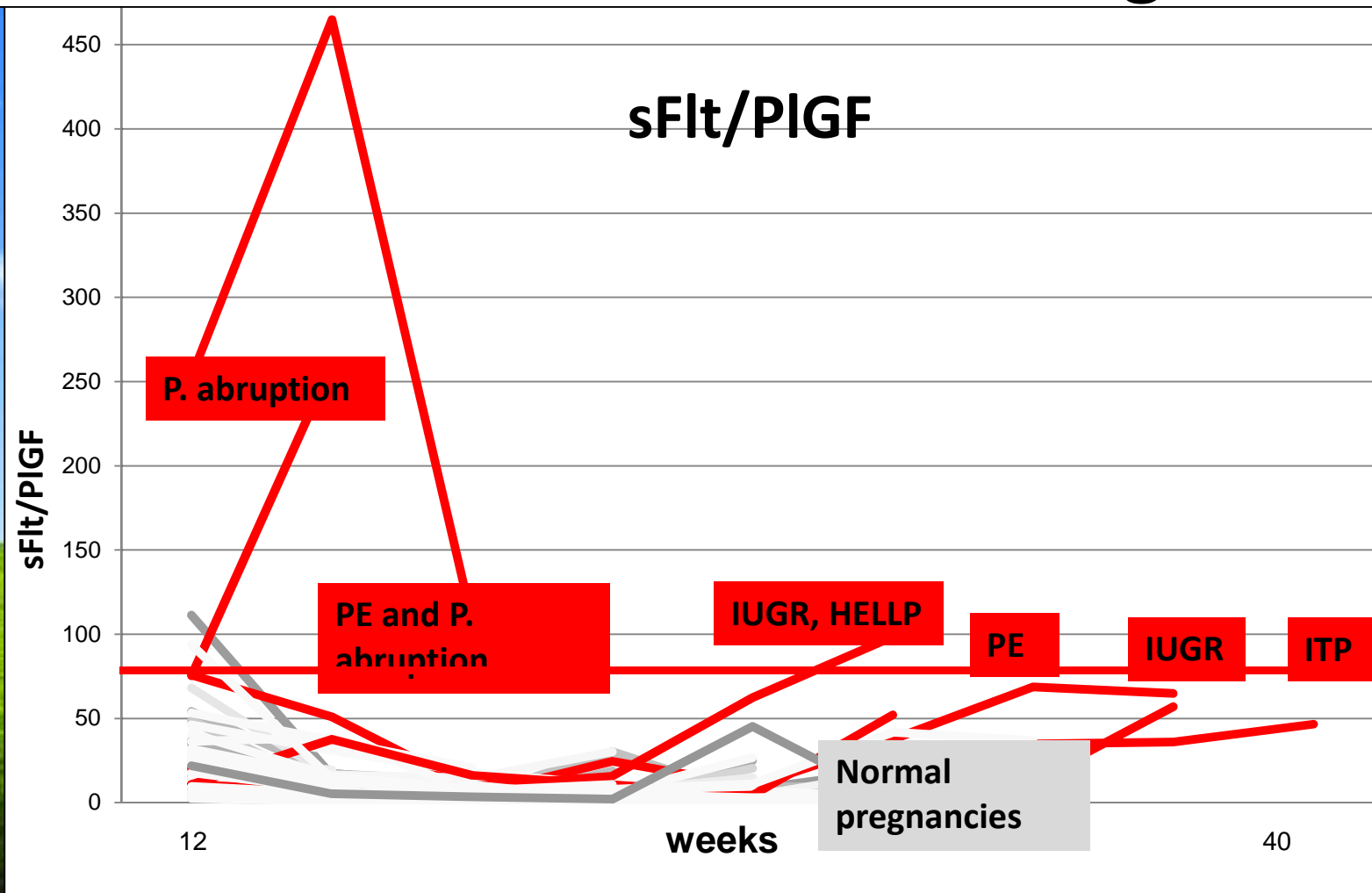
PIGF & sFlt-1



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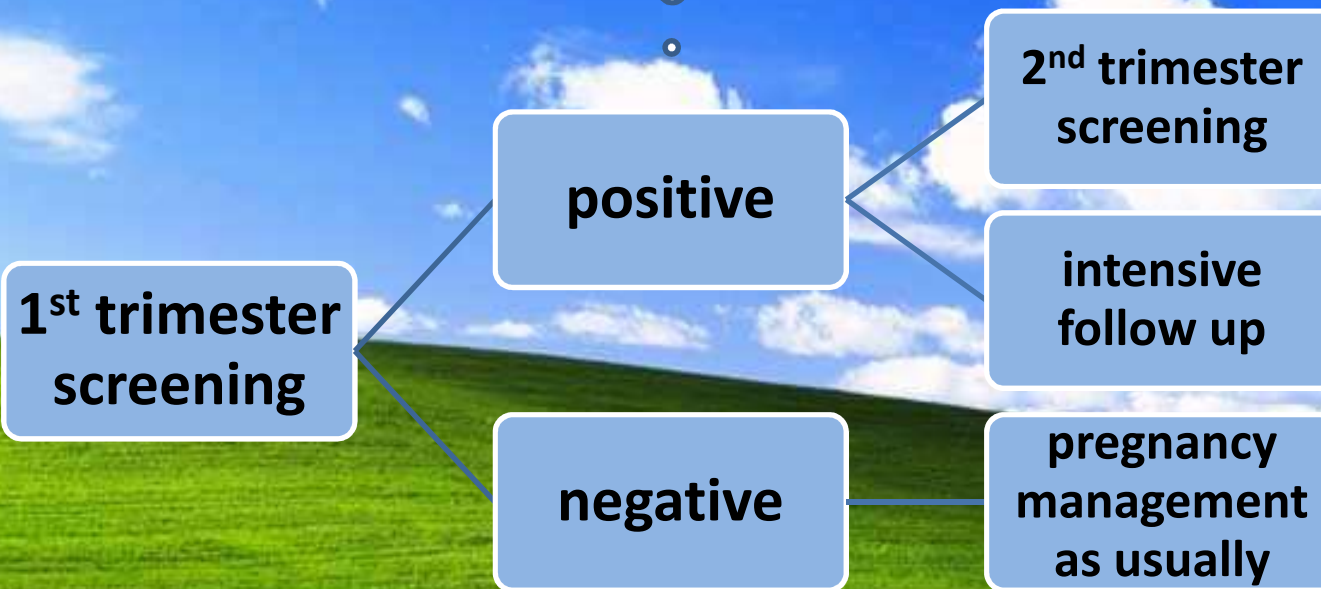
2nd trimester screening



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Screening for Preeclampsia



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Recommendations for prevention of preeclampsia

- ❖ ASS 75 mg/day
- ❖ diagnostic of associated maternal diseases
- ❖ low fat, high fiber, no salt restriction, vitamins, 1-2 g calcium
- ❖ avoiding of stress, moderate physical activity
- ❖ 2nd trimester screening for preeclampsia and associated maternal diseases
- ❖ thrombophilia: LWMH
- ❖ previous preeclampsia: psychological treatment
- ❖ interdisciplinary for associated diseases
- ❖ all patients: high quality obstetric treatment

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Thrombophilia: publications in Pub Med - last 5 years

- Thrombophilia & Fetal Demise: 68
- Thrombophilia & Fetal Growth Restriction: 62
- Thrombophilia & Preeclampsia: 128
- Thrombophilia & Abruptio Placentae: 35
- Thrombophilia & Fetal Loss: 75
- Thrombophilia & Habitual Abortion: 82
- Thrombophilia Screening in Pregnancy: 358
- Thrombophilia and Pregnancy: 696
- Thrombophilia and Pregnancy Complications: 594
- Thrombophilia and Placental Complications: 176

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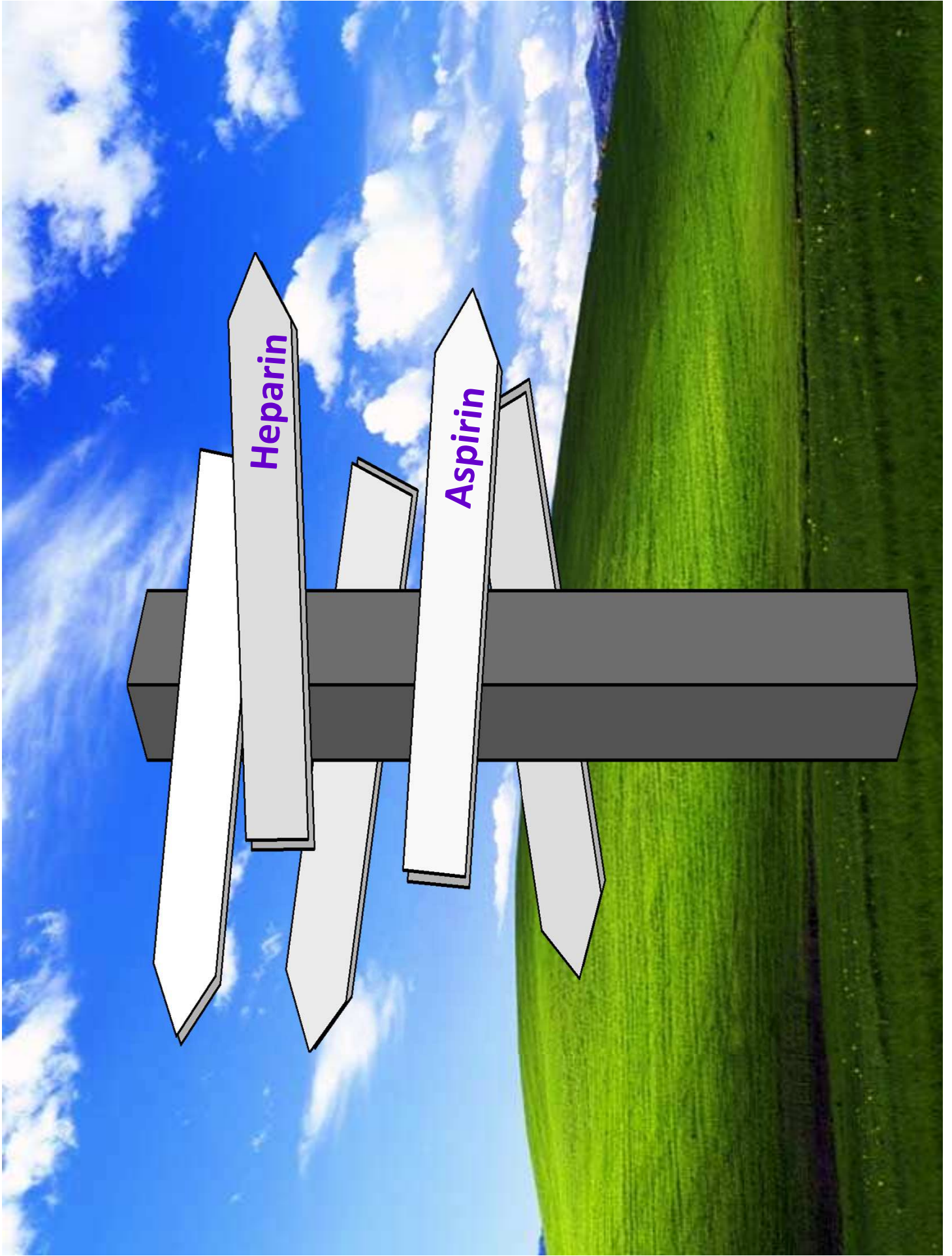


Coagulation and Pregnancy Complications

- **Preeclampsia & APC-R, PS, PC, AT III, Prothrombin**
- **Fetal death & Prothrombin**
- **Habitual abortions & Prothrombin, PAI, Factor V**
- **Placental abruption & elevated Factor VIII activity, APC-R**

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Heparin

Aspirin

Diagnosis, prophylaxis and treatment of pregnant women with Activated Protein C Resistance- How can we optimize the management of these patients?

Third Generation APC Resistance Testing Supersedes Genetic Factor V Leiden Mutation Testing

**F. Prüller, E.-C. Weiss, R. B . Raggam, M. Cervar-Zivkovic
W. Renner, J. Wagner**

NEJM 371:7,2014

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Potential New Biomarkers

- myostatin,
- irisin,
- follistatin,
- cytokeratin 19
- ...

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Platelet proteomics - Biomarkers of platelet function

- Established workflow for proteome analysis of patient-specific platelet samples
- High-resolution LC-MS/MS
- Cost-effective semiquantitative analysis using dimethyl labeling
- Enrichment of platelet membrane proteins, when feasible
- Enrichment and network analysis of over- and underexpressed proteins
- Western blot analysis of platelet receptor levels.
- Correlation with platelet function testing

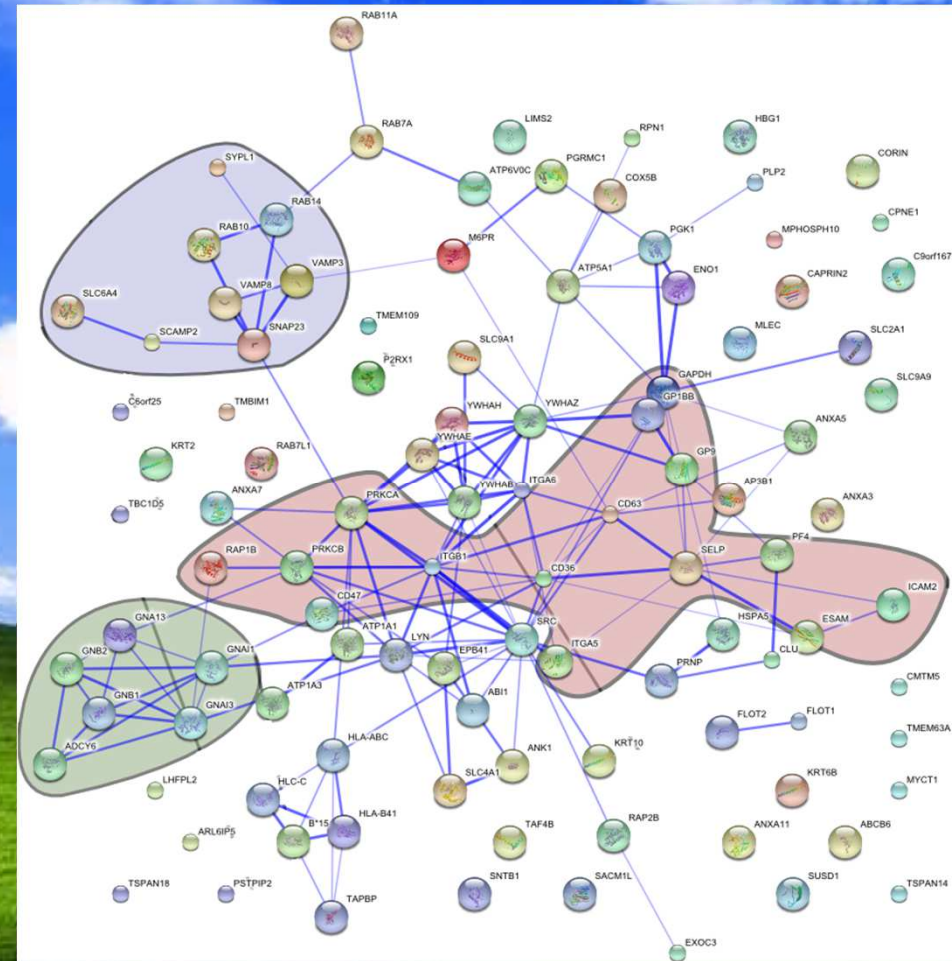


Figure: Network analysis of overexpressed proteins

Schlagenhauf A, Schweintzger S, Birner-Gruenberger R et al., Platelets 2010
Schlagenhauf A, Kozma N, Leschnik B et al., Transfusion 2012

Biomarker Research

Medical University of Graz

Clinical research

Bioinformatics and biostatistics (also for public health)

Imaging

Genetic, genomics

Metabolomics

Additional advanced analytic methods

In silico modeling

Biobank

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Biomarker Research, MUG

Hepatology
Cardiology

Endocrinology

Ob Gyn

Bayer Schering
Pharma AG
BG Stats
Consulting

BIOCRATES
Lifesciences AG

Biomarker Design
Forschungs GmbH

BioVendor
Laboratori
medicina a.s.

IASON GmbH

IDS GmbH

JSW Lifesciences
GmbH

LBI Traumatologie

ZMF

Joanneum
Research
Center of

Lab. f. Molekular-
biol. Analytik
M&R
Automation
Noxygen Science
GmbH

Protagen AG

Proteopharm GmbH

Siemens Healthcare
Diagnostics GmbH

SustSol GmbH

TU Graz

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Thank you for your attention!

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