



UNIVERSITY OF IOANNINA
SCHOOL OF MEDICINE



ΓΕΝΙΚΟ ΝΟΣΟΚΟΜΕΙΟ ΑΘΗΝΩΝ
Ο ΕΥΑΓΓΕΛΙΣΜΟΣ

The Future of Flow Cytometry in Europe

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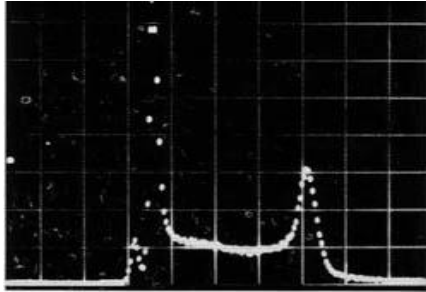
27th Balkan Clinical Laboratory Federation (BCLF) Congress and
30th National Biochemistry Congress (NBC) of TBS
27 - 31 October 2019, Antalya, Turkey.

Part 1: European pioneers of Cytometry



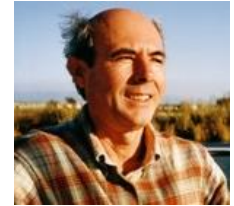
Wolfgang Göhde:

- The **founder of European Flow Cytometry**
- Developed the **first fluorescence based Flow Cytometer**



Claude Courties:

- Application of flow cytometry to oceanography
- Discovery of *Ostreococcus tauri* by flow cytometry, the smallest eukaryotic organism (*Courties et al. Nature, 1994*)



Andrew Riddell:

- The founder of **European Cytometry Network**
- Development of “**The Cytometry Toolkit**” application



Gerd Schmitz:

- Founder of **EWGCCA**
(European Working Group on Clinical Cell analysis)
- Pioneer in **Cytomics** of blood cells



Günter Valet:

- Pioneer of **multiparametric** flow cytometric analysis
- Promoter and Applier of **Cytomics** and its application to Predictive Medicine (Valet, Cytometry A, 2005).



Filipe Sansonetty:

- First flow cytometrist in Portugal
- First International Workshop on **Flow and Image Cytometry** 1991 “The Porto Workshop”



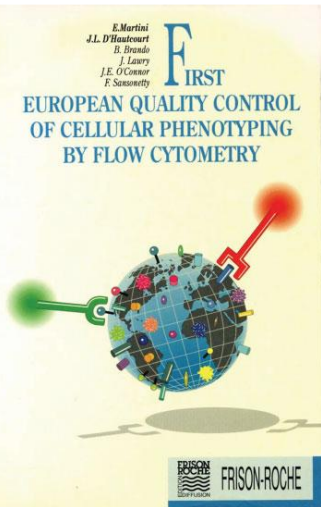
Part 2: European initiatives of cytometry



The first European **Quality Control** of Cellular Phenotyping by Flow Cytometry

- 1988 Jean-Luc D'Hautcourt and Eric Martini pre-stained and fixed white cells
- Bruno Brando, John Lawry, José-Enrique O'Connor and Filipe Sansonetty largest multinational study ever published

External Quality Assurance in Clinical Cell Analysis
Brando et al. (Cytometry B 2007)



Paris, 1989



The European Cytometry Network (ECN)

- An initiative of the European Molecular Biology Laboratory EMBL, Heidelberg, 2008
- A network to establish communication, cooperation, education and promotion of Cytometric science and techniques among its members.
- **Aim:** To organise cytometrists from all over Europe around a system that provides modern infrastructure to build up connections between professionals in Cytometry.
- Founder: Andrew Riddell

EUROFLOW

- 19 diagnostic research groups and one SME, experts in the field of flow cytometry and molecular diagnostics
- **Aim:** All aspects of development, standardization, and validation of highly sensitive techniques
- Division of ESLHO (European Scientific Foundation for Laboratory HematoOncology)
- J.J.M. Van Dongen (chair) and Alberto Orfao (co-chair)

The European Working Group on Clinical Cell Analysis (EWGCCA)

- 1995: Gerd Schmitz and Gregor Rothe chairs, J.W. Gratama treasurer
Regensburg, Germany
- 1996 and 2000: Biomed-2 programme of the European Commission (EC)
- Standardized flow cytometric assays in 4 major clinical applications:
 - enumeration of lymphocyte subsets,
 - enumeration of CD34+ hematopoietic stem cells,
 - leukaemia/lymphoma immunophenotyping
 - platelet analyses
- 2000: EC Quality of Life programme via the “Eurostandards” project chaired
by Dr. David Barnett at Sheffield (UK)
 - European standards (long-term stabilised blood samples)

The European Working Group on Clinical Cell Analysis (EWGCCA)

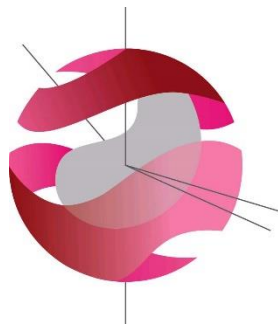
- 2000-2005:
 - 5 Euroconferences
 - 8 workshops
 - MASIR (measuring antigen specific immune response) meetings
- 2005, Athens:
 - 1st European Course in Clinical Cytometry

Jan W. Gratama, Maria Arroz, Mario D'Atri, Ingmar A. Heijnen, Stefano Papa, Michael Papamichail, and Katherina Psarra. Clinical Cytometry in Europe, 2005 Cytometry Part B (Clinical Cytometry) 67B:33–34 (2005)

Jan W. Gratama, Maria Arroz, Bruno Brando, Ingmar A. Heijnen, Claudio Ortolani, Stefano Papa Clinical Cytometry in Europe, 2006 Cytometry Part B (Clinical Cytometry) 72B:109–110 (2007)

EWGCCA members

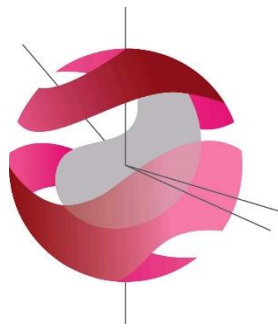
- Prof. Dr. Gerd **Schmitz** Germany
- Dr. Jan W. **Gratama** The Netherlands
- Prof. Brigitte **Autran** France
- Dr. Bruno **Brando** Italy
- Ing. Jean-Luc **D'Hautcourt** France
- Prof. Dr. Andreas R. **Huber** Belgium
- Prof. George **Janossy** UK
- Dr. Hans E. **Johnsen** Switzerland
- Dr. János **Kappelmayer** Hungary
- Dr. Rodica **Lenkei** Sweden
- Prof. Alberto **Orfao de Matos** Spain
- Prof. Stefano **Papa** Italy
- Prof. M. **Papamichail** Greece
- Prof. Thomas H. **Totterman** Sweden
- Prof. Günter K. **Valet** Germany
- Prof. Barbara **Zupanska** Poland



ESCCA

European Society
for Clinical Cell Analysis

- Established as a scientific society in 2006
to ensure the continuation of the activities of EWGCCA
- Annual Conferences in collaboration with the local society
- Annual EuroCourses (Education programs)
- Schools on cytometry (winter, summer, autumn)
- Flow events



ESCCA

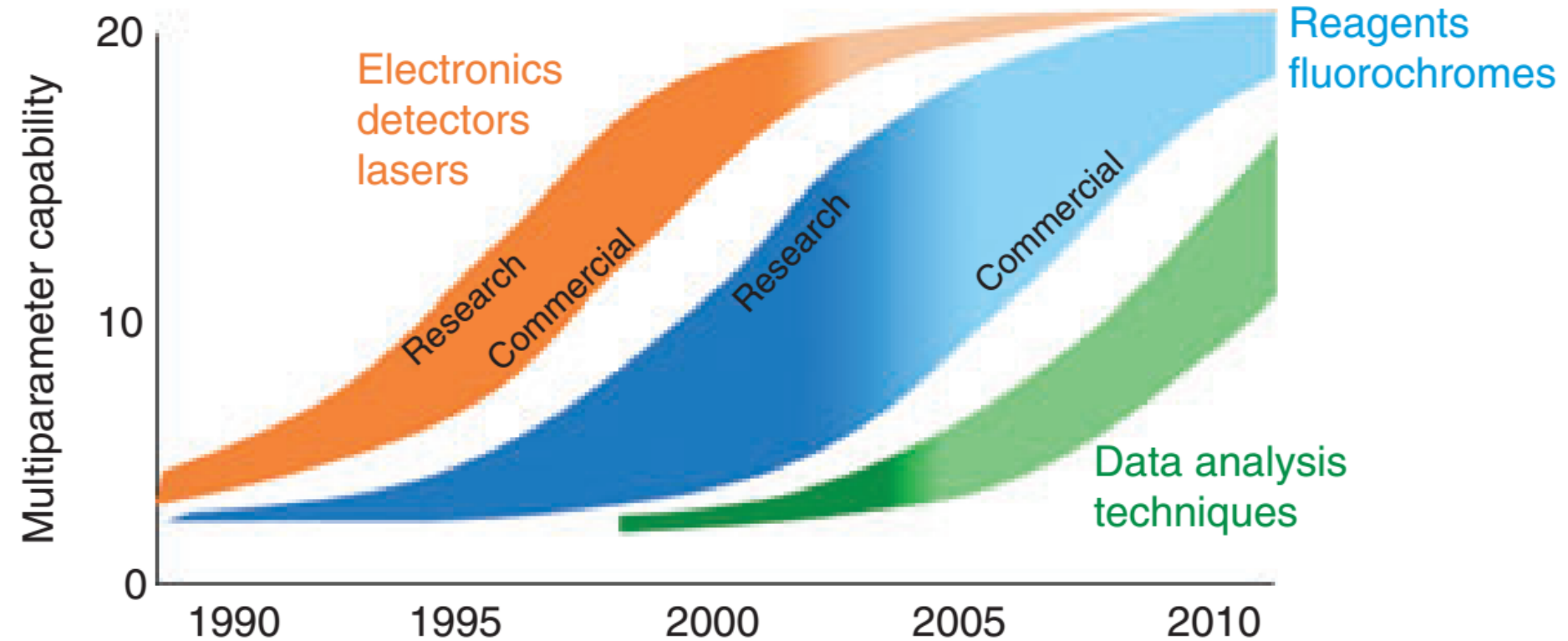
European Society
for Clinical Cell Analysis

- Harmonization and guidelines projects
- Certification exams for
 - Cytometry operator
 - Cytometry specialist
- ESCCAbase

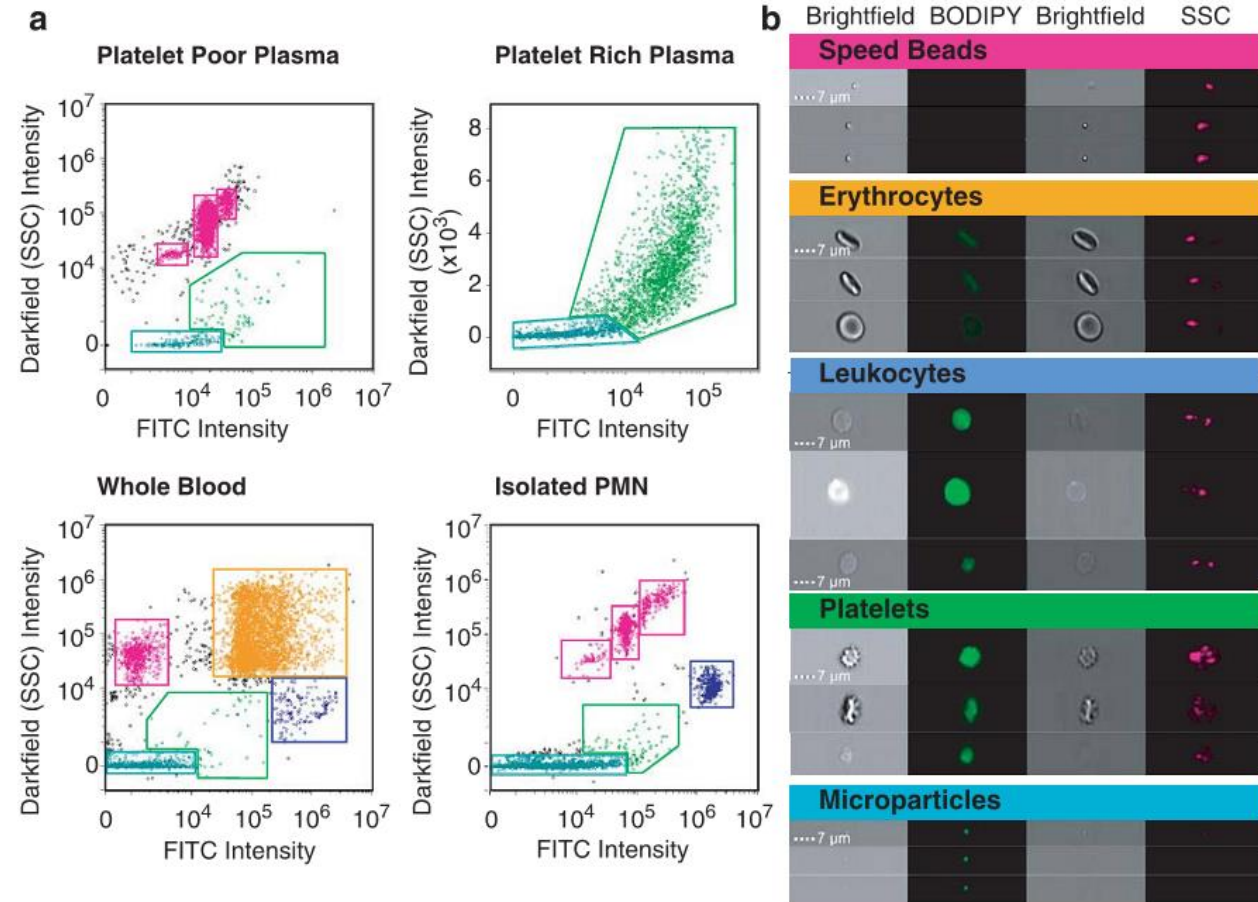
Part 3:

The Present → The Future

Multiparameter flow cytometry

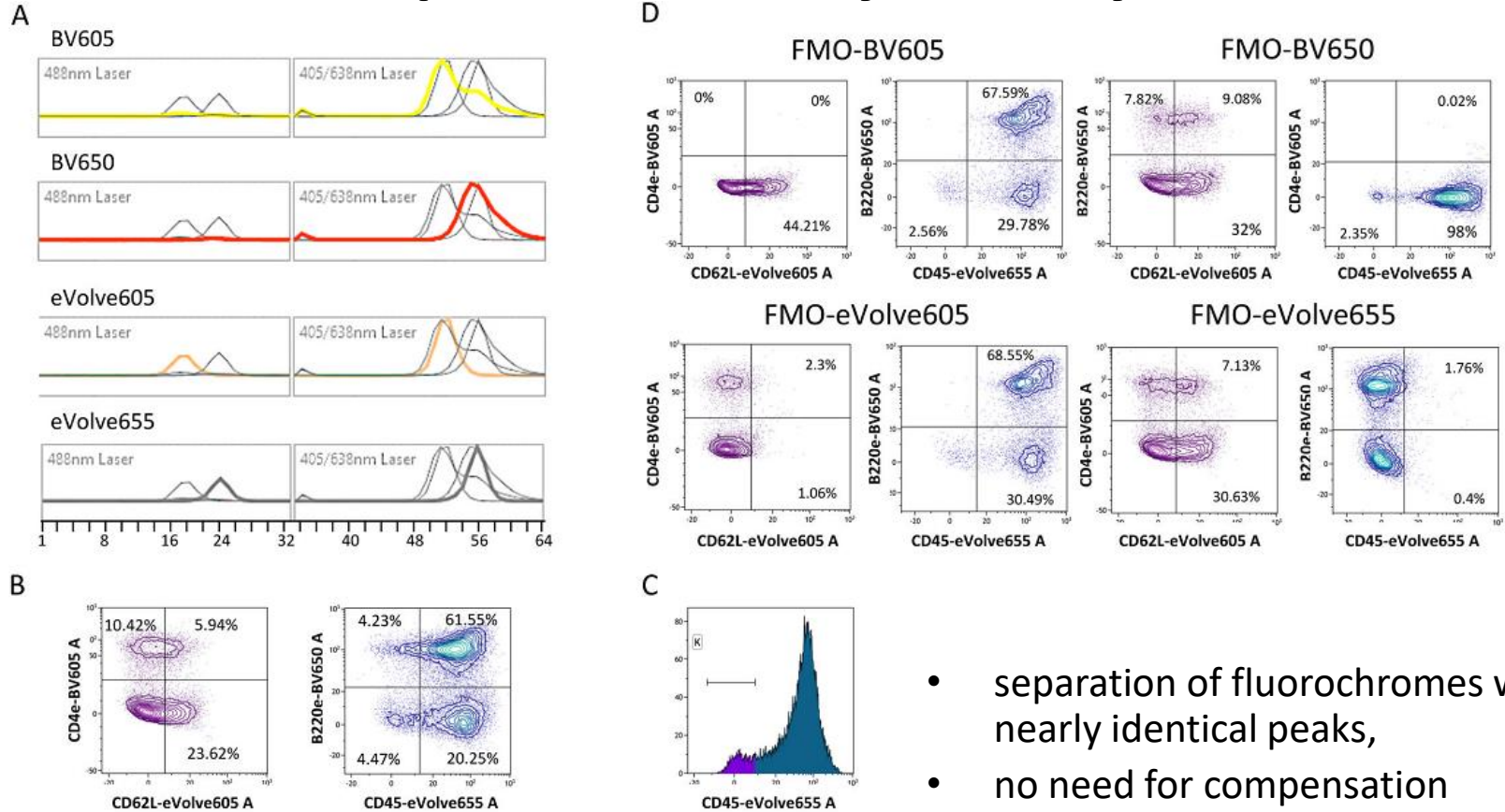


Imaging Flow Cytometry



- Imaging and quantitative analysis
- Increased accuracy in diagnosis
- several clinical applications

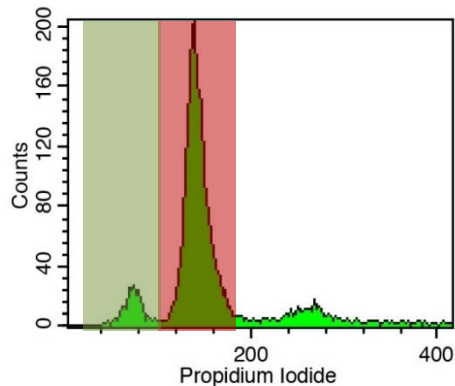
Spectral Flow Cytometry



- separation of fluorochromes with nearly identical peaks,
- no need for compensation
- Up to 40 parameters (till now)

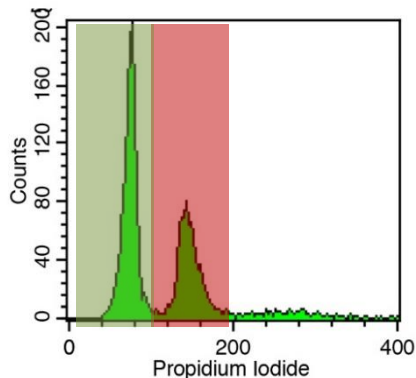
Intraoperative Flow Cytometry

Tumor

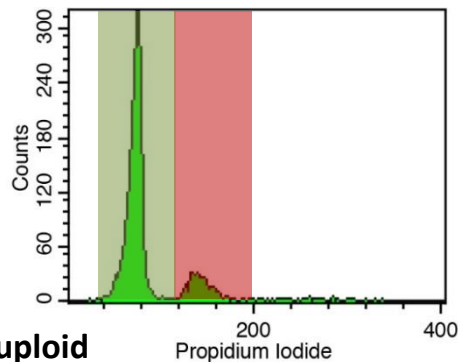


Mostly Aneuploid

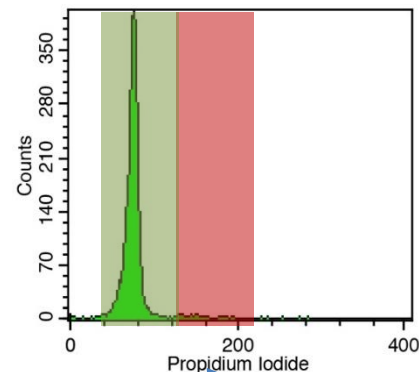
Tumor margins



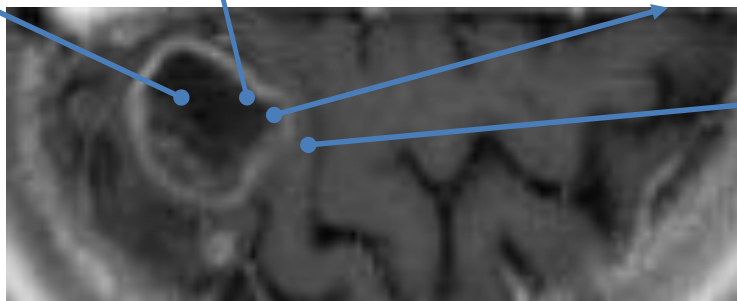
Diploid/Aneuploid



Normal



Only Diploid



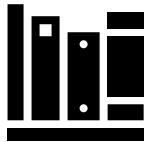
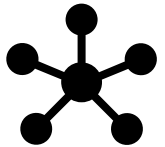
Conclusions: “the future is now”

- Cytometry has been grown to a multidisciplinary field
- Technological advances are continuously evolving
- Cytometry is also evolving based on the needs of the clinic
- European Cytometrists are developing and using cutting-edge techniques

Conclusions: “the future is now”

Our **suggestions** are that the future of the field of European Cytometry should be based on:

- organized **cytometry courses** for **educating** the new generation of **European Cytometrists**
- **cooperation** at all levels: ESCCA, affiliated European Societies and all European Clinical Scientists
- **openness** in knowledge sharing: **dissemination** of knowledge among European Countries and all over the world for the benefit of **patients** and **humankind**.





Thank you very much for the invitation and your attention

