



UNIVERSITY OF GOTHENBURG

Pain relief in assisted reproductive technology - and midwifery in the reproductive field

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The Sahlgrenska Academy

Oocyte retrieval (OR) – statistics

~ 367 000 IVF-cycles in Europe

European Society of Human Reproduction and Embryology 2004 *Andersen et al 2008*

~ 128 000 IVF-cycles in the USA

Centers for Disease Control and Prevention 2004
Wright et al 2007

Oocyte retrieval- influence on pain perception



Comments and experiences from women in recovery after OR

- Everything went OK and the OR was not as painful as expected
- The pain was tolerable but psychologically it was exhausting
- The most effective pain relief was the feeling of support from the midwife; she devoted all her time to my well-being

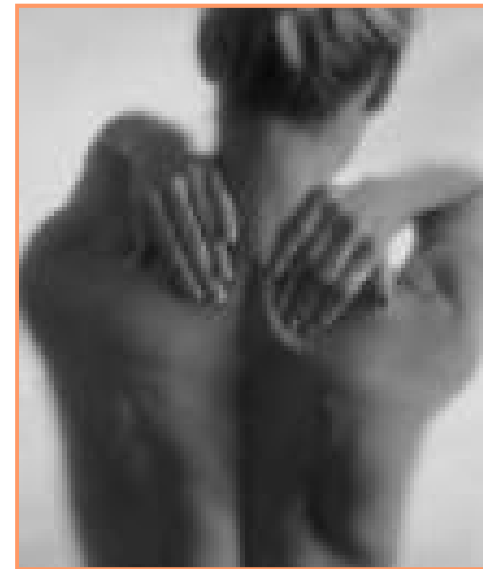
What is pain?

”Pain is an unpleasant sensory and/or emotional experience associated with actual or potential tissue damage, or described in terms of such damage”

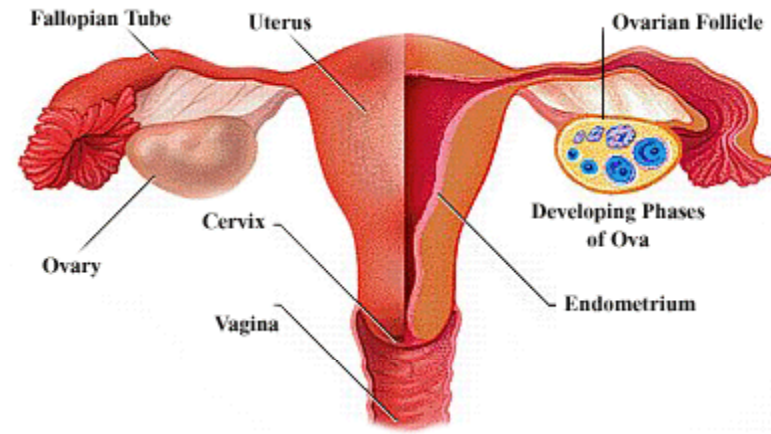
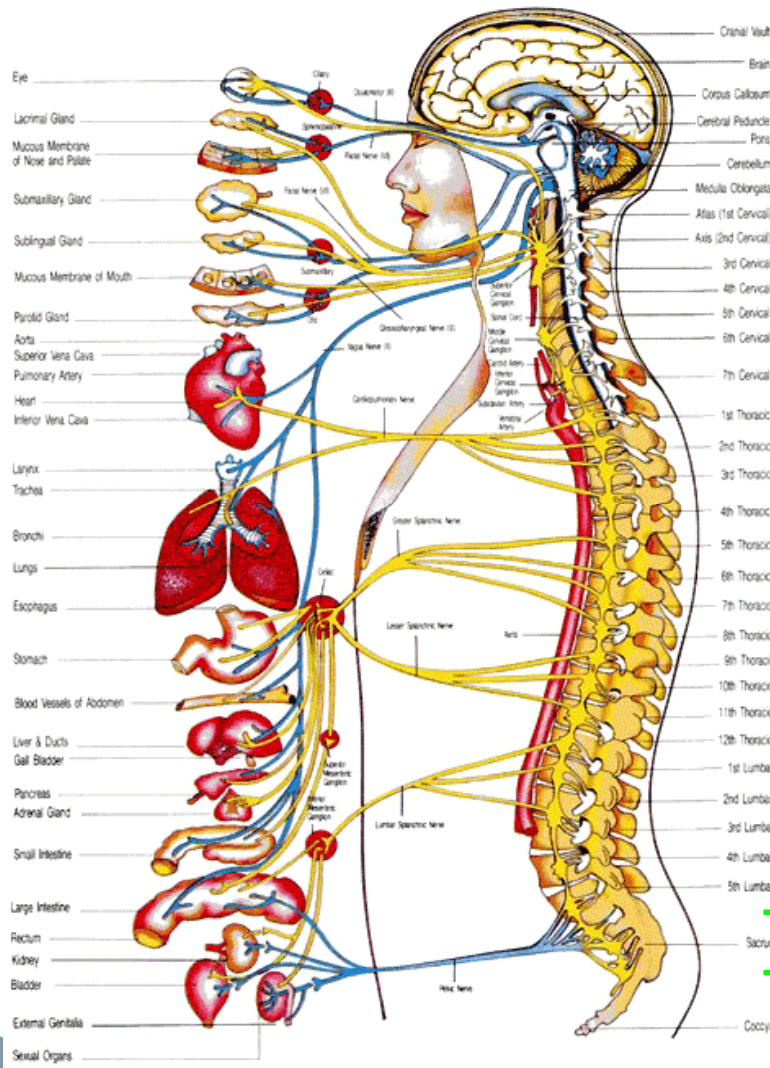
The International Association for the Study of Pain 1994

”Pain is whatever the patient says it is and exist whenever she says it does”

McCaffery 1979



Innervation to the uterus and the ovaries



Thoracic spine 12-Lumbar spine 2

Sacral spine 2-4

Bonica 1999

Pain perceived at OR

Causes by passage of the aspiration needle through

- the vaginal wall and the ovary capsule
- via mechanical stimulation of the ovary

Singel aspiration needle produce significantly less pain

Pain characteristics

- Intensive menstrual pain
- Intermittent

Awonuga et al 1996, Zelcer et al 1992

How stressful is OR?

52 % of women rated OR as a very stressful or extremely stressful event

Other stressful events in an IVF treatment

Waiting for fertilization

Waiting for pregnancy result

Miscarriage

Hammarberg et al 2001

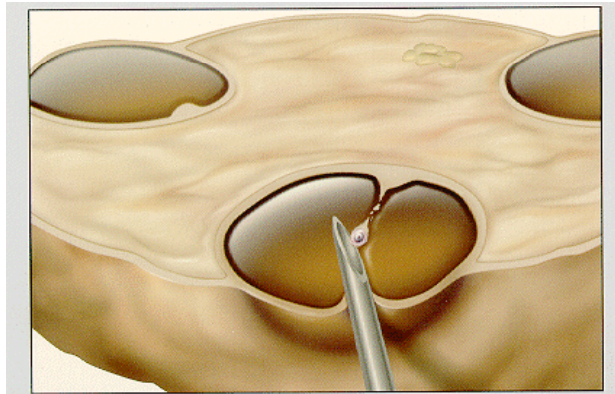
Factors that influence on pain during OR

- Personality
- Memories
- Expectations, desires, emotions
- Anxiety
- Depression and sleeping disturbances
- First IVF cycle
- No. of follicles
- Position of the ovaries
- Body Mass Index

*Hampton 2005, Price & Barell 2000, Gejervall et al 2007,
Chiu et al 2005, Gohar et al 1993, Cerne et al 2006, Tummon et al 2004*

Oocyte retrieval- pain mechanisms

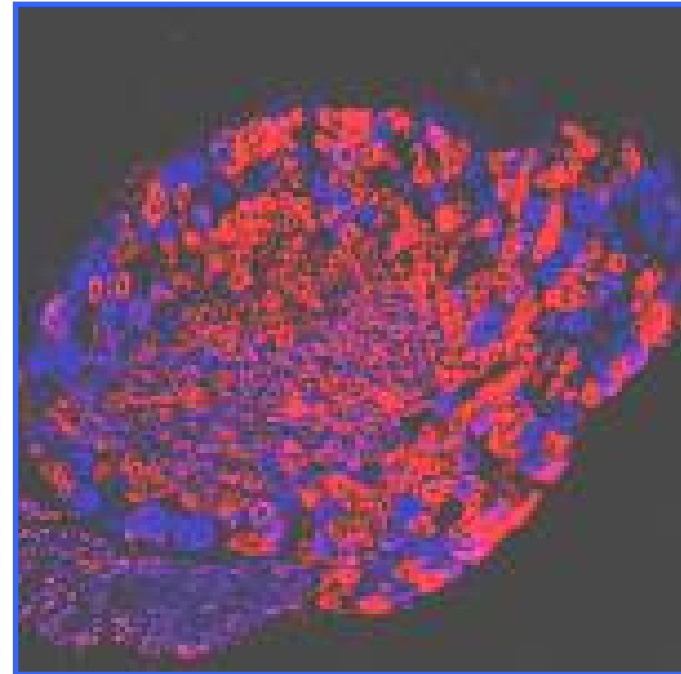
OR - an acute nociceptive pain



Pain classification

- Nociceptive pain
- Inflammatory pain
- Neurophatic pain
- Functional (or idiopathic) pain

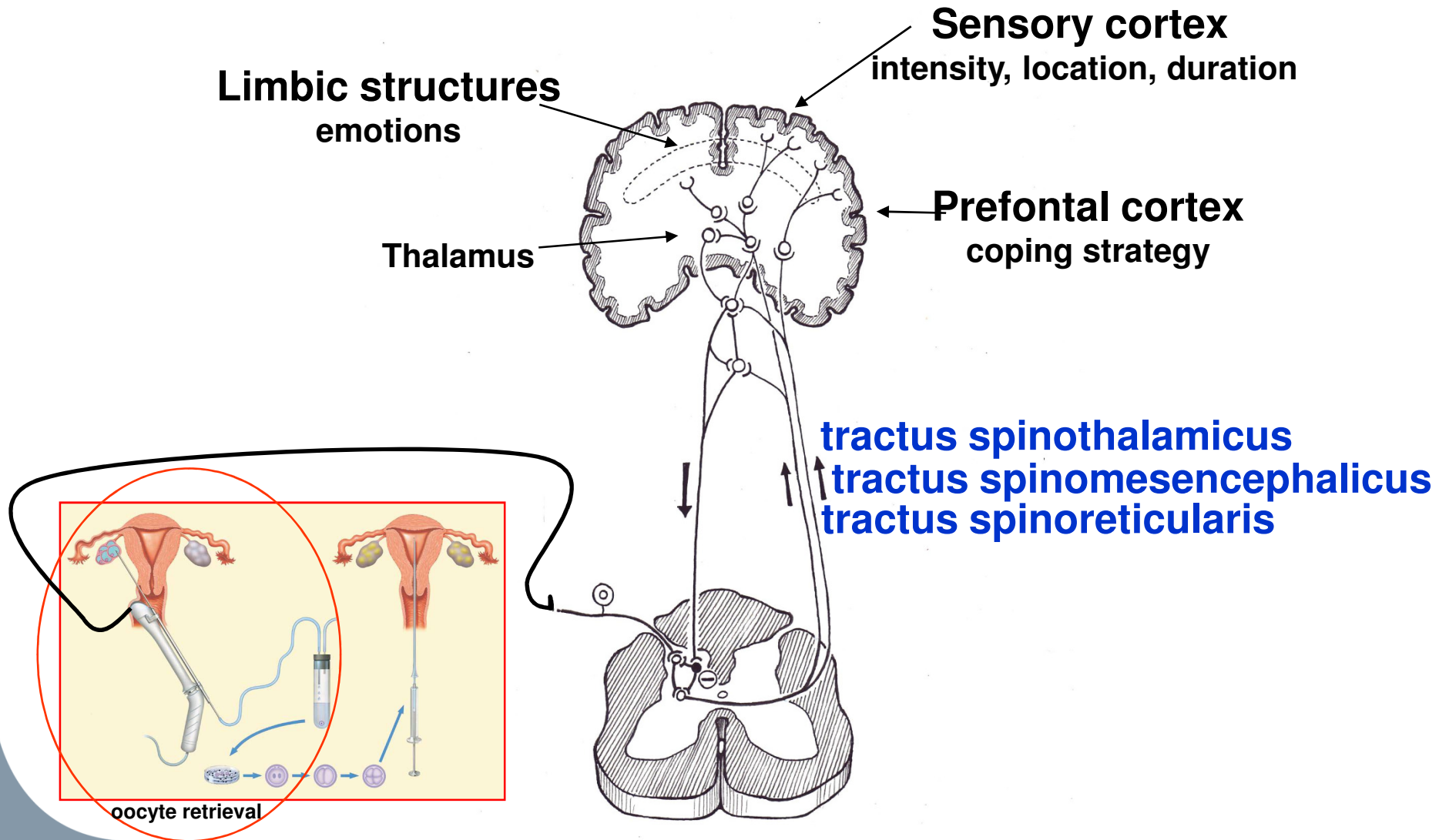
Woolf 2004



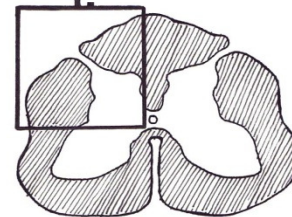
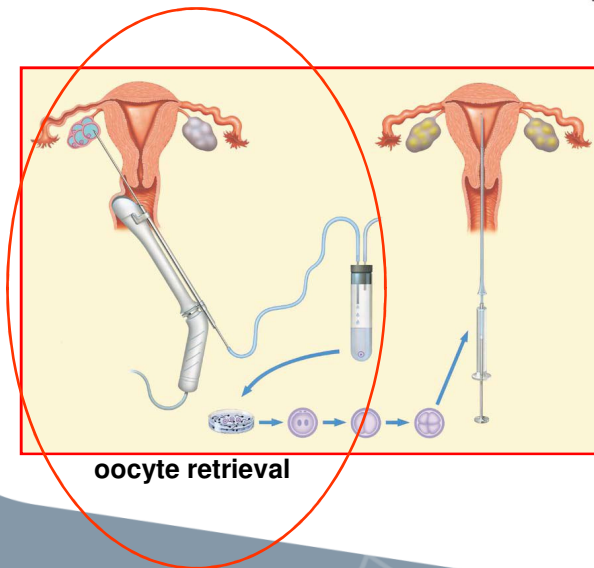
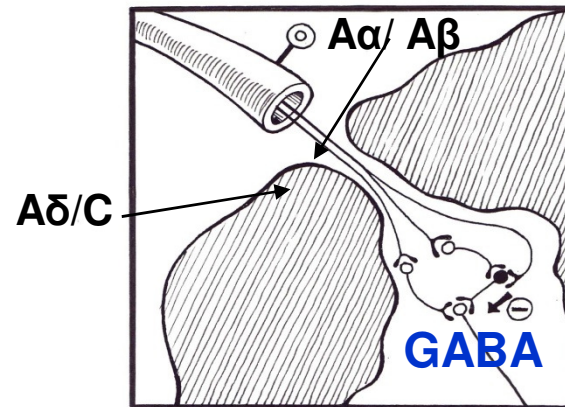
www.anat.ucl.ac.uk

Nociceptors = pain receptors

Pain transmission from periphery to the brain

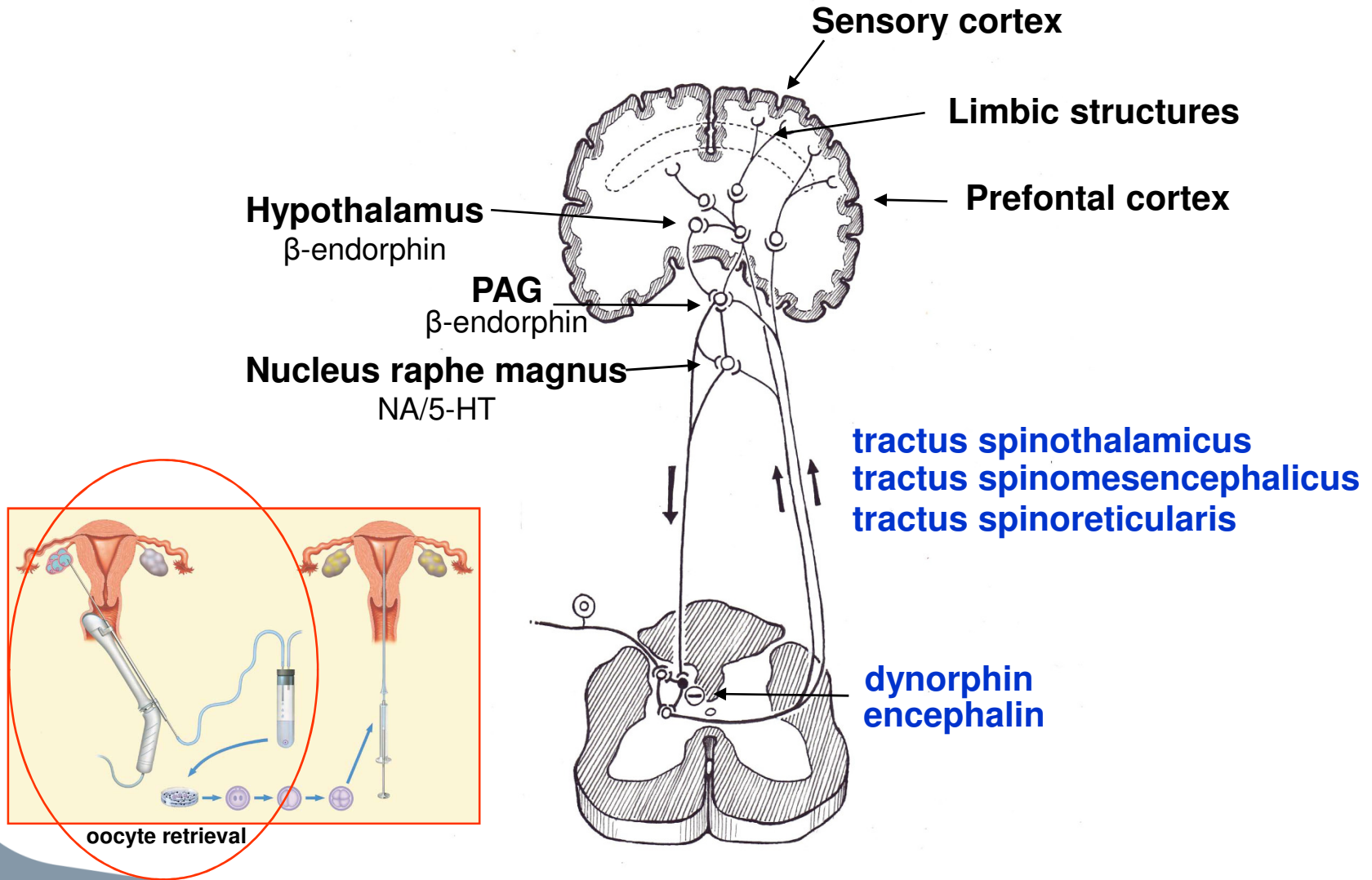


Pain modulation in the dorsal horn via gate control

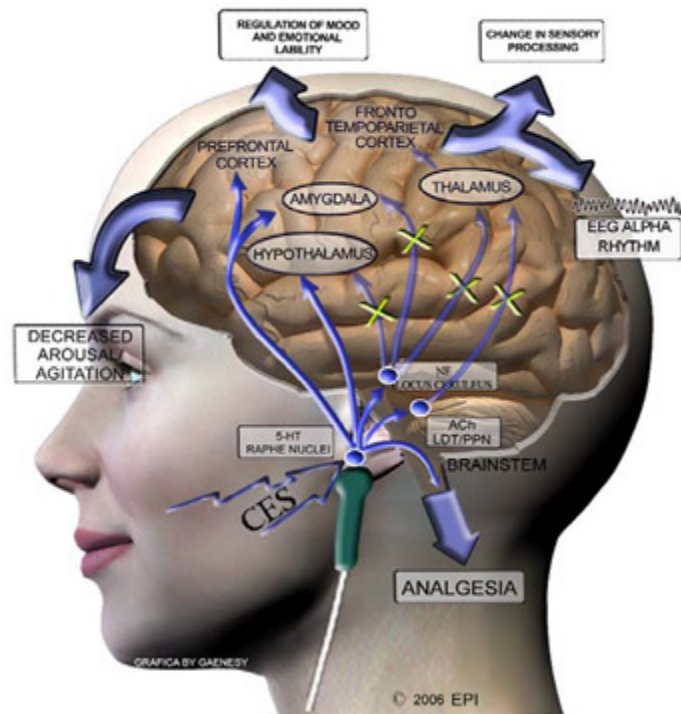


Melzack & Wall 1965

The descending pain inhibitory system

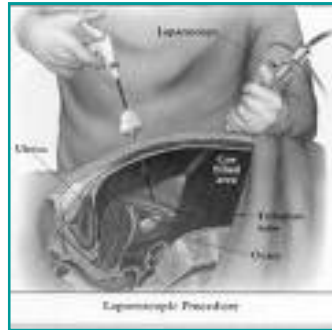


Oocyte retrieval - types of analgesia



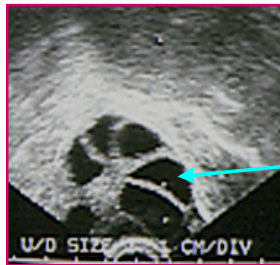
Techniques used for OR

Laparscopy surgery



Louise Brown 1978

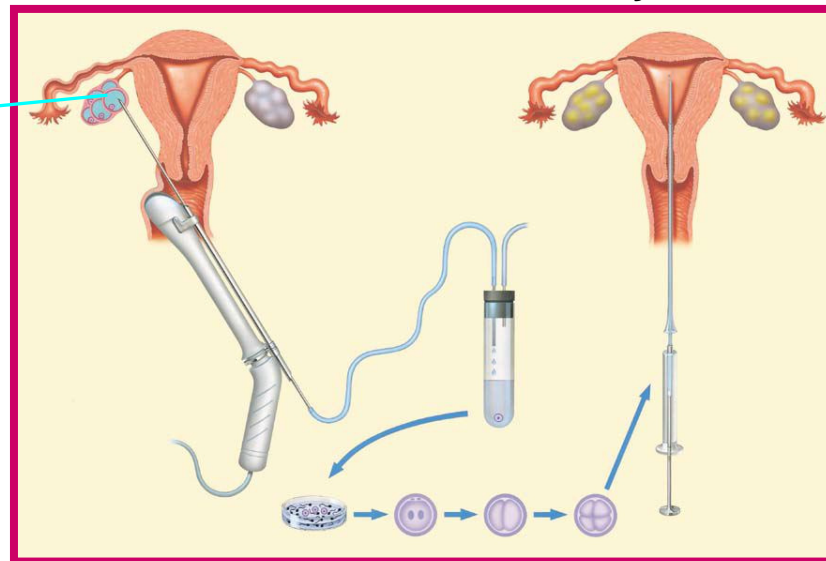
Transvaginal ultrasound guidance (TUGOR)



Lens et al 1981
Wikland et al 1987

Oocyte retrieval

Embryo transfer



A satisfactory pain relief

Adequate pain relief

Safe

Rapid onset

Rapid duration

Rapid recovery

No adverse effects on oocytes, fertilization and embryo development

Easy of administration and easy of monitoring

Different types of analgesia for OR

- I. General anesthesia
- II. Regional anesthesia
- III. Local anesthesia
- IV. Conscious sedation
- V. Pump systems
- VI. Acupuncture
- VII. No analgesia

I. General anesthesia

- a) expected complicated OR
- b) extreme anxiety

Anesthesia personnel

Time consuming

Higher costs



II. Regional anesthesia

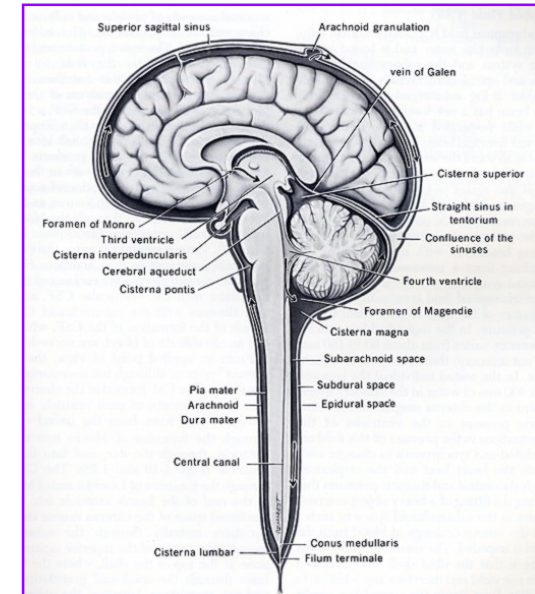
a) epidural anesthesia – epidural space

b) spinal anesthesia – subarachnoid space

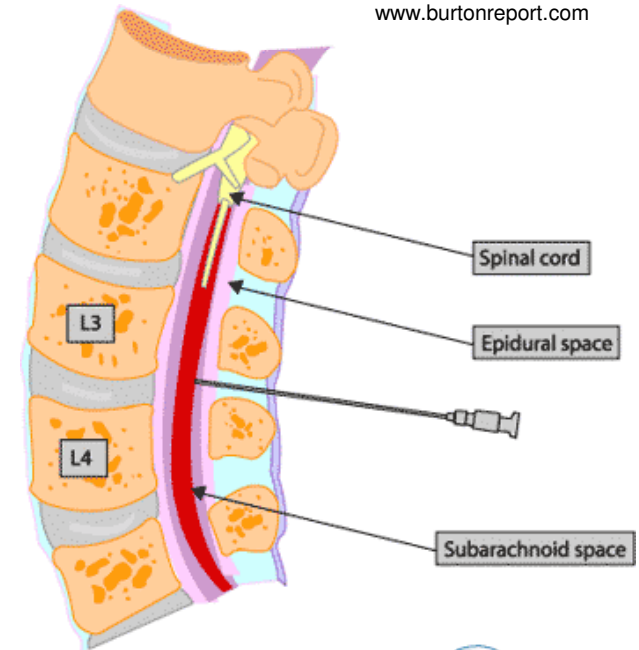
Anesthesia personnel

Time consuming and higher costs

Botta et al 1995, Viscomi et al 1997



www.burtonreport.com



III. Local anesthesia - lidocaine

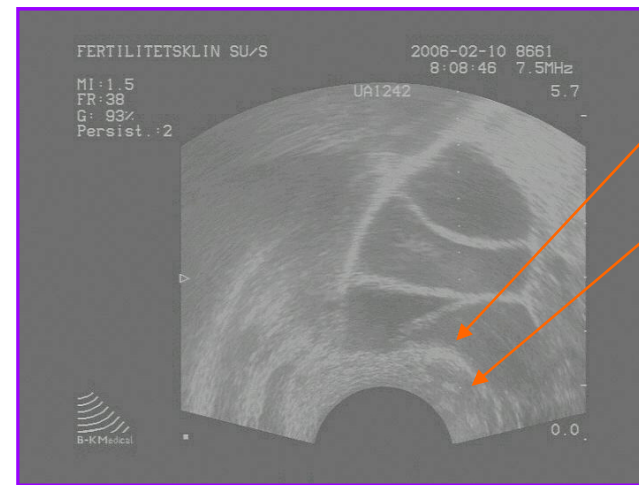
a) Paracervical block (PCB)

- different doses
- in combination with opioids

b) Preovarian block (POB)

- vaginal wall + between the vaginal wall and the peritoneal surface

c) Lidocaine gel



Infiltration
Needle

Application of POB

*Ng et al 1999, 2000, 2001, 2003,
Cerne et al 2006, Tummon et al 2004*

IV. Conscious sedation

Most used method in Europe and the USA

Vlahos et al 2009

Motivated and cooperative patients

Low risk in healthy patients

- puls oximeter
- continuous electrocardiographic monitoring

Cost-effective

Out-side hospital

IV. Conscious sedation

Women reported OR to be significantly less painful than they expected before surgery



www.citydentists.co.nz

Gejervall et al 2007

IV. Conscious sedation

a) Opioids - morphine, mepherdine, fentanyl, alfentanil

Excellent analgesic effects

↓minute ventilation, apnea

stiff cheast syndrome

Naloxone

Muscle relaxant



b) Benzodiazepam - midazolam, diazepam, lorazepam


Sedative, anxiolytix and amnesic effect

- analgesic effect is minimal

- synergistic effect in combination with opiods

IV. Conscious sedation

c) Propofol

- induction agent, good analgesic effect
- mechanism of action is poorly understood
- ↓myocardial contractility, dose-dependent respiratory depression  assistance of ventilation

d) Ketamin - dissociative anesthesia

- good analgesic effect, minimal respiratory depression
- vivid dreaming, extra corporeal experiences, illusions, feelings of excitement and euphoria

V. Pump-systems

- a) patient controlled
- b) physician controlled



Well accepted by women

Favoring physician controlled

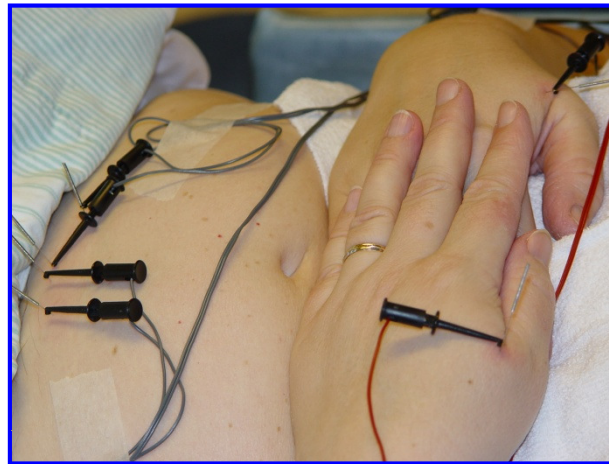
Zelcer et al 1992, Battacharya et al 1997,

Thompson et al 2000, Lok et Al 2002, Kwan et al 2005

VI. Electro - acupuncture

Desires about a
non-pharmacological
analgesia

- contraindication against
opiods
- woman's wish



Time consuming

Conflicting results

Stener-Victorin et al 1999, 2003,
Stener-Victorin & Humadain 2004,
Gejervall et al 2005

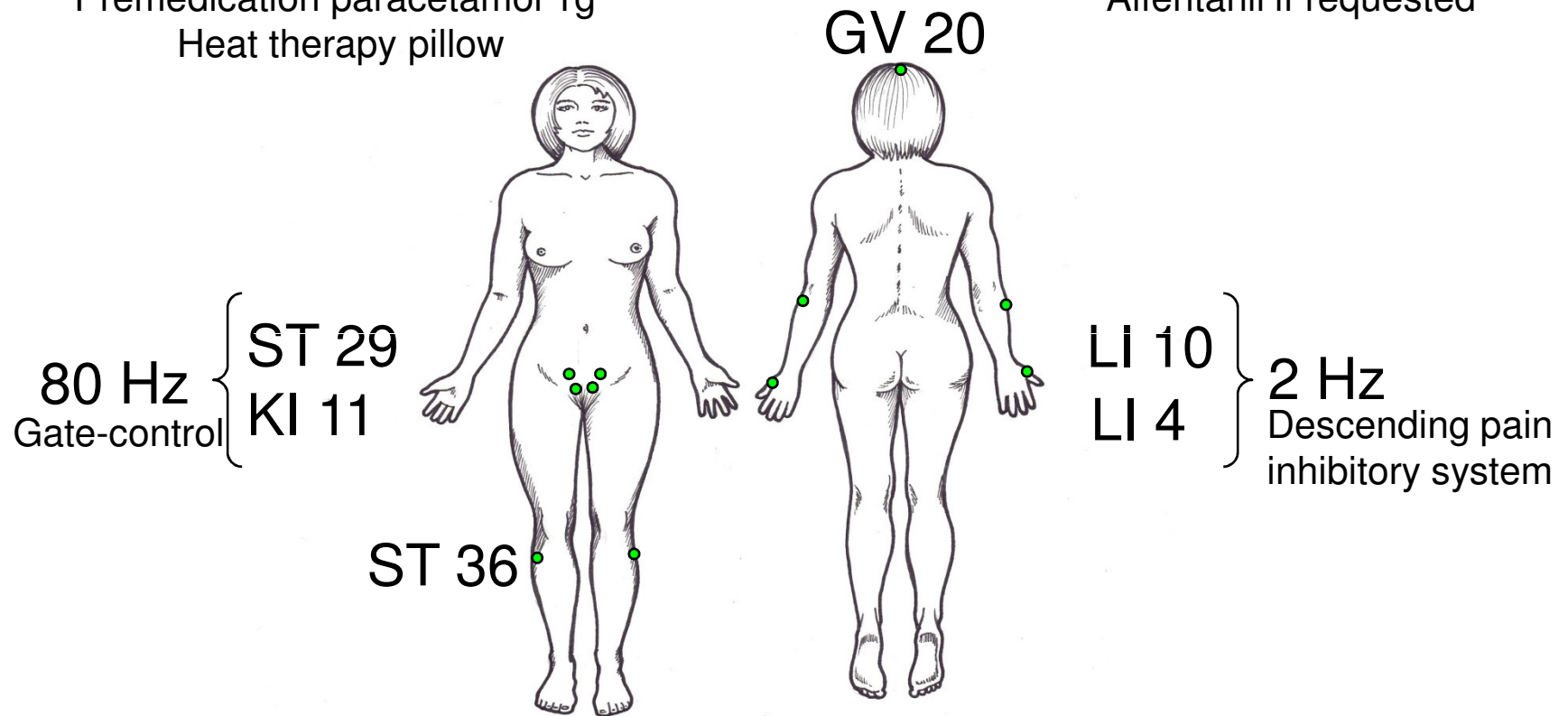
Electro-acupuncture for OR

Preoperativ preparations

ACU ~ 30 minutes prior OR
Premedication paracetamol 1g
Heat therapy pillow

Operating theater

PCB 0.5 %
Alfentanil if requested



Gejervall et al 2005

VII. No analgesia

Ramsewak et al 1990

Wicke et al 2000

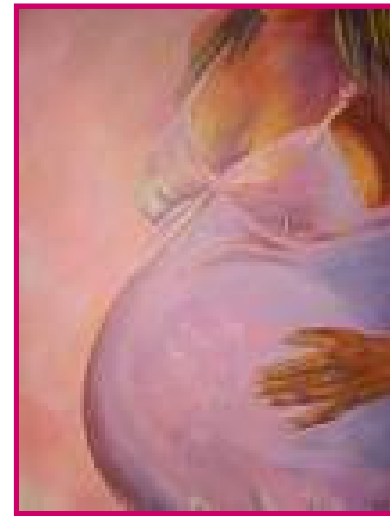
Potential risks with anesthetics agents on reproductive outcome ?

Concentration in follicular fluid

Studies are:

- old
- small
- insufficient power

Conflicting results



www.fineartamerica.com

Soussie et al 1995, Coetsier et al 1992, Shapira et al 1996, Christiaens et al 1999

Studies of anesthetic agents on reproductive outcome

- Significant difference in pregnancy rate
 - a) Gonen et al 1995
 - general anesthesia vs epidural vs PCB
 - b) Wilhelm et al 2002
 - general anesthesia vs remifentanil

- No difference in pregnancy rate
 - a) Christiaens et al 1998
 - general anesthesia vs PCB
 - b) Ben-Shlomo et al 1999
 - general anesthesia vs conscious sedation

Evaluating varied doses of alfentanil

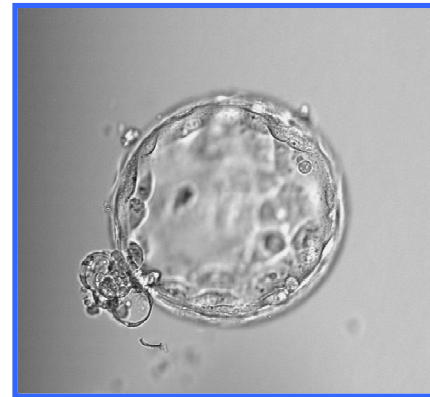
Observational study

n = 841 OR

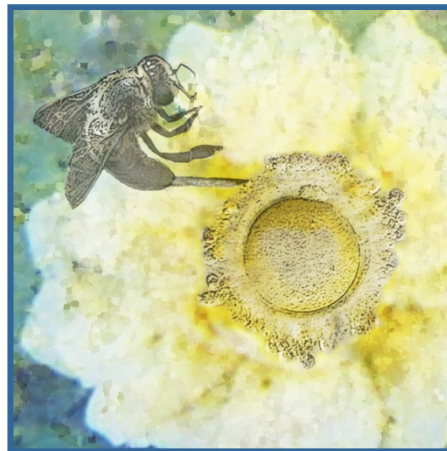
n = 663 women

No adverse effect on fertilization rate and/or Good Embryo Quality (GQE) rate

Gejervall et al 2009 (in manuscript)



Currently no analgesia method
is found to be superior



Stener-Victorin 2005, Kwan et al 2005