

EAA Andrology Training Centre  
Centre Report

**2023**

## CENTRE REPORT

### History of Centre

*See separate paper*

### Organization of Centre

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ANOVA is the name of a section of the department of Endocrinology focused on Andrology, Sexual Medicine, and Trans Medicine. The center is thus a multi-disciplinary unit within the dept of Endocrinology at Karolinska University Hospital. Acting director of ANOVA since 2019 is psychologist Katarina Görts Öberg with a Managerial Group consisting of Lars Björndahl, Mats Holmberg, Josephine Savard, Ulrika Åkerstedt, Maria Ilestam, Jussi Jokinen and Rebecka Holmberg as support.

*The ORGANIZATIONAL CHART (below) describes the placement of ANOVA within the Karolinska University Hospital and Karolinska Institutet.*

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### Educational activities

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For medical students from Karolinska Institutet, one course in Sexual Medicine and one in Andrology and Sexual Medicine is given by ANOVA each semester. The course corresponds to three weeks fulltime studies and 20-25 participants.

The center also offers medical students a possibility of doing their one semester research project that is mandatory in the Swedish medical education. We have so far had three students from Karolinska Institute doing their full-time project.

Graduate courses are given for residents in psychiatry, general medicine, urology, and endocrinology.

Residents in internal medicine, endocrinology, psychiatry, and gynecology (reproductive medicine) are offered 2-3 months clinical training during their rotation. MDs under training in other specialties receive short term (1-2 weeks) clinical andrological training at the Centre.

Currently, three endocrinologists under clinical training to become EAA certified Andrologist.

There have been yearly courses on Basic Semen Analysis (“ESHRE course”) also as EAA/Andronet Training School in Basic Semen Examination. The center was also active in the revision of the 2021 WHO semen examination manual as well as the development of an ISO standard for Basic Semen Examination, with the same scientific base as the revised WHO manual.

Specialists from the center regularly contribute to courses on Andrology, Sexual Medicine, and Transgender Medicine for different professions in the Stockholm region and in other regions of Sweden.

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The center is a co-arranger of two, yearly courses in Andrology. One for doctors under training and one for health care personnel that meet men with sexual problems in their profession. In the fall of 2023, the center starts a new, national, online education in trans medicine for professionals. ANOVA has also been a co-organizer of an EAA-endorsed course in Andrological Endocrinology in Copenhagen in 2023.

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## **Research activities**

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The laboratory continuously evaluates techniques for routine examination of semen. In a collaboration with the Royal Institute of Technology in Stockholm, new principles of barrier methods for contraception are investigated, with the Metropolitan University of Oslo studies on Deep Learning for AI assessment of human sperm motility, and with the Department of Neurobiology at the Karolinska Institute studies on cholinergic functions with spermatozoa as biological model. Our laboratory's access to clinical samples enables in vitro studies of potential contraceptive barrier as well as functional studies of sperm motility and other sperm properties of relevance for fertilization.

The Center is in several national and international collaborations with the purpose to propagate awareness of and knowledge in andrology, among them development of training and research collaboration in the ANDRONET COST Action CA20119).

The center is involved in several studies on the effect of cross-sex hormonal treatment in transgender persons. In this we cooperate with institutions and hospitals outside Karolinska and with a group at UCLA. At present time we are running 6 prospective studies in the transgender group, all based on the before and after treatment concept. The studies investigate metabolic, epigenetic, cardiovascular changes, brain morphology changes, early mental effects, changes in immunological marker expression, changes in experimental pain perception and changes in the prevalence of periodontitis.

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## **Clinical activities**

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The center has approximately 21000 patient visits annually. In general, investigation of the infertile couple is coordinated by a gynecologist specialized in infertility. The gynecologist performs a basic investigation of the female and refers the male for semen analysis. If there is any deviation in the semen quality the male is referred to ANOVA for accredited semen analysis. Our laboratory is now integrated in the public health care as the only laboratory in the Stockholm Region accredited for all basic semen examination modalities according to ISO 15189 and ISO 23162 (Swedac, [www.swedac.se](http://www.swedac.se); accreditation #1886).

This further investigation at ANOVA follows an algorithm based on results from the semen analysis. Approximately 70% of the samples falls within the

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acceptable limits (>39 million sperms/sample and >39% progressively motile sperms). In case of findings below these limits, the male is directly transferred within ANOVA for further investigations. If microscope assessment indicates a possible sperm tail disorder (immotile cilia syndrome, ciliary dyskinesia) electron microscopic is performed (Karolinska Institutet Electron Microscopy Unit, Huddinge). Laboratory findings indicating possible Ejaculatory Duct Obstruction can be further studied with split-ejaculate investigation and lead to recommendations for alternative techniques for sperm collection for Medically Assisted Reproduction (IUI, IVF, IVF-ICSI).

Prior to the following visit with an andrologist at ANOVA additional assessments may be ordered as indicated, these may include genetic tests, gonadal axis assessment and a general health screening.

The continued investigation includes a physical examination. Testicular ultrasound and other additional investigations are performed as indicated by findings and medical history. These additional investigations may include blood test of reproductive hormones and genetic analyses (e.g. karyotype, Y chromosome microdeletion, cystic fibrosis and ciliary dyskinesia). Some investigations are ordered from the laboratory and some at a visit with an andrologist, depending on the medical history and semen analysis findings.

The public health care administration in the Stockholm region has demanded that if subnormal semen analysis results have been found, any center obtaining public subsidies for infertility treatment should offer the man a full andrological investigation. This investigation is provided by ANOVA within the public health care. Thus, the center has regained the possibility to offer andrological examinations that can facilitate the most proper fertility treatment as well as examination of men from infertile couples to determine potential underlying causes for the impaired semen quality. The number of examined men from infertile couples have increased steadily. Patients are referred from any area in Sweden.

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## Name and address of Centre

ANOVA – Andrology, Sexual Medicine, Trans Medicine  
Karolinska University Hospital, Stockholm Sweden  
Norra Stationsgatan 69, level 3 and 4  
S-171 76 Stockholm  
Sweden

### Type of Centre

University   
University Hospital   
Private Centre   
Other (please specify) \_\_\_\_\_

### 1a. Managerial body

**Acting Director** Katarina Görts Öberg  
**Laboratory Andrology** Lars Björndahl  
**Clinical Andrology** Mats Holmberg  
**Psychiatry** Josephine Savard  
**Psychology** Maria Ilestam  
**Nursing** Ulrika Åkerstedt  
**Research** Jussi Jokinen  
**Administration** Rebecka Holmberg

### 2a. Clinical responsible

Mats Holmberg  
Academician  Affiliated Member  Clinical Andrologist

### 2b. Clinical responsible

Lars Björndahl  
Academician  Affiliated Member  Clinical Andrologist

### 2c. Clinical responsible

Josephine Savard  
Academician  Affiliated Member  Clinical Andrologist

### 3. Present Staff (*Senior Scientists*)

1) Name Lars Björndahl  
Degree MD, PhD  
Specialty Clin Chem  
Academician  Affiliated Member  Clinical Andrologist

2) Name Mats Holmberg  
Degree MD, PhD  
Specialty Endocrinology / Internal Medicine  
Academician  Affiliated Member  Clinical Andrologist

**Insert any additional staff below (if required)**

MD/Biologists/Chemists

1) Name Anastasios Fylaktos  
 Degree MD  
 Specialty Endocrinology  
 Full time/part time Full time  
 Academician  Affiliated Member  Clinical Andrologist

2) Name Stefan Arver  
 Degree MD, PhD, Associate Professor  
 Specialty Endocrinology  
 Full time/part time Part time  
 Academician  Affiliated Member  Clinical Andrologist

3) Name Lars Henningsohn  
 Degree MD, PhD, Associate Professor  
 Specialty Urology  
 Full time/part time Part time  
 Academician  Affiliated Member  Clinical Andrologist

4) Name Marie Degerblad  
 Degree MD, PhD  
 Specialty Endocrinology  
 Full time/part time Part time  
 Academician  Affiliated Member  Clinical Andrologist

5) Name Jussi Jokinen  
 Degree MD, PhD, Professor  
 Specialty Psychiatry  
 Full time/part time Part time  
 Academician  Affiliated Member  Clinical Andrologist

6) Name Cecilia Dhejne  
 Degree MD, PhD  
 Specialty Psychiatry  
 Full time/part time Full time  
 Academician  Affiliated Member  Clinical Andrologist

7) Name Josephine Savard  
 Degree MD PhD

Specialty Psychiatry  
Full time/part time Full time  
Academician  Affiliated Member  Clinical Andrologist

8) Name Angelos Kalogiannis  
Degree MD  
Speciality Endocrinology  
Full time/part time Part time  
Academician  Affiliated Member  Clinical Andrologist

10) Name Salwan Maqdasy  
Degree MD, PhD  
Speciality Endocrinologist  
Full time/part time Full time  
Academician  Affiliated Member  Clinical Andrologist

### Psychologists

- 1) Name Katarina Görts Öberg, PhD
- 2) Name Jonas Hallberg, PhD
- 3) Name Filip Landsbo
- 4) Name Charlotte Sparre
- 5) Name Marie Gut
- 6) Name Sara Brodin
- 7) Name Maria Ilestam
- 8) Name Marta Piwowar
- 9) Name Markus Byström
- 10) Name Robert Adebahr
- 11) Name Hanna Bergman
- 12) Name Linda Karlgren
- 13) name Eira Järild
- 14) Name Johanna Masche-No

### Psychotherapists

- 1) Name Katarina Görts Öberg, PhD
- 2) Name Elin Zamore-Söderström

### Counsellors/Social health workers

- 1) Name Camilla Hatt
- 2) Name Hanna Håkansson

### PhD Students

- 1) Name Anastasios Fylaktos, Endocrinologist.  
*Potency enhancing drugs; associations with physical and psychiatric disorders and sexual offence.* Main supervisor: Cecilia Ekeus, Uppsala

- University. Co-supervisors: Mats Holmberg and Jussi Jokinen, ANOVA
- 2) Name Anders Hagelin, Resident in Endocrinology. *Cross-sex hormonal treatment and the impact on gender associated traits*. Main supervisor: Mats Holmberg, ANOVA. Co-supervisors: Katarina Görts Öberg, Jussi Jokinen, ANOVA and Nils Landegren, Uppsala University
- 3) Name Markus Byström, Psychologist *Mental health in gender minorities - Psychosocial predictors and effects of psychological interventions*. Main supervisor: Hanna Sahlin, Stockholm University. Co-supervisors: Maral Jolstedt, Richard Bränström and Hedvig Engberg, Karolinska Institute. Cecilia Dhejne, ANOVA
- 4) Name Petr Houska, MD, Specialist in Laboratory Medicine *Studies on human sperm chromatin stability and DNA damage*. Main supervisor: Lars Björndahl, ANOVA. Co-supervisors: Ulrik Kvist, Johan Flanagan, Rebecka Holmberg, ANOVA
- 5) Name Marta Piwowar, Psychologist. *Compulsive sexual behavior disorder – towards early detection and targeted treatments*. Main supervisor: Josephine Savard, ANOVA. Co-supervisors: Linda Jonsson, Marie Cederschiölds Högskola, Katarina Görts Öberg and Jussi Jokinen, ANOVA
- 6) Name Roberth Adebahr, Psychologist *Help-seeking men with sexual interest in children: clinical presentation and treatment*. Main supervisor: Jussi Jokinen. Co-supervisors: Katarina Görts Öberg, Christoffer Rahm and Josephine Savard, ANOVA

### Nurses

- 1) Name Susanne Jarlvik Alm
- 2) Name Elin Blick
- 3) Name Gabriella Johansson
- 4) Name Long Phan
- 5) Name Ulrika Åkerstedt
- 6) Name Pia Jaensson (assistant nurse)

### Skin Therapists

- 1) Name Hanadi Haddad
- 2) Name Melissa Siahtiri
- 3) Name Yalda Rostami

## Biomedical Scientists

1) Name	Rebecka Holmberg, BMS, PhD
2) Name	Magdalena Larsson Chatziantonis, BMS
3) Name	Annalia Cadenas-Peréz, BMS
4) Name	Tayyebah Jafari, BMS

## Administrative Personnel

1) Name	Rebecka Holmberg, PhD, chief of administration
2) Name	Elisa Ruz
3) Name	Frida Avelin
4) Name	Lena Fors
5) Name	Linda Cederlund
6) Name	Suzanne Grenell
7) Name	Charlotta Lövgren
8) Name	Viviana Charafi
9) Name	Jenny Borgström
10) Name	Anette Sarnyai Lindgren
11) Name	Helena Sjöström
12) Name	Lena Lindberg

## 4. Clinical Activity

A. Outpatients: Consultations per year in the last 3 years (these numbers are approximations since our system does not allow for automatic delivery of exact number of each diagnosis)

<b>Andrology</b>	2020	2021	2022
New patients	2200	2300	2400
Follow-up patients	3500	3500	3400
<b>Entire ANOVA</b>	17 329	19 013	19 884
New patients	3300	3400	3500
Follow-up patients	12000	12000	12000

<b>Type of patients in the last years (%)</b>	2020	2021	2022
Infertility	17	19	17
Erectile dysfunction	13	13	10
Hypogonadotropic Hypogonadism	28	23	17
Klinefelter	1	1	2
Gynecomastia	<1	<1	<1
Varicocele	<1	<1	<1
Cryptorchidism	<1	<1	<1
Male sex accessory gland infections	1	1	<1
Testicular tumors	<1	<1	<1

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Disorders of gender identity	29	30	30
Other	11	14	24

Patients are classified according to referral category and diagnostic classification (ICD-10).

## B. Ultrasound (testis, penile, prostate) \*

	2020	2021	2022
Total	12	15	18
Controls			

\* Performed at ANOVA and the Department of Radiology

## C. Andrological surgery procedures

	2020	2021	2022
Testicular biopsies	0	0	0
Varicocele ligation	0	0	0
Prostate biopsies	0	0	0
BPH	0	0	0
Prostate cancer	0	0	0
Vasectomy	0	0	0
Vaso-vasostomy	0	0	0
Other	0	0	0

## 5. A. Andrology laboratory activity

	2020	2021	2022
Semen examinations	1515	1761	1819
Sperm antibodies	0	0	0
Seminal markers (zinc, fructose, alfa glucosidase)	1510	1758	1812

## 5. B. Andrology laboratory activity

Sperm banking donors                      Yes                       No

Sperm banking cancer patients                      Yes                       No

<i>If yes:</i>			
	2017	2018	2019
Number of samples			

Sperm banking for men in couples expecting IVF / ICSI treatment is handled by the Reproductive Medicine Unit (Gynecology Clinic). This also concerns sperm banking for boys and men undergoing chemotherapy or radiotherapy due to cancer.

The only official commission to ANOVA is to provide self-financed sperm cryopreservation before sterilization (vasectomy).

5. C. Histopathological evaluation of biopsies Yes  No

5. D. Reproductive Hormones Assays Yes  No

The assays are performed at the department of clinical chemistry at the Karolinska University Hospital.

If yes, please specify type of assays and number of samples in the last year

Reproductive Hormones Assays

S-FSH immunochemistry, electrochemiluminescence, ca 2500

S-LH immunochemistry, electrochemiluminescence, ca 2500

S-Testosterone immunochemistry, electrochemiluminescence, ca 5000

S-SHBG immunochemistry, electrochemiluminescence, ca 2300

Prolactin, low molecular ca 200, ordinary ca 2200, immunochemistry, electrochemiluminescence

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5. E. Y chromosome microdeletions according to EAA/EMQN guidelines Yes  No

*If yes* number of tests in the past year

176

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Participation to the EAA quality control scheme? Yes  See note<sup>1</sup> No

*If no*, specify if available in another lab of the same hospital<sup>1</sup> Yes  No

Blood karyotyping Yes  No

*If no*, specify if available in another lab of the same hospital Yes  No

Other genetic tests performed at the department of clinical genetics at the Karolinska University Hospital at the request of ANOVA:(please specify)

FISH sperm

Pre-implantation genetic diagnosis

Amniotic fluid karyotyping

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## 6. Collaborations with other Clinical Units of the University/Hospital

IVF Unit Yes  No

*If yes* please specify: Reproductive Medicine, Dept of Gynecology

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<sup>1</sup> 2021-22 outsourced to Laboratory of Clinical Genetics, Sahlgrenska Academy, Göteborg, due to staff shortage. From 2023 restarted in ANOVA after verification and validation. EAA/EMQN to be resumed

Urology Clinic	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
Endocrine Clinic	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
Genetics Lab at Karolinska University Hospital. Do our chromosome analysis and CT-mutations and more.	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
Pediatric Unit. Referrals from Pediatric unit, DSD, Klinefelter, sperm test, transgender population. We participate in Karolinska's DSD-team together with pediatricians	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
Central Hospital Laboratory. All ordinary blood tests are analyzed there	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
Private Centers	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>

**If yes** please specify: Urology, Gynecology, General Practitioner

### 7. Clinical teaching activity

Duration of training (years):

	Number
A: Trainees in the last five years (external trainees from Saudi Arabia and Switzerland)	3
B: Trainees who passed EAA-ESAU\exam for Clinical Andrologist in the last 5 yrs	0
C: Trainees working in the center preparing to pass the EAA-ESAU examination	3
D: PhD Students (all PhD students at ANOVA receive clinical training designed according to their professions)	6
E: Medical Students (auscultation during andrology curriculum, 3-4 weeks)	50
F: Other students (MSc) (1-2 weeks)	10

**8. Formal Andrology teaching program** Yes  No

**If yes:** specify duration (years/months): Years  Months

	Hours of formal teaching per year	Professional training (weeks/months)
Medical Students	200	2-3 months
PhD Students	200	
Post Graduate students	60	

Trainees	30	
Other degrees (please specify)		

### 9. Research Activity (maximum 1 page)

According to above. *The full list of publications (years 2018-2023) is presented at the end of this report.*

### 10. Research Funding

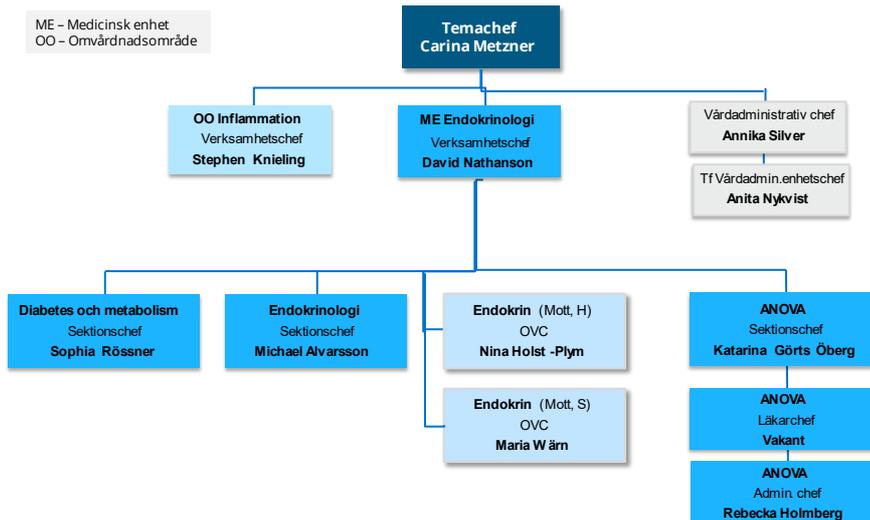
Year	2020	2021	2022
Total amount (€)	~400,000	~400,000	~400,000
Funding Source(s)	Government, Local Government, Foundations, University, University Hospital, Industry		

## ORGANIZATION CHARTS

Karolinska University Hospital is organized in 6 different Themes. The Theme Inflammation and Ageing is organized in 5 different Medical Units. ANOVA is part of the Medical Unit (ME) Endocrinology as described below.

### ME Endokrinologi

#### Tema Inflammation och Åldrande



6



**Karolinska University Hospital**

Director: Björn Zoega

Medical Unit: Endocrinology

Head: David Nathansson

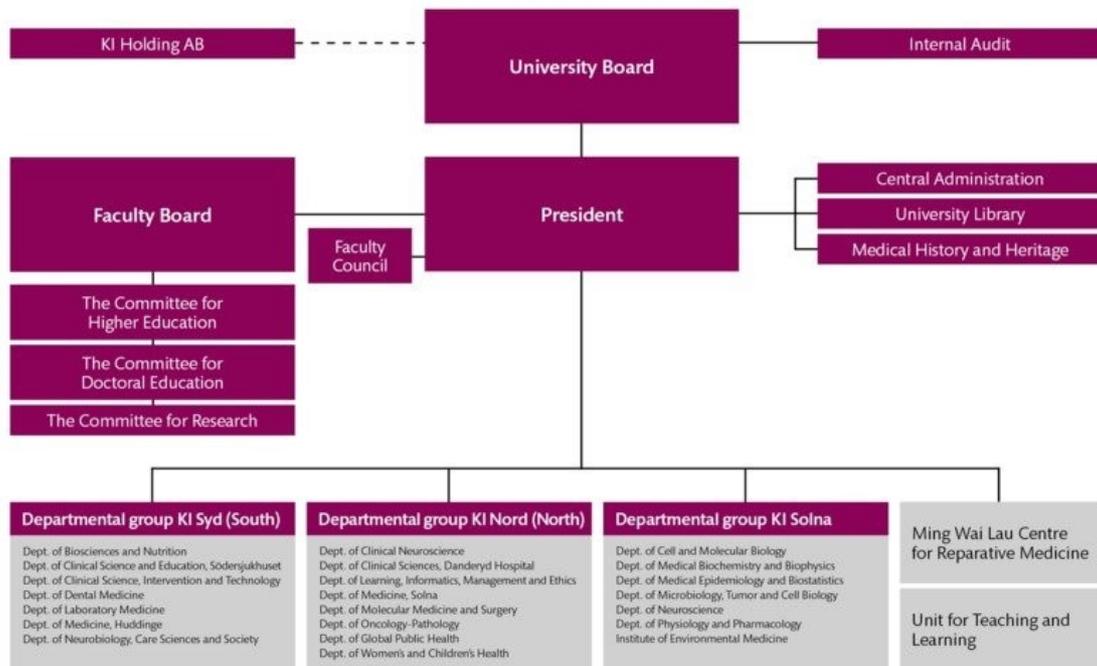
**Theme: Inflammation and Ageing**

Head: Carina Metzner

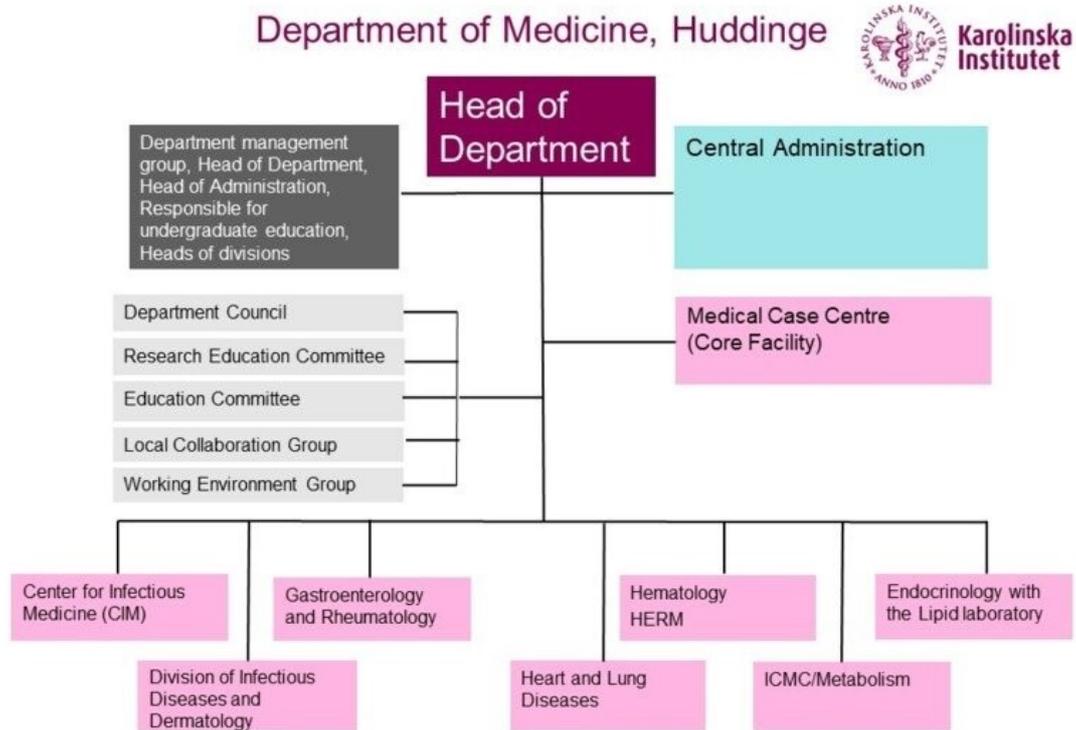
Section: ANOVA

Acting Director: Katarina Görts Öberg

**Karolinska Institutet**



**Department of Medicine, Huddinge**



**Head of Department:** Petter Höglund

**Head of Section:** Endocrinology and Diabetes: Mikael Rydén

**Unit:** ANOVA: Jussi Jokinen

**CENTRE PHOTOS**

**4th floor Main waiting area, Lobby**



**4th floor 2nd waiting room**



4<sup>th</sup> floor. Room for conference and group meetings



4<sup>th</sup> floor. Administrative corridor



**4<sup>th</sup> floor. Main laboratory**



**4<sup>th</sup> floor. Research and biochemistry laboratory**



3<sup>rd</sup> floor. Lunch room



**3<sup>rd</sup> floor.** Lecture room



## Publications 2018 – 2023

### Infertility

1. Thakur, Hasooni, Gera, Mitra, Björndahl & Darreh-Shori, *Presence of key cholinergic enzymes in human spermatozoa and seminal fluid*. *Biology of Reproduction*, 2023. DOI: 10.1093/biolre/ioad127. **JIF 3.6**
2. Haugen, Witczak, Hicks, Bjorndahl, Andersen & Riegler, *Sperm motility assessed by deep convolutional neural networks into WHO categories*. *Sci Rep*, 2023. **13**(1): p. 14777. DOI: 10.1038/s41598-023-41871-2. PMID: PMC10484948. **JIF 4.6**
3. Björndahl, Esteves, Ferlin, Jørgensen & O'Flaherty, *Improving standard practices in studies using results from basic human semen examination*. *Andrology*, 2023. DOI: 10.1111/andr.13504. **JIF 4.5**
4. Wang, Mbizvo, Festin, Bjorndahl, Toskin, other Editorial Board Members of the & Processing of Human, *Evolution of the WHO "Semen" processing manual from the first (1980) to the sixth edition (2021)*. *Fertil Steril*, 2022. **117**(2): p. 237-245. DOI: 10.1016/j.fertnstert.2021.11.037. PMID: PMC8842884. **JIF 6.7**
5. Schimpf, Caldas-Silveira, Katchan, Vigier-Carriere, Lantier, Nachmann, Gidlof, Jonasson, Bjorndahl, Trombotto, Druart & Crouzier, *Topical reinforcement of the cervical mucus barrier to sperm*. *Sci Transl Med*, 2022. **14**(673): p. eabm2417. DOI: 10.1126/scitranslmed.abm2417. **JIF 17.1**
6. Rimmer, Howie, Anderson, Barratt, Barnhart, Beebeejaun, Bertolla, Bhattacharya, Bjorndahl, Bortoletto, Brannigan, Cantineau, Caroppo, Collura, Coward, Eisenberg, De Geyter, Goulis, Henkel, Ho, Hussein, Huyser, Kadijk, Kamath, Khashaba, Kobori, Kopeika, Kucuk, Lujan, Matsaseng, Mathur, McEleny, Mitchell, Mol, Murage, Ng, Pacey, Perheentupa, Du Plessis, Rives, Sarris, Schlegel, Shabbir, Smiechowski, Subramanian, Sunkara, Tarlarzis, Tuttelmann, Vail, van Wely, Vazquez-Levin, Vuong, Wang, Wang, Zini, Farquhar, Niederberger & Duffy, *Protocol for developing a core outcome set for male infertility research: an international consensus development study*. *Hum Reprod Open*, 2022. **2022**(2): p. hoac014. DOI: 10.1093/hropen/hoac014. PMID: PMC8990106. **JIF 8.3**
7. Bjorndahl, Kirkman Brown, other Editorial Board Members of the & Processing of Human, *The sixth edition of the WHO Laboratory Manual for the Examination and Processing of Human Semen: ensuring quality and standardization in basic examination of human ejaculates*. *Fertil Steril*, 2022. **117**(2): p. 246-251. DOI: 10.1016/j.fertnstert.2021.12.012. **JIF 6.7**
8. Bjorndahl, Barratt, Mortimer, Agarwal, Aitken, Alvarez, Aneck-Hahn, Arver, Baldi, Bassas, Boitrelle, Bornman, Carrell, Castilla, Cerezo Parra, Check, Cuasnicu, Darney, de Jager, De Jonge, Drevet, Drobnis, Du Plessis, Eisenberg, Esteves, Evgeni, Ferlin, Garrido, Giwercman, Goovaerts, Haugen, Henkel, Henningsohn, Hofmann, Hotaling, Jedrzejczak, Jouannet, Jorgensen, Kirkman Brown, Krausz, Kurpisz, Kvist, Lamb, Levine, Loveland, McLachlan, Mahran, Maree, Martins da Silva, Mbizvo, Meinhardt, Menkveld, Mortimer, Moskovtsev, Muller, Munuce, Murtatori, Niederberger, O'Flaherty, Oliva, Ombelet, Pacey, Palladino, Ramasamy, Ramos, Rives, Roldan, Rothmann, Sakkas, Salonia, Sanchez-Pozo, Sapiro, Schlatt, Schlegel, Schuppe, Shah, Skakkebaek, Teerds, Toskin, Tournaye, Turek, van der Horst, Vazquez-Levin, Wang, Wetzels, Zeginiadou & Zini,

- Standards in semen examination: publishing reproducible and reliable data based on high-quality methodology.* Hum Reprod, 2022. **37**(11): p. 2497-2502.DOI: 10.1093/humrep/deac189. PMID: PMC9627864. **JIF 6.1**
9. Bjorndahl, *A paradigmatic shift in the care of male factor infertility: how can the recommendations for basic semen examination in the sixth edition of the WHO manual and the ISO 23162:2021 standard help?* Reprod Biomed Online, 2022. **45**(4): p. 731-736.DOI: 10.1016/j.rbmo.2022.03.011. **JIF 4.0**
  10. Kurek, Akesson, Yoshihara, Oliver, Cui, Becker, Alves-Lopes, Bjarnason, Romerius, Sundin, Noren Nystrom, Langenskiold, Vogt, Henningsohn, Petersen, Soder, Guo, Mitchell, Jahnukainen & Stukenborg, *Spermatogonia Loss Correlates with LAMA 1 Expression in Human Prepubertal Testes Stored for Fertility Preservation.* Cells, 2021. **10**(2).DOI: 10.3390/cells10020241. PMID: PMC7911157. **JIF 6.0**
  11. Esteves, Lombardo, Garrido, Alvarez, Zini, Colpi, Kirkman-Brown, Lewis, Bjorndahl, Majzoub, Cho, Vendeira, Hallak, Amar, Cocuzza, Bento, Figueira, Sciorio, Laursen, Metwalley, Jindal, Parekattil, Ramasamy, Alviggi, Humaidan, Yovich & Agarwal, *SARS-CoV-2 pandemic and repercussions for male infertility patients: A proposal for the individualized provision of andrological services.* Andrology, 2021. **9**(1): p. 10-18.DOI: 10.1111/andr.12809. PMID: PMC7267121. **JIF 4.5**
  12. de la Motte, Custovic, Tapper, Arver, Martling & Buchli, *Effect of preoperative radiotherapy for rectal cancer on spermatogenesis.* Br J Surg, 2021. **108**(7): p. 750-753.DOI: 10.1093/bjs/znab019. **JIF 9.6**
  13. Campbell, Lotti, Baldi, Schlatt, Festin, Bjorndahl, Toskin & Barratt, *Distribution of semen examination results 2020 - A follow up of data collated for the WHO semen analysis manual 2010.* Andrology, 2021. **9**(3): p. 817-822.DOI: 10.1111/andr.12983. **JIF 4.5**
  14. Berg, Houska, Nesheim, Schuppe, Pilatz, Fijak, Manthey, Steger, Wagenlehner & Schagdarsurengin, *Chronic Prostatitis/Chronic Pelvic Pain Syndrome Leads to Impaired Semen Parameters, Increased Sperm DNA Fragmentation and Unfavorable Changes of Sperm Protamine mRNA Ratio.* Int J Mol Sci, 2021. **22**(15).DOI: 10.3390/ijms22157854. PMID: PMC8346101. **JIF 5.6**
  15. Kumar, Kumar, Flanagan, Langstrom, Björndahl & Darreh-Shori, *Esomeprazole reduces sperm motility index by targeting the spermic cholinergic machinery: A mechanistic study for the association between use of proton pump inhibitors and reduced sperm motility index.* Biochem Pharmacol, 2020. **182**: p. 114212.DOI: 10.1016/j.bcp.2020.114212. **JIF 5.8**
  16. Jiang, Maresch, Petry, Paradowska-Dogan, Bhushan, Chang, Wrenzycki, Schuppe, Houska, Hartmann, Wudy, Shi & Linn, *Elevated CCL2 causes Leydig cell malfunction in metabolic syndrome.* JCI Insight, 2020. **5**(21).DOI: 10.1172/jci.insight.134882. PMID: PMC7710294. **JIF 8.0**
  17. Holmes, Björndahl & Kvist, *Hypotonic challenge reduces human sperm motility through coiling and folding of the tail.* Andrologia, 2020. **52**(11): p. e13859.DOI: 10.1111/and.13859. PMID: PMC7757238. **JIF 2.4**
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## **History of the center**

In 1996 the Center became the first EAA accredited Training Center in Sweden. Within the Karolinska University Hospital andrology consultations were originally related to male infertility at the departments of Urology, Endocrinology, Clinical Chemistry and Gynecology. In 1992 all infertility matters were concentrated in a Reproductive Medicine Center. Three positions as Andrologists were created, two of which were combined clinical and mid-level research positions and one was a clinical andrologist.

This platform became the EAA accredited Andrology Training Center. From 1992 to 1996 the Centre developed methods for androgen replacement therapy, participated in clinical trials with PDE-5 inhibitors and other pharmacological methods for treatment of erectile dysfunction, developed Y-chromosome microdeletion analysis and identification of genotype-phenotype characteristics of novel androgen receptor mutations. Activities in laboratory andrology included development of Basic Semen Analysis Courses and development of user-friendly operating procedures for semen analysis.

Until 2012 the center managed most semen analyses in Stockholm County and implemented good laboratory standards according to WHO and ESHRE recommendations and developed algorithms for further clinical examination of men with abnormalities in semen. The laboratory established an international External Quality Assessment Program for semen laboratories by commission from ESHRE

The development of treatment for erectile dysfunction was enhanced by the engagement of behavioral scientists and psychotherapists with sexology competence. The inclusion of these specialist widened the spectrum of clinical problems addressed and became the start for work with problematic sexuality and strategies for the prevention of sexual abuse. In 2005 Stockholm County added Sexual Medicine to the scope of the center and the name was changed to Center for Andrology and Sexual Medicine (CASM). Furthermore, transgender medicine became an increasingly important field for the improvement of health in subjects with gender dysphoria with need for psychiatric as well as somatic care. When also the unit for investigation of gender dysphoria was included in 2016 the name ANOVA was adopted.

The expansion of the center commissions an increased number of annual consultations has occurred, and the number of staff members increased from 12 to 40. Concomitantly, the number of research projects increased.

The Center moved to new premises in May 2016 located in the center of Stockholm's Life Science Campus, close to the New Karolinska Hospital, and the Solna Campus of Karolinska

Institutet. After 2016 the center has continued to grow, adding one section for removal of unwanted hair and one for venesection and the total number of employees in 2023 exceeds 60. The venue covers 2000 sqm and includes several well-equipped medical examination rooms, rooms for conversational therapy, a clean room (as registered Tissue Establishment), and a routine and development andrology laboratory (accredited to ISO15189), equipped for microscopy, biochemistry, PCR, Y-chromosome microdeletion electrophoresis, sperm cryo preservation and flow cytometry (Sperm Chromatin Structure Assay, SCSA). The laboratory has capacity for microscope courses.

Furthermore, the center has reception rooms for nurses to give IC and IM injections and venipuncture, Rigiscan programming, instructions and reading. Upon entry patients are welcomed by a receptionist for registration and can relax in calm waiting area. Separate from the clinical rooms are office space and meeting rooms equipped for on-line meetings.

The key strength of the Center is the ability to attract patients and maintain a high-quality up-to-date patient management. Access to compiled structured descriptive data of the different cohorts of subjects referred to and investigated and treated at the center enables a reliable platform for clinical intervention studies. Systematic documentation gives opportunity for retrospective and prospective studies.

A strength that also represents a risk is the multidisciplinary setting. Management strategies considers the diversity of competence and has to be sensitive in preventing fragmentation and loss of overall perspective.

Strategies to maintain a living understanding of common goals needs to be on the agenda of the management.

Current research areas cover aspects of male infertility- diagnostics and treatment, Androgen effects short and long-term,

Sexual dysfunction in males and development of treatment strategies and modalities. The latter also involves development of pharmacological as well as behavioral programs to address sexual abuse and offence. This also includes development and validation of web-based education and treatment of the spectrum of sexual abuse and violence.

The research area dysfunctional sexuality is translational as it addresses basic mechanism regulating sexual behavior and hard-core clinical implementation.

The Center focuses on expanding development of strategies to prevent sexual misconduct, an area with high levels of unmet medical and societal needs.

Trans medicine is another area of strength, and the center will develop more efficient and less costly management program, filling an important knowledge gap. If the center can maintain a central role in the trans medicine field which will be based on further development of both diagnostic and treatment procedure. The current momentum in these areas need to be kept and that remains a task of major importance and within reach if endocrine and behavioral as well as psychiatric competence can be maintained in combination with advanced molecular genetics knowledge.

The Center has the ambition to broaden its role within the current core areas.