The history of PGD

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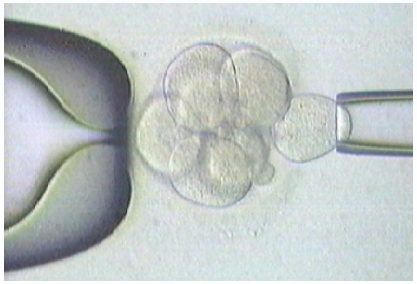
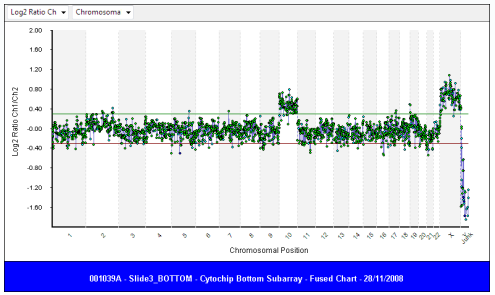
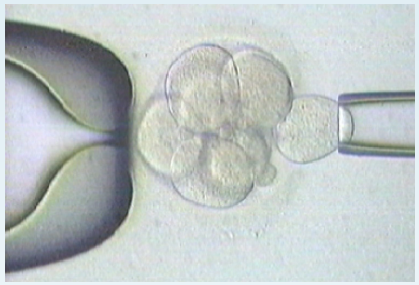
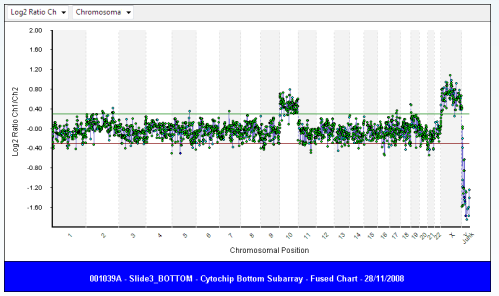




Overview

- What is PGD/PGS
- Biopsy
- Diagnosis
- First PGD cases
- PGD USA
- PGD worldwide
- International working group
- ESHRE PGD Consortium
- ESHRE PGS task force
- The future of PGD/PGS





What is Preimplantation Genetic Diagnosis?

AIM

identify genetically or chromosomally normal embryos for patients at risk of transmitting a specific genetic/chromosome abnormality

TYPE OF PATIENTS

mainly fertile patients

Main option would be prenatal diagnosis

PGD just for the disorder

Undiagnosed embryos should never be transferred

Current techniques relatively uncontroversial

What is Preimplantation Genetic Screening?

AIM

Get the patient pregnant

Deciding which embryo to transfer on chromosome status to hopefully improve IVF delivery rate

TYPE OF PATIENTS

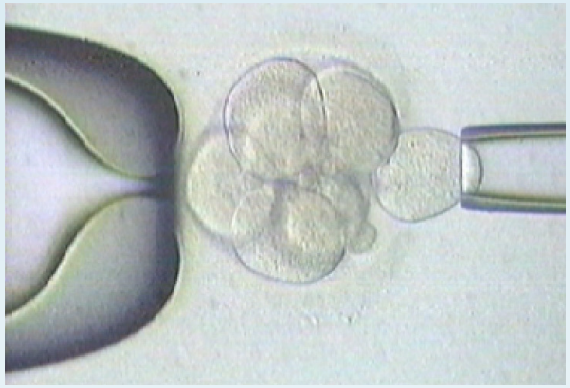
infertile or subfertile

Undiagnosed embryos can be transferred

Need to have evidence to show it improves delivery rates

Controversial technique

Animal studies



- **Embryo Biopsy**
  - Seidel (1952) rabbits
  - Tarkowski and Wroblewska (1967) mice

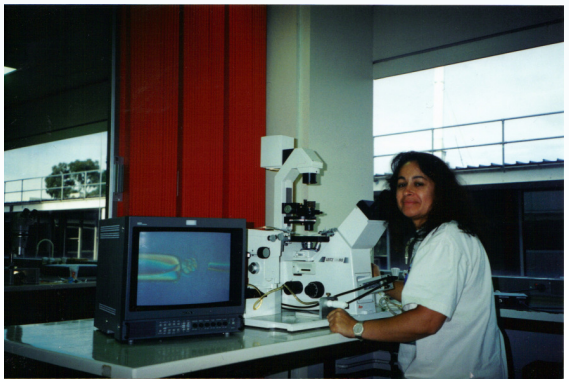
- **First PGD**
  - Richard Gardner & Robert Edwards (1967)
  - Sexing rabbit blastocysts

Biopsy

- **Polar Body biopsy**
  - Yury Verlinksy (1988)
- **Cleavage biopsy**
  - Leeanda Wilton (1986)
  - Andre van Steirteghem (1987)
  - Handyside and Monk (1987)
  - Hardy (1990)

1986

- **Blastocyst biopsy**
  - Audrey Muggleton-Harris and Marilyn Monk (1988)
  - Dokras et al (1990) and Summer et al (1988)
- **Uterine lavage**
  - Buster (1985)
  - Brambati and Tului (1990)



1993

Diagnosis

1988

Marilyn Monk and Cathy Holding
Mouse models, Lesch-Nyhan

PCR
Karen Sermon
Elena Kontogianni
Yury Verlinsky
Pierre Ray
Mark Hughes
Gary Harton

FISH
Leeanda Wilton
Darrren Griffin
Jamie Grifo
Santiago Munne
Yury Verlinsky

First clinical PGD

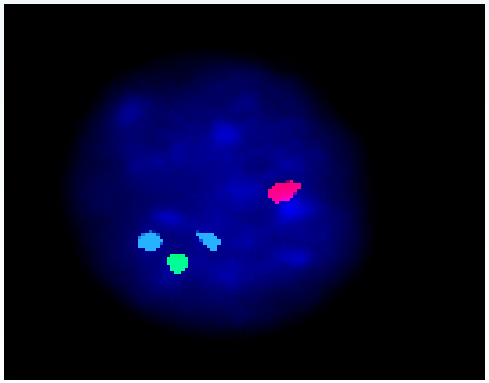
1993

- Elena Kontogianni, Alan Handyside, Robert Winston
- Amplification of Y chromosome by PCR
- Female embryos transferred in five couples at risk of X linked disease
- Resulting in two twin and one singleton pregnancy

FISH UK

1990

- Late 1980s
- Darren Griffin and Joy Delhanty
- Indirect FISH and indirect probes
- X and Y chromosomes



The Hammersmith/UCL team

1994

PGD USA

Yury Verlinsky (RGI)

Santiago Munne and Jacques Cohen (Reprogenetics)

Mark Hughes (Genesis Genetics)

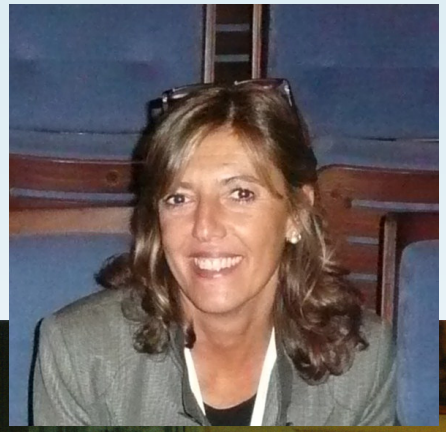
Gary Harton (GIVF)

PGD USA

1994

2005

PGD worldwide



ESHRE, Bologna, 2000

ESHRE, Edinburgh, 1997

1994 – worldwide PGD

- **8 centres worldwide**

- Current status of PGD (Harper and Handyside, 1994)
- 83 cycles sex selection for X linked disease using PCR or FISH
- 51 cycles monogenic disorders

- **Three centres dominated the field:**
- Hammersmith/UCL team
- Cornell University Medical College
- Reproductive Genetics Institute

- **Other centres were**
- University Hospital, Ontario
- Academic Hospital, Brussels
- Jones Institute, Norfolk
- Genetics & IVF Institute, Fairfax
- GIEPH, Barcelona

International working group

Preimplantation Genetics, Chicago, 1997

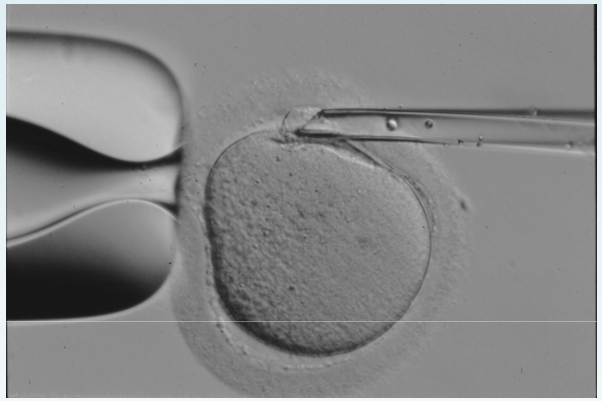
ESHRE, Greece, 1993

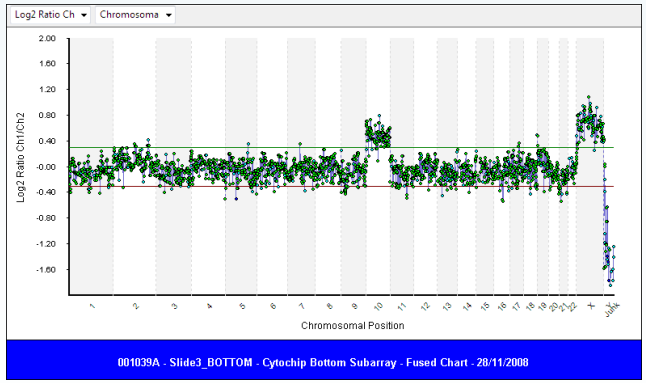
ESHRE PGD Consortium - 1997

ESHRE Central Office, 1997

ESHRE Campus Workshop,
London, 2010

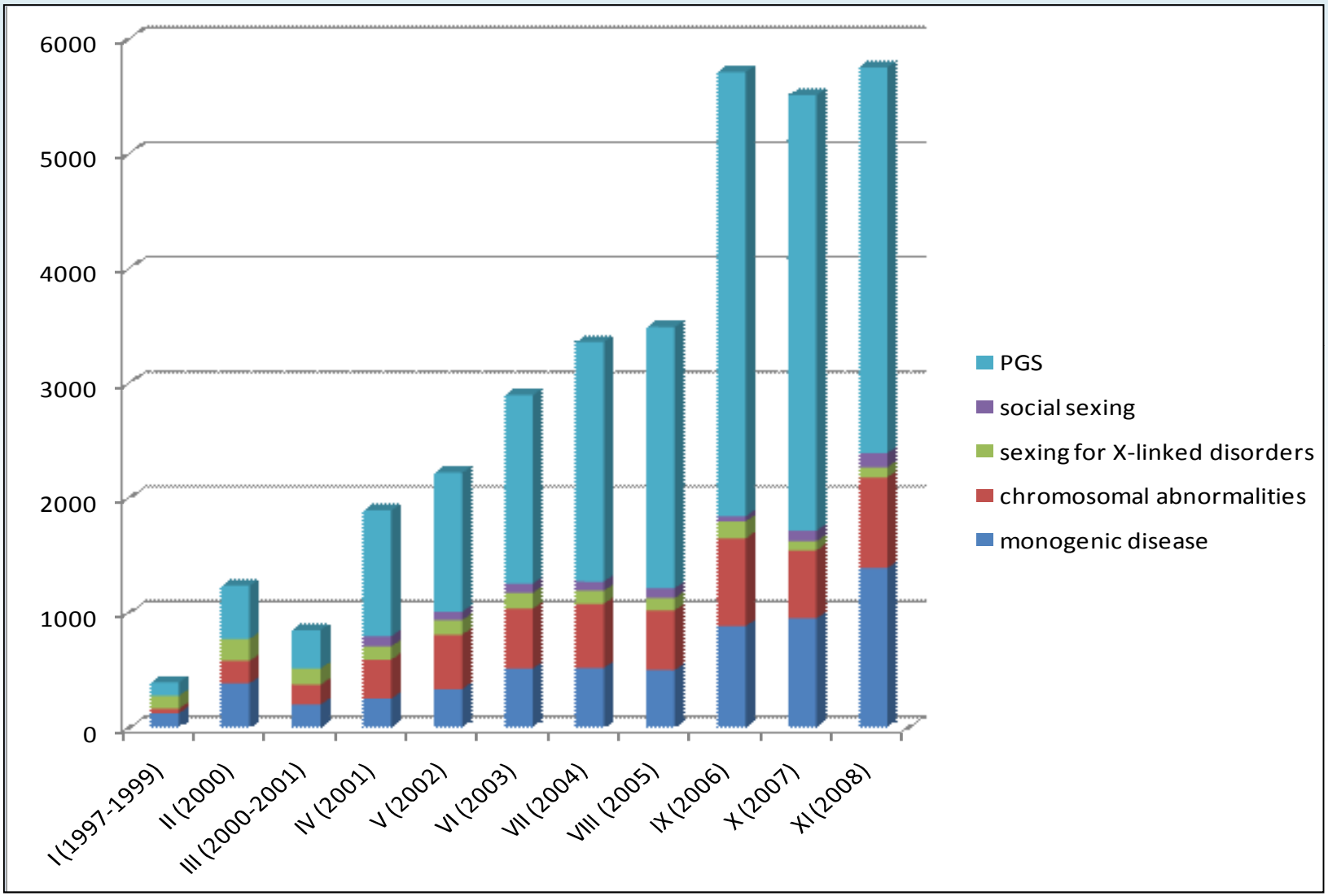
ESHRE PGS Task Force - 2007



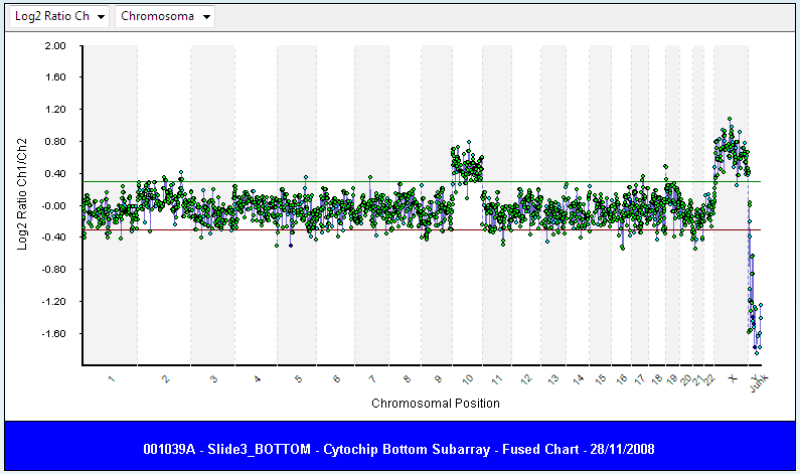


Brussels, 2010

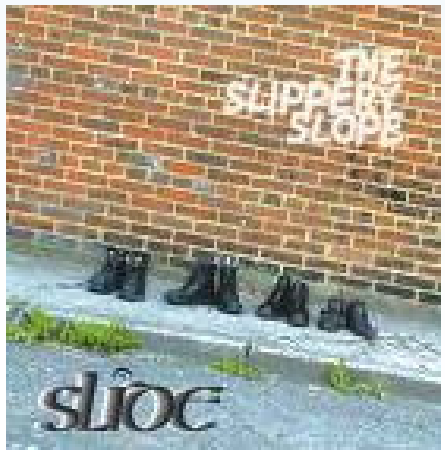
Evolution of cycle data



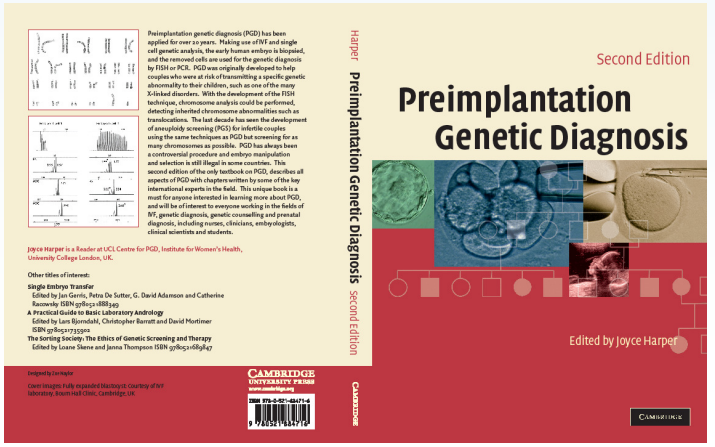
Future of PGD/PGS



- **Biopsy**
  - Polar body
  - Blastocyst biopsy
  - Vitrification
- **PGD**
  - New technology to allow diagnosis of more disorders
  - Whole genome amplification
  - SNP arrays and array-CGH
- **PGS**
  - RCT to see if valid procedure with clinical significance
  - NOT cleavage stage biopsy
  - Try polar body or trophectoderm
  - NOT FISH
  - Try arrays (either SNP or array-CGH)



UCL Centre for PG&D and CRGH



ISPD, Japan, 2006