

# **New Developments in Assisted Reproductive Technologies**

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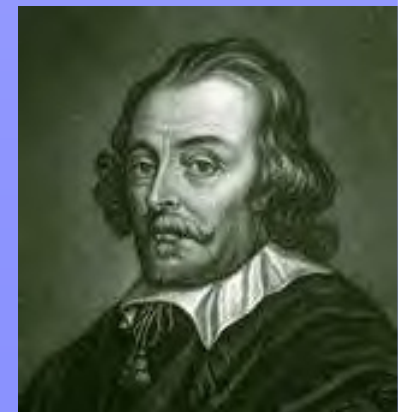
# Overview

1. Historical developments
2. Current methods
3. Numbers and figures
4. Controversial issues



# History

- 1322 oldest indication in literature about the attempt to inseminate
- 1564 Bartolomeo Eustachi, doctor of the pope and medical professor, recommended an insemination to a colleague whose wife would not fall pregnant.
- 1565 William Harvey described that all living beings have oocytes
- 1677 John Ham „found“ semen under the microscope



# History



- 1799 John Hunter carried out the 1. successful insemination.
- 1884 Dr. Pancoast carried out the 1. Insemination with a donor in the USA. This is published in a journal only in 1909.
- 30ies Hormones are investigated in and used to stimulate oocyte development
- 1978 1. Child resulting from IVF is born in the UK (Luise Brown)

# Current state of affairs

Of all couples affected by infertility

~ 40 % the male or the female partner is affected

~ 10% both

~ 10% no reason can be ascertained

Female infertility has been investigated for much longer and therefore there is a better understanding for this. For many years, women were treated before their partner's fertility status was known.

New and advanced possibilities do not only mean more hope but also managing the social, psychological and legal implications.

# Current methods of ART legal in Germany

Hormonal stimulation

IUI Intra-uterine insemination

IVF In-vitro-fertilisation

ICSI Intracytoplasmic sperm injection

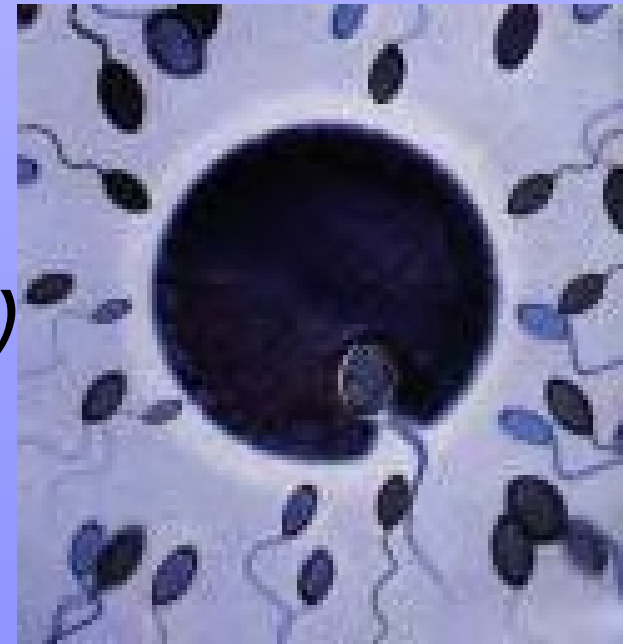
cryo cryopreservation of fertilized oocytes or semen

DI Donor insemination

# Hormonal stimulation

## **Irregular menstrual cycle**

*The female receives oral medication (drugs, hormones) which contributes to follicular growth*



# IUI

## Intra-uterine insemination



### **Male subfertility**

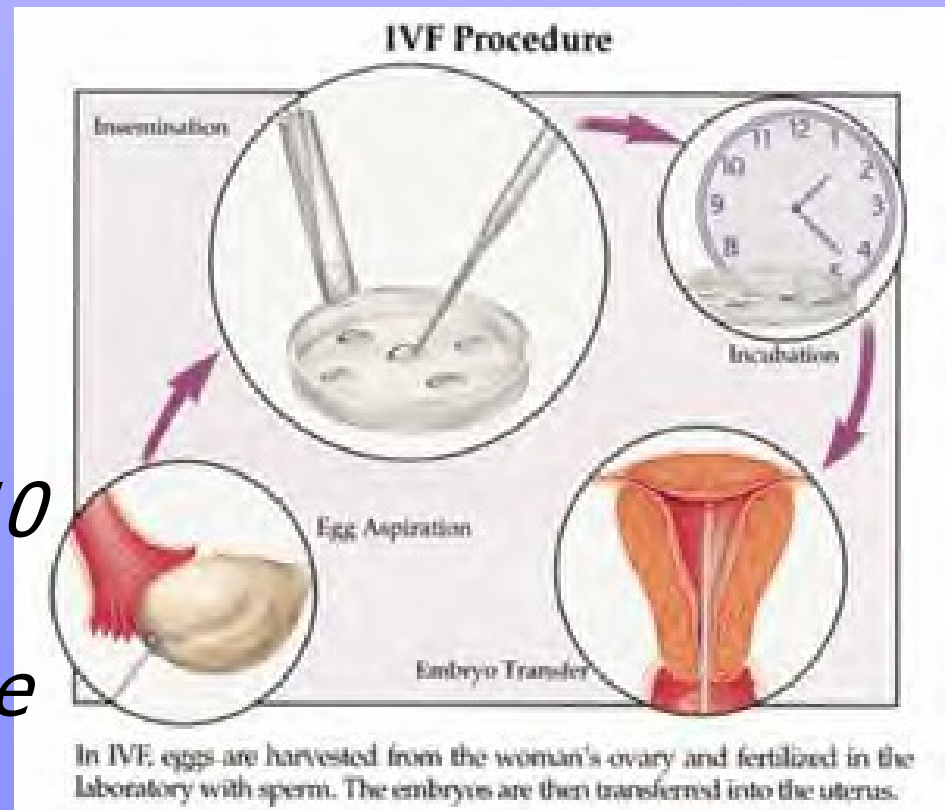
*Semen is inseminated into the vagina or the uterus (with or without hormonal stimulation, depending on the situation of the female partner)*

# IVF

## In-vitro-fertilisation

### Blocked ovarian tubes

*The female partner is stimulated with drugs (injections) to produce 5-10 oocytes, these are collected, fertilized with the husband's semen and transferred into the uterus*



# ICSI

## Intracytoplasmatic sperm injection



**Severe male  
subfertility**

*As with IVF;  
in addition, semen  
is individually  
injected into the  
oocytes*

# Cryo Cryopreservation

**If more than 3  
oocytes are  
fertilized**

*they can be  
cryopreserved for  
later treatment  
cycles*

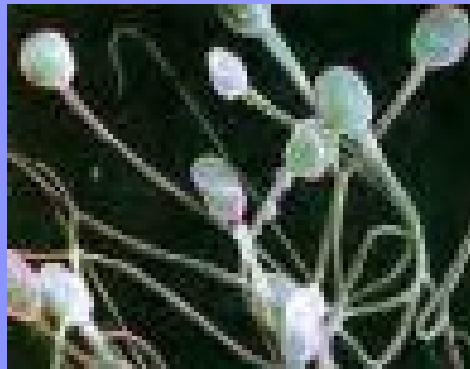


# DI

## Donor insemination

### Male infertility, sterility

*The female partner is inseminated with the semen of another male who remains anonymous*



# Figures and numbers

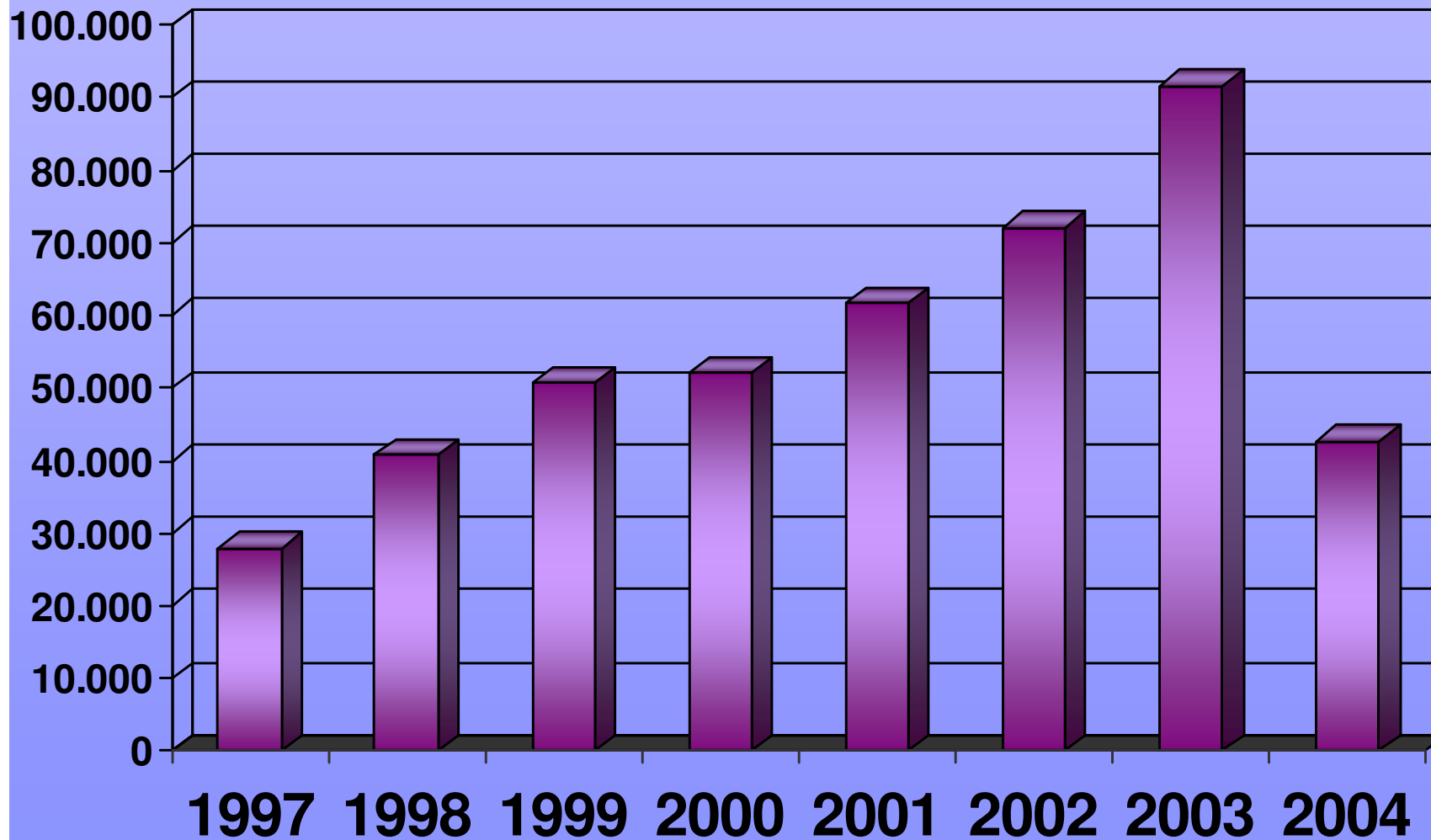
Hormonal stimulation: ?

IUI: ?

DI (2002): ~ 3.700 cycles of treatment

~ 500 pregnancies

# Figures and numbers – IVF + ICSI



(DIR Register 2005)

# Pregnancy rates per treatment cycle

		1 child	twins	triplets
IVF:	28,4 %	76 %	22%	2%
ICSI:	27,9 %			
Cryo:	17,0 %			
DI:	~14,0 %			

**Take-home-baby-rate ~15%**

(DIR Register 2001)



# Controversial Issues

- Reimbursement by our health insurance system
- Multiples
- Social infertility
- Egg (oocyte) donation
- Embryo donation
- Stem cell research
- PGD – pre-implantation genetic diagnosis
- Reproductive tourism



# Reimbursement

## prior to Dec. 2003

8 IUI without Stimulation

6 IUI with Stimulation

4 IVF

4 ICSI

Females until 45

⊗ DI

⊗ Cryo

## as of Jan. 2004

8 – 50% reimbursement only

3 –50% reimbursement only

3 IVF (~ € 3.000)

3 ICSI (~ € 4.000)

50% reimbursement only

females from 25. – 40. LJ, prior to 25 only with medical indication, males until 50

⊗ DI (~ € 1.000 + € 200)

⊗ Cryo (~ € 500)

# Multiples

Little awareness of the risk of multiples:

1999: 22.962 twins

1.495 higher-order multiples

Comparing to 1980 this is an increase by 44% and 485%  
(Stat. Bundesamt 2000)

- *Premature birth*
- *Peri-natal complications, rate of handicapped children higher (cerebral palsy, retardations, low IQ)*
- *Physical, emotional and financial strain for parents, (higher divorce rate, more depressive mothers, higher rate of neglect)*



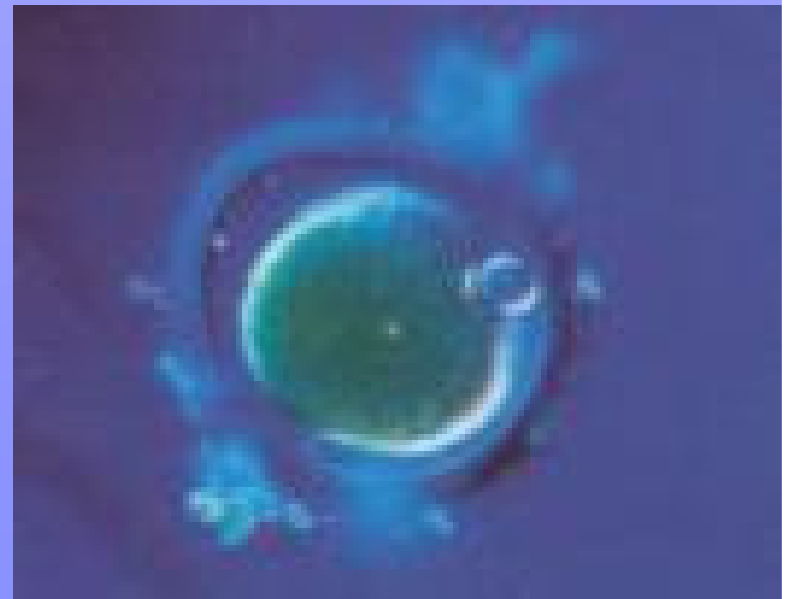
# Social infertility

- Homosexual couples using ART to build a family
- Lesbian couples use DI (and egg donation)
- Gay couples use egg donation and surrogacy



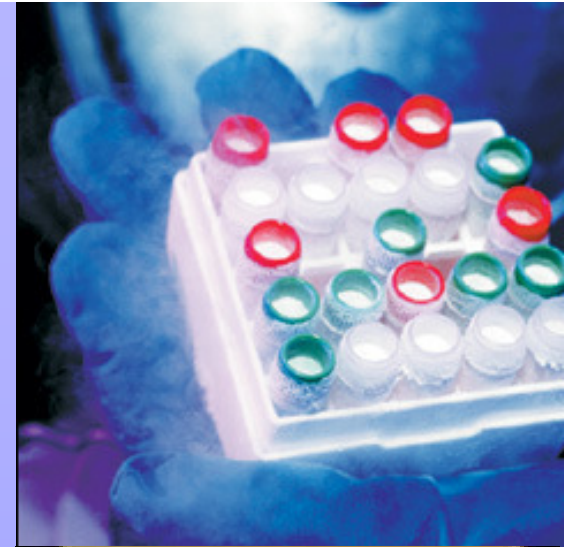
# Egg (oocyte) donation

- USA: 5.000 to 10.000 \$ compensation, ASRM suggested capping at \$ 5.000 to prevent exploitation
- Spain: € 1.000
- Great Britain: Brit Pounds 250
- Former Eastern Block countries
- Russia
- Approx. 1000 German couples travel abroad for egg donation



# Embryo donation

- In GB, couples undergoing IVF can donate, then IVF costs are reduced
- Is it like a „pre-natal“ adoption? (guidelines in New Zealand)
- In the US, a couple „adopted“ embryos for religious reasons; they did not want embryo to be destroyed
- In 2000, there were 400.000 frozen embryos, 2% of parents were willing to „donate“, 3% for research, 7% for destruction, 88% for later personal use.



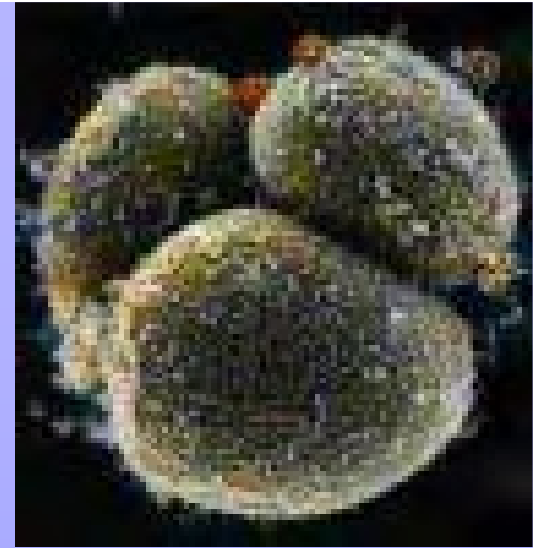
# Stem cell research

Embryonic stem cell research may lead to knowledge and treatment options for diseases currently fatal.

After the stem cell line has been extracted, the embryo cannot develop any further.

Adult stem cells do not seem as promising as embryonic stem cells.

When do embryos deserve human dignity?



# PGD

## Pre-implantation genetic diagnosis



The oocyte is fertilized. As long as it is totipotent, individual cells can be separated and used for genetic screening

1. Possible to conceive „selected“ children (sex, looks, intelligence.....)
2. What happens with the oocytes that are not used for implantations?

# Reproductive tourism

For treatment options that are illegal in Germany (egg donation, PGD, surrogacy etc.)

- Legally challenging
- Additional burden of travelling abroad (cost, language etc.)



**Questions  
and  
Discussion**