



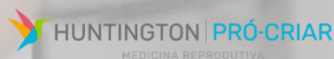
Yearly Scientific Report

Copenhagen Fertility Center

2022-
2023



COPENHAGEN FERTILITY CENTER





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Introduction

The Section for Human Reproduction is involved in education, teaching, training and research within mammalian reproduction.

The Section for Human Reproduction in Copenhagen Fertility Center was founded in 1982 in the Chromosome lab at Rigshospitalet, Copenhagen University, where the first IVF baby was created in Denmark in 1982. The lab was further developed into a research unit as a result of a long lasting scientific collaboration and research between the Department of Obstetrics and Gynaecology, Section for Reproductive Biology and IVF at Herlev Hospital and The Ciconia Fertility Clinics and pharmaceutical industries. Today the section collaborates with universities in both Denmark and abroad, clinics within the Eugin group, of which Copenhagen Fertility Center is a member, the pharmaceutical industries including veterinary medicine.



Doctors Svend Lindenberg and Suzan Lenz in 1983 at Rigshospitalet and in 2019 at Copenhagen Fertility Center.

Every year the section is responsible for conducting studies both in-house and in collaboration with our national and international collaborators. We publish the research in international peer reviewed journals as well as present the studies at international conferences and symposiums. Research is a cornerstone in the treatments offered by the clinic and is therefore a closely integrated into the daily procedures with all members of staff taking part in the research.

The section is responsible for education not only the staff but also postgraduate education of doctors, embryologists, nurses and midwives. This happens through internal symposiums and lectures, Bachelor- and Master Projects, PhD studies and a master program in collaboration with Eugin and the Barcelona School of Management which every year welcomes several international students studying embryology and clinical infertility.

Furthermore, every year colleagues from all over the world visit the clinic in shorter periods for training and knowledge sharing, just as staff from the clinic go on educational visits several times a year to learn new practices and establish new collaborations.



Members of the staff are GCP-educated and have passed the national boards of examination. The section has been through a FDA audit training program and tests by the pharmaceutical industries, including accreditations for EU tissue regulative and has been ISO Certified for our clinical activities as well as research, EU Tissue directive accredited and accepted by the Danish Quality Model clinics.

Vision

The Section for Human Reproduction has the vision to generate knowledge in human reproductive biology and hereby be a leading institution for implementing new treatments to benefit infertile couples. This is carried out through careful handling of patients, research projects, teaching and international collaboration

Results 2022-2023

In 2022 and 2023 two master student from the Master in Embryology in Collaboration with Pompeu Fabra University have finished their final master thesis in the clinic. Investigating AMH as a marker for fertility and the effect of metformin and semaglutide to improve outcomes in PCOS women respectively.

Four peer-reviewed papers were published:

Are we close enough to understanding and diagnosing polycystic ovarian syndrome?
Lindenberg, Svend et al.
Fertility and Sterility, Volume 117, Issue 4, 882 – 883

Geeta Nargund, Adrija Kumar Datta, Stuart Campbell, Pasquale Patrizio, Ri-Cheng Chian, Willem Ombelet, Michael Von Wolff, Svend Lindenberg, Rene Frydman, Bart CJM Fauser,
The case for mild stimulation for IVF: recommendations from The International Society for Mild Approaches in Assisted Reproduction, Reproductive BioMedicine Online, Volume 45, Issue 6, 2022, Pages 1133-1144, ISSN 1472-6483, <https://doi.org/10.1016/j.rbmo.2022.07.019>.

I Ulsø, F Lindenberg, E Færch, G Almind, S Lindenberg, P-061 What is the optimal number of IUIH cycles before changing treatment ?, *Human Reproduction*, Volume 37, Issue Supplement_1, July 2022, deac107.057, <https://doi.org/10.1093/humrep/deac107.057>

Frederikke LDVM, Ida U, Gitte JA et al. GLP-1 analogue as a novel approach for fertility treatment: unravelling the therapeutic potential: A narrative review. *Obstet Gynecol Int J.* 2023;14(4):120–122. DOI: 10.15406/ogij.2023.14.0070

In addition members of the staff thought students at the Master in Embryology in Barcelona, and colleagues participated in meetings and conferences in Copenhagen, Netherlands, Finland, Spain and Italy



Research areas

- **Mild stimulation in IVF**, which has already resulted in ground breaking new treatments that are more patient friendly with less medication and resulting side effects as well as more economical.
- **The relationship between inflammation, obesity and PCOS and how to treat them collectively**. This is a large focus area and we are collaborating with international pharmaceutical companies to understand how their medication can be used in patients with endocrinological challenges.
- **Oocyte morphology/quality check and registration procedures for optimising ART technologies**. This work has led to devising instruments and optimising clinical procedures for selection of human embryos prior to embryo transfer.
- **Genetics in reproduction**
- **Clinical/technological improvements that make use of large data-sets**. This is done in collaboration with the rest of the Eugin groups and has already results in several multi center studies.
- **Improvement of AMA patients**
- **Male factor**. We have conducted research resulting in better selection criteria for unexplained fertility and oligospermic men have been introduced prior to IVF/ICSI.
- Clinical phase I, II and III pharmaceutical trials.
- Allergy and unexplained infertility.
- IVM

Educations

Since 2003 the Department has been involved in teaching in the university and in other medical faculties. This is an ongoing process to attract new staff and participate in sharing new research results.

Since 2020 the department has been a part of the Master in Embryology in Collaboration with Pompeu Fabra University 2020, teaching at the course and educating the students in the clinic and lab as well as mentoring them in their final master thesis. So far four students have finished their master thesis in the department:

- Patrycja Blaszczyk – Prospective analysis of the ability of an embryologist to foresee the blastocyst formation on day 2/3
- Ainhoa Coco – Study on D-vitamin AMH and insulin resistance interrelation in PCOS patients
- Emilie Færch Sømmer – From an existing idea to an actual research project – The journey of IVM in Copenhagen Fertility Center



- Anna Espigol – Study on the effect of calcium addition to the culture medium and the effect on fertilization
- Sami Obaya Ghailan - Oocyte Retrieved in Mild Stimulation in Relation to Pre-treatment AMH
- Marta Peña - Use of metformin and semaglutide as a new approach to improve IVF outcomes in overweight PCOS women

Congresses organized and held by Copenhagen Fertility Center

- ISMAAR member visiting the clinic at the ISIVF meeting 2015
- ISIVF World Congress in Copenhagen 2015
- ISMAR Symposium 2020



ISIVF 2015

Publications

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Geeta Nargund, Adrija Kumar Datta, Stuart Campbell, Pasquale Patrizio, Ri-Cheng Chian, Willem Ombelet, Michael Von Wolff, Svend Lindenberg, Rene Frydman, Bart CJM Fauser, The case for mild stimulation for IVF: recommendations from The International Society

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Awards

Svend Lindenberg has been awarded with the "**Commercialization Prize awards**" 2005 from the county mayor, Copenhagen



Awards for the **Best scientific presentation 2009**. 15th World Congress on In Vitro Fertilization, 4th World Congress on In Vitro Maturation, Geneva April 2009.

Svend Lindenberg's work on implantation has contributed to the **Virtual Human Embryo, EDH**. (<http://www.ehd.org/virtual-human-embryo/figure.php?stage=4&figure=4>)

Patents

1 Assay to indicate the presence of non-fertilisable ova.

Inventor: LINDENBERG SVEND (DK); MIKKELSEN ANNE LIS (DK) Applicant: MEDI CULT AS (DK)

EC: IPC: G01N33/68 ; G01N33/74

Publication info: SK19152000 - 2001-12-03

2 In Vitro Fertilisation

Inventor: LINDENBERG SVEND (DK) Applicant: KOEBENHAVNS AMTS SYGEHUS HERLEV (DK); LINDENBERG SVEND (DK)

EC: C12N5/06B4F; C12N5/06B2E; (+1) IPC: C12N5/06 ; C12N5/08 ; (+1)

Publication info: WO03106662 - 2003-12-24

3 Assay to indicate the presence of non-fertilizable ova

Inventor: LINDENBERG SVEND (DK); MIKKELSEN ANNE LIS (DK) Applicant: MEDI CULT AS (DK)

EC: C12N5/06B4F; G01N33/68T; (+1) IPC: G01N33/533

Publication info: US6649344 - 2003-11-18

4 A method for in vitro maturation of human gametes.

Inventor: BERTHEUSSEN KJELL (DK); SMITH STEVEN DALE (DK); (+2) Applicant: MEDI CULT AS (DK)

EC: C12N5/06B4F IPC: C12N5/08

Publication info: US2002115211 - 2002-08-22

5 In vitro maturation of human oocytes in one day

Inventor: SMITH STEVEN DALE (DK); LINDENBERG SVEND (DK); (+2) Applicant:

EC: C12N5/06B4F; G01N33/74B IPC: A01K67/027

Publication info: US2001028878 - 2001-10-11

6 Assay to indicate the presence of non-fertilizable ova

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EC: IPC: G01N33/68 ; G01N33/74

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7 Method and device for treatment of conditions associated with inflammation or undesirable activation of the immune system

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Collaborations

The department have ongoing collaborations with the University of Copenhagen resulting in several PhDs and other studies with the Eugin group and with private pharmaceutical and medcotechnical companies Merck, Novo Nordisk Healthcare Robotics and Exceed.

For further information, inquiries about collaborations etc please see our website:

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Yours Sincerely

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