Illustration shows the first attachment and implantation by human blastocyst in vitro from the thesis by Svend Lindenberg.
Photographer Lennart Nilsson
The unit has supported research, treatment and education

We do more than 1800 IVF related cycles per year

We do more than 1700 IUI cycles per year
CFC section for Human Reproduction

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.

Vision

Introduction

The Section for Human Reproduction in Copenhagen 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 it consists of collaboration between the Copenhagen University, Copenhagen Fertility Center and several pharmaceutics - medical industries including veterinary medicine.

Primary research areas

- In vitro maturation techniques for human immature oocytes with the object of devising new and simple non-hormonal treatments to substitute conventional in-vitro fertilisation treatments with ovarian hyperstimulation. In this area of artificial reproductive techniques this institution is one of the world’s leading.
- Oocyte morphology/quality check and registration procedure for optimising artificial reproductive technologies such as IVF and ICSI. This work has led to devising instruments and optimising clinical procedures for selection of human embryos prior to embryo transfer.
- Sperm and oocyte apoptosis studies. Following this research 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.
The section is responsible for postgraduate education and training in human reproductive biology including in-vitro maturation techniques for clinical treatments i.e.

- International and national universities and pharmaceutical companies
- MicroRNA in Endometriosis and oocyte development in humans
- Internal database and e-learning
- Reproduction and immunology

We highly appreciate the many visitors from more than 20 different countries visiting our clinic every year, especially the colleagues coming for training and research.

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.

FUNDRAISING

Fundraising from external sources is a vital part of the units’ work

ONGOING RESEARCH COLLABORATION WITH:

- Copenhagen University, Copenhagen
Visiting Scientific Staff
2007-2016

- Edurne Novella Post Doc in Nordica, Valencia IVI clinic (IVM project)
- Prof. Dr Salam Omar Jibrel MD Head of OB-GYN Department Bahrain Specialist Hospital Manama, Bahrain (Cryo biology)
- Lec. Ph.D Gail Jones Researcher, Monash University (IVM project)
- Dr. Sören von Otte, Lübeck IVF Clinic (IVM project)
- Associate Professor cand. Med. Vet Ph.D Nicolai Jarlov, Hørsholm Hestrepraksis, Denmark
- Associated Professor Finn Hald, Head of Department for Reproductive Biology, Brædstrup, Denmark
- More than 260 doctors, embryologists in the Fertility School'
- Geeta Nargund, Chairman for ISMAAR, UK
- Professor dr. med. Matts Brennstrom, Gøteborg.
- Professor Guang Xi Lu, China
- Dr. Nie Hongchuan, China
- Alejandro Fernandez Ponce, Post Doc at CFC.
- Olga Zaytseff AVA clinic St Petersburg

ISMAAR member visiting the clinic at the ISIVF meeting 2015

ISIVF World Congress in Copenhagen 2015
Institut for Human Reproduktion, Copenhagen Fertility Center

**Publications 1999 – 2016**

Gabrielsen A, Bhatnager P, Petersen K, Lindenberg S.

Gabrielsen, A. Lindenberg S, Petersen, K.
The impact of the Zona Pellucida Thickness Variation of human embryos before transfer on pregnancy outcome.

Hildebrandt N, Høst E, Mikkelsen AL.
Pain experience during transvaginal aspiration of immature oocytes for IVM.

Høst E, Lindenberg S, Christensen F.
DNA strand breaks in human sperm cells: A comparison between men with normal and oligozoospermic sperm samples.

Høst E, Lindenberg S, Ernst E, Christensen F.
Sperm morphology and IVF: Embryo quality in relation to sperm morphology following the WHO and Krüger’s strict criteria.

Høst E, Lindenberg S, Ernst E, Christensen F.
DNA strand breaks in human spermatozoa: A possible factor, to be considered in couples suffering from unexplained infertility.

Høst E, Lindenberg S, Smidt-Jensen S.
DNA strand breaks in human spermatozoa: Correlation with fertilization in vitro in oligozoospermic men and in men with unexplained infertility.

Høst E, Lindenberg S, Smidt-Jensen S.
The role of DNA strand breaks in human spermatozoa used for IVF and ICSI.

Mikkelsen AL, Smith SD, Lindenberg S.
In vitro maturation of human oocytes from regular menstruating women may be successful without FSH priming.

Mikkelsen AL, Smith S, Lindenberg S.
Impact of oestradiol and inhibin A concentrations on pregnancy rate in in-vitro oocyte maturation.
Human Reprod. 2000; 14, no. 8: 1685-1690.

Mikkelsen AL, Lindenberg S, Smith S.
Possible factors affecting the development of oocytes in in-vitro maturation.

Mikkelsen AL, Andersson A-M, Skakkebæk, NE, Lindenberg S.
Basal concentrations of oestradiol may predict the outcome of in-vitro maturation in regularly menstruating women.
Human Reprod. 2001; 16, no. 5: 862-867.

Mikkelsen AL, Lindenberg S.
Human Reprod. 2001; 16, no. 8: 1717-1718.

Mikkelsen AL, Høst E, Lindenberg S.
Incidence of apoptosis in granulosa cells from immature human follicles.


Mikkelsen AL, Lindenberg S, Smith SD Factors affecting the development of oocytes in IVM. Human Reprod. 2000, 15 (suppl. 5), 11-17


Cortes D, Thorup J, Lindenberg S, Visfeldt J. Infertility despite surgery for cryptorchidism in childhood can be classified by patients with normal or elevated follicle-stimulating hormone and identified at orchidopexy. BJU Int. 2003 May;91(7):670-4.


Hanne Udengaard, Svend Lindenberg

Mikkelsen AL, Ravn SH, Munk M., Lindenberg S. Health status and development of children born after in vitro maturation of immature oocytes. Submitted RBMOnline

Petersen A, Mikkelsen AL, Lindenberg S.


DM Ottosen, Johnny Hindkjær, Svend Lindenberg, Hans Jakob Ingerslev.


A prospective randomized multicentre study comparing vaginal progesterone gel and vaginal micronized progesterone tablets for luteal support after in vitro fertilization/intracytoplasmic sperm injection

Low Ovarian Stimulation Using Tamoxifen/FSH Compared to Conventional IVF: A Cohort Comparative Study in Conventional IVF Treatments
FB Lindenberg, GJ Almind, S Lindenberg Reprod Sys Sexual Disorders S 5, 2, 2013

New approach in patients with polycystic ovaries, lessons for everyone
S Lindenberg
Fertility and Sterility 1’ 2013

Differential expression of inflammation-related genes in the ovarian stroma and granulosa cells of PCOS women
J Schmidt, B Weijdegárd, AL Mikkelsen, S Lindenberg, L Nilsson, ... Molecular human reproduction 20 (1), 49-58, 2013

Female asthma has a negative effect on fertility: what is the connection?
E Juul Gade, SF Thomsen, S Lindenberg, V Backer, ISRN allergy 2014 1 2014

Asthma affects time to pregnancy and fertility: a register-based twin study
EJ Gade, SF Thomsen, S Lindenberg, KO Kyvik, S Lieberoth, V Backer European Respiratory Journal 43 (4), 1077-1085, 6 2014

The effect of liraglutide on weight loss in women with polycystic ovary syndrome: an observational study
CB Rasmussen, S Lindenberg, Frontiers in endocrinology 5, 140, 15 2014

Female asthma has a negative effect on fertility: what is the connection?
E Juul Gade, SF Thomsen, S Lindenberg, V Backer, ISRN allergy 2014 1 2014

Lower values of VEGF in the endometrial lining are a possible cause of reduced fertility in asthmatic patients
EJ Gade, SF Thomsen, S Lindenberg, N Macklon, V Backer European Respiratory Journal 44 (Suppl 58), P4076, 2014

Lower values of VEGF in endometrial secretion are a possible cause of subfertility in non-atopic asthmatic patients
EJ Gade, SF Thomsen, S Lindenberg, NS Macklon, V Backer Journal of Asthma 52 (4), 336-342, 1 2015

A multi-centre phase 3 study comparing efficacy and safety of Bemfola® versus Gonal-f® in women undergoing ovarian stimulation for IVF
M Rettenbacher, AN Andersen, JA Garcia-Velasco, M Sator, P Barri, ... Reproductive biomedicine online 30 (5), 504-513, 6 2015

Method for the preparation of micro-RNA and its therapeutic application
F Vein, S Lindenberg US Patent 9,078,914 2015

Fertility outcomes in asthma: a clinical study of 245 women with unexplained infertility
**Chapters in books**


Mikkelsen Al. In vitro maturation. Kapitel i nordisk lærebog om IVF.

Lindenberg S. Endometrial Cavity Fluid Collection Aspiration at time of ET. Dr. Gautam Allahbadia’s forthcoming monogram on “EMBRYO TRANSFER” 2006 Rotunda - The Center For Human Reproduction India


**Posters/Lectures**


Gabrielsen A. PGD – en undersægelse af 63 biopserede embryoer med dårlig embryo score. Foredrag. Dansk Fertilitetsskabs årsmøde, Odense, Danmark 1999

Gabrielsen A. Hvad betyder modning, kernetransplantation, cytoplasmadonation Foredrag. Organon’s fertilitetsskole, Herlev, Danmark 1999

Gabrielsen A. Hvad betyder modning, kernetransplantation, cytoplasmadonation Foredrag. Organon’s fertilitetsskole, Skejby, Danmark 1999

Gabrielsen A. Mandlig infertilitet i dag Foredrag. Organon’s fertilitetsskole, Herlev, Danmark 1999

Gabrielsen A Assisted Hatching Foredrag. Dansk Fertilitetsskabs årsmøde, Odense, Danmark 2000

Gabrielsen A, Palmstiarna M. Embryokvalitet Embryoscore, ZPTV, symmetri i embryoer Foredrag. Organon’s fertilitetsskole, Skøjby, Danmark 2000


Mikkelsen AL, Lindenberg S. Timing of aspiration promotes pregnancy rate in IVM: the impact of the concentration of oestradiol and inhibin A. Foredrag. ESHRE 16th Annual meeting, Bologna, June 2000.


Mikkelsen AL. Clinical aspects of IVM. XV Nordic IVF Meeting Helsingør, Denmark 2003.


Munk M


Munk M


Munk M


Etiske dilemmaer ved reagensglasbehandling. Foredrag. Nordisk Medicinsk laboratorie Kongres, Denmark 2001.10.30


Mikkelsen AL. Clinical aspects of IVM. XV Nordic IVF Meeting Helsingør, Denmark 2003.


Teaching


WHEN IS ENOUGH ENOUGH?
Pregnancy rate and cost-effectiveness of 3 times homologous intrauterine insemination (IUIH) vs. 1 time mild ovarian stimulation IVF.

HERAFTER 60 POSTERS IN INTERNATIONAL CONFERENCES ON IVM/IVF

Mikkelsen AL. ESHRE Campus Workshop, GRECOT meeting. Harvesting and freezing of ovarian and testicular tissue. Invited speaker and participant in the workshop for 2 days. November 2000


Mikkelsen AL. IVM Workshop forlæsser og underviser på i alt 3 internationale kurser om IVM.


A.L.Mikkelsen, S.Lindenberg. Timing of aspiration promotes pregnancy rate in IVF, the impact of the concentration of estradiol and inhibin A. 16th Annual meeting (ESHRE), Bologna, 2000.


S. Lindenberg. Videnregnskab i en moderne gynaekologisk afdeling. DSOG efterårsmøde 17 – 18 November 2000


S.Lindenberg. Pædiplantatorisk diagnose, terapeutisk kloning. DSOG forårsmøde 28 april 2001


S. Lindenberg. Forventninger til afdelingsledelse og niveauet under afdelingsledelse på Amtssygehuset i Herlev: opgaver, kvalifikationer og værdier. ALF-møde og seminar for Herlev Amtssygehus. 20.01.2001


Svend Lindenberg invited speaker, A review and teaching session for 2 days in IVM at the Taipei University Center. Invited by Taiwanese Society for reproductive Medicine. 12. September 2005

Svend Lindenberg invited speaker, IVM in all aspects. The Jordanian Society for Fertility and Genetics, Workshop at Fahran Hospital. 7-9/9 2005

P. Humaidan, L. Bugum, M. Bugum, F. Hald, I Agerholm, J Blåberg, C. Yding Andersen, S. Lindenberg, ESHRE, Copenhagen 2005 CRASH-A better protocol for stimulation of the low responder patient?

Lindenberg S. IVM, Why, history, recommended criteria. IVM – Workshop Universitätsfrauenklinik Lübeck, 28. novebere 2005

Lindenberg S. IVM, the golden standard and future. IVM – Workshop Universitätsfrauenklinik Lübeck, 29. novebere 2005

Lindenberg S. Stamcelleforskning. Key Note lecture, Forskningsdag ved Amtssygehuset i Herlev November 27. 2005

Mikkelsen AL, Ravn SH, Munk M. Lindenberg S. Health status and development of children born after in vitro maturation of immature oocytes Poster, Forskningsdag ved Amtssygehuset i Herlev November 27. 2005

A. Petersen, A.L. Mikkelsen, S. Lindenberg. Poster, Forskningsdag ved Amtssygehuset i Herlev November 27. 2005 Oxygen tension and embryo development


DM Ottosen, Johnny Hindkær, Svend Lindenberg, Håns Jakob Ingerslev. Murine pre-embryooxygen consumption and developmental competence. ESHRE Lyon, 2007

Svend Lindenberg. In vitro fertilisation in the future. IFFS meeting Durban, SA 2007

Erik Hest, DNA Strand Breaks in Human Spermatozoa, A possible new tool in ART. Thesis, Copenhagen University, Denmark, 2011

15th World Congress on In Vitro Fertilization, 4th World Congress on In Vitro Maturation Geneve, Switzerland Effect of maturation in vitro on spindle morphology in human oocytes Mette Munk, Svend Lindenberg april 2009.

ESHRE Amsterdam: Effect of low oxygen tension on human blastocyst culture. Mette Munk, Svend Lindenberg.


2. Congress of the society of Reproductive Medicine Oct. 2009 IVM laboratory aspects, Mette Munk, Svend Lindenberg

Nordisk IVF Meeting 2009 august: Spindel view in human oocytes. Mette Munk

Nordisk IVF Meeting 2009 august: Patient Friendly approach to oocyte pick-up procedure. Suzan Lenz, Svend Lindenberg

Since then more than 30 international invited session in ART given by Svend Lindenberg from 2008 to 2015
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 ACQUIRED INTERNATIONAL

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

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
Inventor: LINDENBERG SVEND (DK); MIKKELSEN ANNE LIS (DK)  Applicant: MEDI CULT AS (DK)
EC: IPC: G01N33/68 ; G01N33/74
Publication info: CZ20004629 - 2001-06-13

7 EP2416789 - METHOD AND DEVICE FOR TREATMENT OF CONDITIONS ASSOCIATED WITH INFLAMMATION OR UNDESIRABLE ACTIVATION OF THE IMMUNE SYSTEM

8 WO2011029903 - METHOD FOR THE PREPARATION OF MICRO-RNA AND ITS THERAPEUTIC APPLICATION

9. LONG ACTING BIOLOGICALLY ACTIVE LUTEINIZING HORMONE (LH) COMPOUND
P NORDKILD, S LINDENBERG, C ANDERSEN, K ANDERSEN

10. METHOD FOR THE PREPARATION OF MICRO-RNA AND ITS THERAPEUTIC APPLICATION

11. Long acting biologically active luteinizing hormone (lh) compound
P NORDKILD, S Lindenberg, CY Andersen, KV Andersen

12. METHOD AND DEVICE FOR TREATMENT OF CONDITIONS ASSOCIATED WITH INFLAMMATION OR UNDESIRABLE ACTIVATION OF THE IMMUNE SYSTEM

13. METHOD FOR THE PREPARATION OF MICRO-RNA AND ITS THERAPEUTIC APPLICATION

14. METHOD AND DEVICE FOR TREATMENT OF CONDITIONS ASSOCIATED WITH INFLAMMATION OR UNDESIRABLE ACTIVATION OF THE IMMUNE SYSTEM
S LINDENBERG, F VELIN, WO Patent 2,010,118,979 2010

15. Method for the preparation of micro-rna and its therapeutic application

16. DOUBLE CANNULA SYSTEM FOR ANAESTHETIC NEEDLE
S LINDENBERG, WO Patent 2,010,054,860,2010
**Website activities**

www.copenhagenfertilitycenter.com

**Copenhagen Fertility Center activities**

In total Copenhagen Fertility Center perform more than 3000 treatment cycles every year including IVF/ICSI/IUI and related treatments. This makes Copenhagen Fertility Center one of the largest Scandinavian ART centers.

Copenhagen Fertility Center hosted the ISMAAR congress 2012 and was the host for the ISIVF 2015 in Copenhagen.

Svend Lindenberg  
Professor dr. med

Suzan Lenz, dr. med.  
Scientific director.