

EAA Andrology Training Centre  
Centre Report

**2019**



Unità Operativa Complessa di Andrologia Medica

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Ospedale Civile San Salvatore

Università di L'Aquila

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**CENTRE REPORT**

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### **History of Centre**

Andrology in L'Aquila is a more than 30 years experience. Among the scientific events organized in L'Aquila in this area, is worth mentioning the International Congress "Oligozoospermia: Recent progress in Andrology", held in 1980; this was a key event in promoting Andrology as new basic and clinical medical science. Twenty years later L'Aquila hosted the European Academy of Andrology (EAA) "1st European Congress of Andrology".

The "Complex Unit of Medical Andrology" of the University Hospital of L'Aquila was instituted in 2000. A bank for male gamete cryopreservation is operative since 2003. The Unit was certified as EAA training centre in 2005 (see report in Int J Androl 2006 vol.29, supplement 1, pag. 154-159), and since 2008 it was certified as Abruzzo reference centre for Andrology and Male Gametes Cryopreservation. In 2016 it was certified "Centre of Excellence" in Andrology and Sexual Medicine by the Italian Society of Andrology and Sexual Medicine.

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### **Organization of Centre**

The L'Aquila EAA centre consists of the Complex Unit of Medical Andrology within the University Hospital of L'Aquila. The Unit includes medical clinic for outpatients, a seminology laboratory and the bank for male gamete cryopreservation. Close cooperation exists within the L'Aquila University Hospital with the Clinical Pathology Service (for hormonal determinations and bacterial culture of semen, including search for Chlamydia and Ureaplasma in urethral swab and molecular genetic tests), the Medical Genetics Unit (for cytogenetic tests), the Urology Unit (for Micro-TESE and Surgical Andrology), the Unit of Operative Radiology (for scleroembolization of spermatic vein), the ART centre of Obstetrics and Gynaecology Unit, the Paediatric Unit (for handling young boys with defects of hypothalamus-pituitary-gonadal axis). Thus, andrological patients have access to all medical requirements within short distance.

The Andrology Unit also cooperates with the Spinal Unit of San Raffaele Sulmona Institute for the management of sexual and reproductive dysfunctions of men with spinal cord injuries.

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### **Educational activities**

#### Current activities

Post-graduate School of Endocrinology. In 1981 a Postgraduate School of Andrology was instituted at the University of L'Aquila. In 1986 it was replaced by the Postgraduate School of Endocrinology. Postgraduate students spend the last 2 years of the course in the Andrology Unit.

Pre-graduate course of Andrology for medical students at the University of L'Aquila.  
Pre-graduate course of Andrology for students in Reproductive Biotechnologies at the University of Teramo (professional training in andrology at the Andrology Unit of L'Aquila).

#### Previous activities

Course on Management of Male Infertility (2013, February). A 2 days Course reserved to 80 doctors from different area of Russia Federation, actively involved in Andrology clinics, and selected by FARMAMED, a pharmaceutical institution of Russia.

MASTER in Quality Management and Safety in Handling and Storage of Human Cells and Tissues (2012-2013 and 2013-2014).

Postgraduate course in Quality Management and Safety in Handling and Storage of Human Cells and Tissues (2014).

### Research activities

In the field of **erectile dysfunction (ED)** and its relationship with cardiovascular risk, we explored the molecular mechanisms involved in the inhibition of circulating angiogenic cells (CACs) in subjects with ED and explored the role of PDE5i on CACs and endothelial function (Atherosclerosis 2008,196:313; Int J Androl 2012,35:645; Asian J Androl 2014,16:290; J Sex Med 2016,13:1063). The psychological correlates of ED have been also assessed both in subjects with DE and VRF (Int J Impot Res 2007,19:597; Int J Androl 2009,32:74) and in spinal cord injured men (J Sex Med 2012,9:830).

In the field of **male infertility**, interest has been focused on clinical correlates of asthenozoospermia ranging from the study of the spontaneous variability of seminal parameters in infertile subjects (Int J Androl 2007,30:174) to the relationship of seminal leucocytes with sperm pathophysiology (oxidative stress, DNA damage, apoptosis) (Int J Androl 2009,32:623; Fertil Steril 2011,95:2676; Andrology 2016,4:808), seminal levels of endocannabinoids (Andrology 2017,5:87), semen quality and ART outcomes (Andrology. 2019 Jun 28, in press, doi:10.1111/andr.12662). Studies have been also carried out on the relevance of both morphological and functional mitochondrial modifications in spermatozoa of subjects with asthenozoospermia (Fertil Steril 2011, 95:641; Fertil Steril 2011, 95: 2315) and on ultrastructural characterization of genetic sperm tail defects (Fertil Steril 2006, 85:940; Hum Reprod 2008,4:996, Hum Reprod 2008,23:1957). A cross-over study on the efficacy of intrauterine insemination in oligo-astheno-terato-zoospermia and in male immunological infertility was also carried out (Fertil Steril 2009,92:1009). Expertise in the field of immunological infertility is documented by the publication of various reviews by invitation (Front Biosci 2007,12:2890; MALE AUTOIMMUNE INFERTILITY In: WKH Krause & RK Naz: IMMUNE INFERTILITY, Ed. Springer-Verlag, Berlin pp.145-153, 2009, and an updated 2<sup>nd</sup> Edition in 2017; INFERTILITY: IMMUNOLOGICAL ASPECTS In: eLS, John Wiley & Sons, Ltd: Chichester, 2012) and by a recent retrospective analysis of over 10,000 men (the largest published so far) assessing the prevalence of anti-sperm antibodies and the relationship of degree of sperm auto-immunization to semen parameters and post-coital test outcome (Hum Reprod 2019,34:834). Attention has been also focused on the effect of varicocele repair on male reproductive outcomes (J Endocrinol Invest 2019, Apr 6, in press, doi:10.1007/s40618-019-01042-5; Andrologia 2018,50:e13118; J Endocrinol Invest 2017,40:1145), as well as on the clinical significance of epididymal ultrasound in the diagnosis of excretory and secretory azoospermia, and in oligozoospermia (Andrology 2013,1:133; Hum Reprod 2014,7:1368). Finally, we recently also carried out a comprehensive evaluation of the risk of testicular cancer in infertile men with and without testicular microlithiasis (Front Endocrinol 2019,10:164).

In the field of **physiology and physiopathology of human spermatozoon** we explored the dynamics of tyrosine phosphorylation during capacitation in relation to the acquisition of sperm fertilizing ability (Biol Reprod 2008,79:649; Asian J Androl 2010,12:853); the role of the chemokine system (Mol Hum Reprod 2008,14:387; Hum Reprod 2009, 24:2979) and of endocannabinoid system (Endocrinology 2009,150:4692; Endocrinology 2010,151:5882; Andrology 2014,2:502). We also demonstrated the involvement of mitochondrial dysfunction in the inhibitory effect on sperm motility exerted by the seminal plasma from men with spinal cord injury (Andrology 2013,1: 456-63) and the protective role of lactobacilli on sperm oxidative damage (Fertil Steril 2011, 95:2485; PLoS One 2013,8:e83136). We recently carried

out the first study assessing the effects in vitro of the plasticizer bisphenol A on human spermatozoa (Reprod Toxicol 2016,66:61).

**Hypogonadism and its correlates** have been addressed in men with spinal cord injury (SCI) who exhibit a high prevalence of biochemical androgen deficiency (Andrology 2014,2:721; J Spinal Cord Med 2016,25:1; J Spinal Cord Med 2016,39:246; Arch Phys Med Rehabil 2016,97:726; Spinal Cord 2018,56:494; Arch Phys Med Rehabil 2017;98:940; J Endocrinol Invest 2019;42:167).

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### Clinical activities

1. *Andrology Clinic*: The Medical Andrology Unit is mainly active in the evaluation and management of infertile patients and those with sexual dysfunctions. Patients with primary or secondary hypogonadism, boys with delayed puberty and patients with other endocrine diseases are also seen.

2. *Seminology laboratory*: **Conventional semen analysis** is performed according to the World Health Organization recommended procedures (2010). IgG-MAR-test is performed as screening test for immunological infertility, on all ejaculates in the context of the standard semen analysis. In the presence of a positive IgG-MAR-test, IgA-MAR test is also performed in the same ejaculate, and sperm-agglutinating activity is titrated in serum and seminal plasma. Laboratory participates to external quality assessment for semen analysis UK NEQAS (Birmingham).

Sperm **DNA fragmentation** (TUNEL assay) is assessed using flow cytofluorimetry in cases of ART failure and recurrent pregnancy loss.

Flow cytometry is also employed for quantifying and phenotyping seminal leukocytes by using monoclonal antibodies (anti-CD45, anti-CD14 and anti-HDL-DR) and the Flow-Count™ Fluorospheres kit (Beckman Coulter).

**Post Coital Test** (PCT) is performed to assess “in vivo” sperm-cervical mucus interaction.

**Computer-Assisted Semen Analysis** (CASA) is performed for an objective assessment of sperm motility in selected cases (i.e., on evaluating effectiveness of treatments).

For research purpose, CASA and flow cytometry analyses are carried out to assess mitochondrial membrane potential, mitochondrial ROS generation, membrane lipid peroxidation, DNA 8OHdG, caspase activation, sperm tyrosine phosphorylation during capacitation and anti-sperm antibody load on sperm surface.

**Transmission electron microscopy** (TEM) can be offered to ascertain genetic conditions of total sperm immotility with preserved sperm vitality.

3. *Centre for male gamete cryopreservation*: A bank for male gamete cryopreservation is operative since 2003. Sperm cryopreservation is offered mainly to patients with malignant diseases before chemotherapy or radiotherapy but also to patients with severe oligozoospermia or intermittent presence of motile spermatozoa in the semen (as backup for ICSI), to patients with hypothalamo-pituitary hypogonadism after gonadotrophin treatment and to patients undergoing pelvic surgery.

Cryopreservation of testicular sperm is also routinely performed after TESE/Micro-TESE.

4. *Testicular sperm extraction*: Up to December 2018, TESE has been performed by Andrology Unit staff in azoospermic patients. Starting from January 2019, Micro-TESE is performed in cooperation with the Urology Unit of the Hospital. Specimens are

immediately transferred to Andrology laboratory for sperm extraction and histology.

5. Medically assisted ejaculation procedures: Penile vibratory stimulation (PVS) is offered to spinal cord injured men for semen evaluation and/or cryopreservation.

6. Ultrasonography: Ultrasonographic examinations are performed with a duplex scanner equipped with colour flow imaging (General Electric, Healthcare, WI, USA). Scrotal color-Doppler ultrasound (CDU) as diagnostic tool in patients with poor semen quality, in those with an increased risk of malignancy and in those with an evidence of varicocele at physical examination. Penile CDU, 10 and 30 minutes following intracavernous injection of 10 µg of the vasoactive drug prostaglandin E1, is offered to men with erectile dysfunction associated to vascular diseases or vascular risk factors. This is also offered in men with Peyronie's disease. Penile examination is associated to ultrasound determination of common carotid arteries intima-media thickness as an objective evaluation of preclinical atherosclerosis of large arteries. Trans-rectal CDU is performed as a diagnostic tool in patients with azoospermia or severe oligozoospermia to screen possible obstructions of the distal seminal tract. This is also offered to men with persistent leucocytospermia or possible prostate-vesiculitis after general and physical examination. Transvaginal sonography is performed to monitor follicular development and ovulation for Post Coital Test (PCT).

7. The activity of the ART centre of Obstetrics and Gynaecology Unit, discontinued after the 2009 earthquake (intrauterine inseminations continued to be offered at the Andrology Unit), restarted from 2019. A strict co-operation exists with the Andrology Unit. Female outpatients are visited by gynecologist within the Andrology Unit.

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**Name and address of Centre**


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 Unità Operativa Complessa di Andrologia Medica
 

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**Type of Centre**University University Hospital Private Centre 

Other (please specify) \_\_\_\_\_

**1. Director**Felice Francavilla (until 31/10/2019)

Academician

Affiliated Member

Clinical Andrologist

Sandro Francavilla (starting from 01/11/2019)

Academician

Affiliated Member

Clinical Andrologist

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

1)                    Name                    Felice Francavilla  
                          Degree                    Associate professor  
                          Speciality                Endocrinology

Academician             Affiliated Member     Clinical Andrologist   

2)                    Name                    Sandro Francavilla  
                          Degree                    Associate professor  
                          Speciality                Endocrinology, Andrology

Academician             Affiliated Member     Clinical Andrologist   

3)                    Name                    Carla Tatone  
                          Degree                    Associate professor  
                          Speciality                Biologist

Academician             Affiliated Member     Clinical Andrologist   

4)                    Name                    Arcangelo Barbonetti  
                          Degree                    Researcher (RTDb)  
                          Speciality                Endocrinology

Academician             Affiliated Member     Clinical Andrologist



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

MD/Biologists/Chemists

1)	Name	<u>Giuliana Cordeschi</u>
	Degree	<u></u>
	Speciality	<u>Biologist, funzionario tecnico University of L'Aquila</u>
	Full time	<u></u>

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

1)	Name	<u>Chiara Castellini, PhD</u>
2)	Name	<u>Settimio D'Andrea, M.D., PhD</u>

**Nurses**

1)	Name	<u>Anna Spaziani</u>
2)	Name	<u>Rita Nannicola</u>

#### 4. Clinical Activity

##### A. Outpatients: Consultations per year in the last 3 years

	2016	2017	2018
New patients	1275	1259	997
Follow-up patients	1695	1828	1893

Type of patients in the last years (%)	2016	2017	2018
Infertility	≈ 25%	≈ 25%	≈ 25%
Erectile dysfunction	≈ 25%	≈ 25%	≈ 25%
Hypogonadism	≈ 25%	≈ 25%	≈ 25%
Klinefelter	≈ 1%	≈ 1%	≈ 1%
Gynaecomastia			
Varicocele	Included in "infertility"	Included in "infertility"	Included in "infertility"
Cryptorchidism			
Male sex accessory gland infections			
Testicular tumours	<1%	<1%	<1%
Disorders of gender identity	<1%	<1%	<1%
Other	≈ 25%	≈ 25%	≈ 25%

##### B1. Male ultrasound (testis, penile, prostate)

	2016	2017	2018
Total	310	274	241

##### B2. Female ultrasound (transvaginal ultrasonography)

	2016	2017	2018
Total	152	85	72

##### C. Andrological surgery procedures

	2016	2017	2018
TESE*	8	10	2
Varicocele scleroembolization (Performed at the Interventional Radiology Unit)	35	16	26
Prostate biopsies			
BPH			
Prostate cancer			
Vasectomy			
Vaso-vasostomy			

\*Starting from September 2018 Micro-TESE are carried out (from September 2018 to October 2019: 22 mTESE have been performed).

## 5. A. Andrology laboratory activity

	2016	2017	2018
Semen analyses	779	763	694
Sperm antibodies: in our lab MAR test is an integral part of standard semen analysis			

## 5. B. Andrology laboratory activity

Sperm banking donors                      Yes       No                     

Sperm banking cancer patients            Yes       No                     

<i>If yes:</i>			
	2016	2017	2018
Number of samples	188	256	236

5. C. Histopathological evaluation of biopsies                      Yes       No                     

5. D. Reproductive Hormones Assays                      Yes       No                     

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

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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

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Participation to the EAA quality control scheme?                      Yes       No                     

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

Blood karyotyping                      Yes       No                     

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

Other genetic tests (please specify)

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

**IVF Unit** Yes  No   
*If yes* please specify: Children, Endocrinology, IVF, Urology, Genetics, Pathology

Urology Clinic Yes  No

Endocrine Clinic Yes  No

Genetics Lab/Unit Yes  No

Paediatric Unit Yes  No

Central Hospital Laboratory Yes  No

Private Centres Yes  No

*If yes* please specify:

### 7. Clinical teaching activity

Duration of training (years): 

2 years of Reproductive Medicine and Andrology out of 5 years of Postgraduate School of Endocrinology
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	Number
A: Trainees in the last five years	5
B: Trainees who passed EAA-ESAU\exam for Clinical Andrologist in the last 5 yrs	0
C: Trainees working in the centre preparing to pass the EAA-ESAU examination	1
D: PhD Students	2
E: Medical Students	80/yr
F: Other students (MSc): Students of Biotechnologies of Reproduction	25/yr

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

*If yes:* specify duration (years/months): Years  2  Months  0

	Hours of formal teaching per year	Professional training (weeks/months)
Medical Students	20	1 week
PhD Students		
Post Graduate students	30	11 months
Trainees		
Students of Biotechnologies of Reproduction	25	1 week

## 9. Research Activity (main topics of the last 5 years)

### Sexual dysfunction

Continuing our traditional research on the relationship between erectile dysfunction (ED) and cardiovascular risk, in the last 5 years, we characterized molecular mechanisms involved in the inhibition of circulating angiogenic cells (CACs) in subjects with ED<sup>31</sup> and comprehensively assessed the possible effects of PDE5i on endothelial function<sup>8</sup>. The relationship between sexual dysfunctions (ED and premature ejaculation) and sexual orientation was also investigated<sup>6</sup>.

### Male infertility

Recently, our interest has been focused on the relationship of seminal macrophages with sperm oxidative/apoptotic damages<sup>32</sup>, semen quality and ART outcomes<sup>1</sup>. A strong correlation between macrophages concentration and seminal levels of the endocannabinoid 2-AG was also demonstrated<sup>26</sup>. Continuing our traditional research on the field of immunological infertility, in a recent retrospective analysis of over 10,000 men (the largest published so far), we assessed the prevalence of anti-sperm antibodies and the relationship of degree of sperm auto-immunization to semen parameters and post-coital test outcome<sup>5</sup>. Attention has been also focused on the effect of varicocele repair on male reproductive outcomes<sup>3,12,21</sup> and on the risk of testicular cancer in infertile men with and without testicular microlithiasis<sup>4</sup>.

### Physiology and physiopathology of human spermatozoon

We recently carried out the first *in vitro* study exploring the dose-response effects of the plasticizer bisphenol A on human spermatozoa<sup>30</sup>. Experiments are in progress in our lab to explore the effects of TNF-alpha on human spermatozoa.

### Hypogonadism and other endocrine disorders in men with spinal cord injury (SCI)

Continuing our clinical research on androgen deficiency and its correlates in men with SCI, we recently demonstrated an independent association of low testosterone levels with non-alcoholic fatty liver disease<sup>33</sup> and hypovitaminosis D<sup>35</sup>, which, in turn, is related to poor physical function<sup>34,20</sup> and depression<sup>25</sup>. In men with SCI we also explored the bone-testis axis, revealing a strong positive association between osteocalcin and testosterone levels<sup>9</sup>. Finally, by carrying out a systematic review with meta-analysis of case-control studies, we recently brought out a lower risk of developing prostate cancer in this category of patients<sup>14</sup>.

## 10. Research Funding

Funding from University of L'Aquila to support annual projects in the last 3 years: 20.000 Euro

PRIN (Research Program of National Interest 2017): 93.000 Euro.

## ORGANIZATION CHARTS

## Organization charts legend: Department / Unit Structure

<b>Name of the Centre</b> Complex Unit of Medical Andrology
<b>Director:</b> Prof. Felice Francavilla (until 31/10/2019) Prof. Sandro Francavilla (starting from 01/11/2019)
Staff members: Please, see pages 8-9
<b>Clinical activities:</b> Andrological outpatient clinics Endocrinological outpatients clinics Infertility outpatient Clinic (couples) Female reproductive endocrinology Seminology Ultrasound Cryopreservation of sperm TESE/mTESE*
<b>Contribution to EAA training:</b> Infertility investigation, infertility management and fertility preservation Management of andrological disorders Andrological ultrasound

**CENTRE PHOTOS**

**FULL LIST OF PUBLICATIONS of staff members from the last 5 years**

1. Castellini C, D'Andrea S, Martorella A, Minaldi E, Necozone S, Francavilla F, Francavilla S, Barbonetti A. Relationship between leukocytospermia, reproductive potential after assisted reproductive technology, and sperm parameters: a systematic review and meta-analysis of case-control studies. *Andrology*. 2019 Jun 28. doi: 10.1111/andr.12662.
2. Balercia G, Bonomi M, Giagulli VA, Lanfranco F, Rochira V, Giambersio A, Accardo G, Esposito D, Allasia S, Cangiano B, De Vincentis S, Condorelli RA, Calogero A, Pasquali D; KING group. Thyroid function in Klinefelter syndrome: a multicentre study from KING group. *J Endocrinol Invest*. 2019 Mar 25. doi: 10.1007/s40618-019-01037-2.
3. D'Andrea S, Barbonetti A, Castellini C, Nolletti L, Martorella A, Minaldi E, Giordano AV, Carducci S, Necozone S, Francavilla F, Francavilla S. Left spermatic vein reflux after varicocele repair predicts pregnancies and live births in subfertile couples. *J Endocrinol Invest*. 2019 Apr 6. doi: 10.1007/s40618-019-01042-5.
4. Barbonetti A, Martorella A, Minaldi E, D'Andrea S, Bardhi D, Castellini C, Francavilla F, Francavilla S. Testicular Cancer in Infertile Men With and Without Testicular Microlithiasis: A Systematic Review and Meta-Analysis of Case-Control Studies. *Front Endocrinol (Lausanne)*. 2019 Mar 21;10:164. doi: 10.3389/fendo.2019.00164.
5. Barbonetti A, Castellini C, D'Andrea S, Cordeschi G, Santucci R, Francavilla S, Francavilla F. Prevalence of anti-sperm antibodies and relationship of degree of sperm auto-immunization to semen parameters and post-coital test outcome: a retrospective analysis of over 10 000 men. *Hum Reprod*. 2019 May 1;34(5):834-841. doi: 10.1093/humrep/dez030.
6. Barbonetti A, D'Andrea S, Cavallo F, Martorella A, Francavilla S, Francavilla F. Erectile Dysfunction and Premature Ejaculation in Homosexual and Heterosexual Men: A Systematic Review and Meta-Analysis of Comparative Studies. *J Sex Med*. 2019 May;16(5):624-632. doi: 10.1016/j.jsxm.2019.02.014.
7. Guadagni V, Sarà M, Conson M, Carolei A, Sacco S, Vadini S, Pistarini C, Barbonetti A, Iaria G, Pistoia F. Cognitive and Emotional Empathy in Individuals with Spinal Cord Injury. *Behav Neurol*. 2019 Feb 10;2019:1312934. doi: 10.1155/2019/1312934.
8. D'Andrea S, Barbonetti A, Martorella A, Necozone S, Francavilla F, Francavilla S. Effect of prolonged treatment with phosphodiesterase-5-inhibitors on endothelial dysfunction in vascular diseases and vascular risk conditions: A systematic review analysis and meta-analysis of randomized double-blind placebo-controlled trials. *Int J Clin Pract*. 2019 Feb;73(2):e13296. doi: 10.1111/ijcp.13296.
9. Barbonetti A, D'Andrea S, Samavat J, Martorella A, Felzani G, Francavilla S, Luconi M, Francavilla F. Can the positive association of osteocalcin with testosterone be unmasked when the preeminent hypothalamic-pituitary regulation of



- testosterone production is impaired? The model of spinal cord injury. *J Endocrinol Invest.* 2019 Feb;42(2):167-173. doi: 10.1007/s40618-018-0897-x.
10. Di Emidio G, D'Aurora M, Placidi M, Franchi S, Rossi G, Stuppia L, Artini PG, Tatone C, Gatta V. Pre-conceptional maternal exposure to cyclophosphamide results in modifications of DNA methylation in F1 and F2 mouse oocytes: evidence for transgenerational effects. *Epigenetics.* 2019 Jun 19;1-8. doi: 10.1080/15592294.2019.1631111.
  11. Di Emidio G, Santini SJ, D'Alessandro AM, Vetuschi A, Sferra R, Artini PG, Carta G, Falone S, Amicarelli F, Tatone C. SIRT1 participates in the response to methylglyoxal-dependent glycativ stress in mouse oocytes and ovary. *Biochim Biophys Acta Mol Basis Dis.* 2019 Jun 1;1865(6):1389-1401. doi: 10.1016/j.bbadis.2019.02.011.
  12. D'Andrea S, Barbonetti A, Castellini C, Martorella A, Minaldi E, Viktor Giordano A, Carducci S, Necozone S, Francavilla F, Francavilla S. Reproductive hormones and sperm parameters after varicocele repair: An observational study. *Andrologia.* 2018 Dec;50(10):e13118. doi: 10.1111/and.13118.
  13. Colpi GM, Francavilla S, Haidl G, Link K, Behre HM, Goulis DG, Krausz C, Giwercman A. European Academy of Andrology guideline Management of oligoastheno-teratozoospermia. *Andrology.* 2018 Jul;6(4):513-524. doi: 10.1111/andr.12502.
  14. Barbonetti A, D'Andrea S, Martorella A, Felzani G, Francavilla S, Francavilla F. Risk of prostate cancer in men with spinal cord injury: A systematic review and meta-analysis. *Asian J Androl.* 2018 Nov-Dec;20(6):555-560. doi: 10.4103/aja.aja\_31\_18.
  15. Vezzani S, Giannetta E, Altieri B, Barbonetti A, Bellastella G, Certo R, Cignarelli A, Cinti F, D'Andrea S, Di Dalmazi G, Frara S, Garelli S, Giuffrida G, Maiorino MI, Mele C, Mezza T, Pani MG, Samà MT, Satta C, Santi D. AN ITALIAN SURVEY OF COMPLIANCE WITH MAJOR GUIDELINES FOR L-THYROXINE OF PRIMARY HYPOTHYROIDISM. *Endocr Pract.* 2018 May;24(5):419-428. doi: 10.4158/EP-2017-0159.
  16. Santini SJ, Cordone V, Falone S, Mijit M, Tatone C, Amicarelli F, Di Emidio G. Role of Mitochondria in the Oxidative Stress Induced by Electromagnetic Fields: Focus on Reproductive Systems. *Oxid Med Cell Longev.* 2018 Nov 8;2018:5076271. doi: 10.1155/2018/5076271.
  17. Falone S, Santini S Jr, Cordone V, Di Emidio G, Tatone C, Cacchio M, Amicarelli F. Extremely Low-Frequency Magnetic Fields and Redox-Responsive Pathways Linked to Cancer Drug Resistance: Insights from Co-Exposure-Based In Vitro Studies. *Front Public Health.* 2018 Feb 23;6:33. doi: 10.3389/fpubh.2018.00033.
  18. Tatone C, Di Emidio G, Barbonetti A, Carta G, Luciano AM, Falone S, Amicarelli F. Sirtuins in gamete biology and reproductive physiology: emerging roles and therapeutic potential in female and male infertility. *Hum Reprod Update.* 2018 May 1;24(3):267-289. doi: 10.1093/humupd/dmy003.

19. Barbonetti A, Calogero AE, Balercia G, Garolla A, Krausz C, La Vignera S, Lombardo F, Jannini EA, Maggi M, Lenzi A, Foresta C, Ferlin A. The use of follicle stimulating hormone (FSH) for the treatment of the infertile man: position statement from the Italian Society of Andrology and Sexual Medicine (SIAMS). *J Endocrinol Invest*. 2018 Sep;41(9):1107-1122. doi: 10.1007/s40618-018-0843-y.
20. Barbonetti A, D'Andrea S, Martorella A, Felzani G, Francavilla S, Francavilla F. Low vitamin D levels are independent predictors of 1-year worsening in physical function in people with chronic spinal cord injury: a longitudinal study. *Spinal Cord*. 2018 May;56(5):494-501. doi: 10.1038/s41393-017-0058-7.
21. D'Andrea S, Micillo A, Barbonetti A, Giordano AV, Carducci S, Mancini A, Necozone S, Francavilla F, Francavilla S. Determination of spermatic vein reflux after varicocele repair helps to define the efficacy of treatment in improving sperm parameters of subfertile men. *J Endocrinol Invest*. 2017 Oct;40(10):1145-1153. doi: 10.1007/s40618-017-0695-x.
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