PATERNAL LIFESTYLE FACTORS AND ITS RELATIONSHIP TO SEMEN QUALITY AND IN VITRO REPRODUCTIVE OUTCOMES

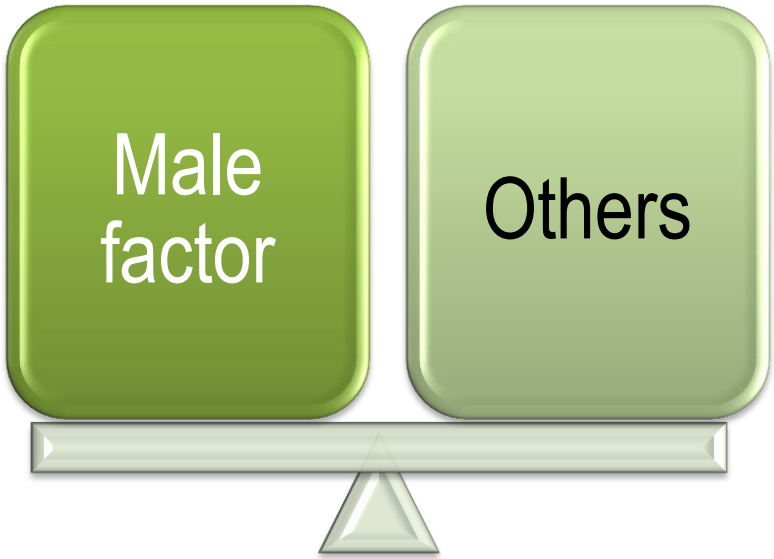
Amanda Setti[1,2], Daniela Paes de Almeida Ferreira Braga[1,2], Rita de Cássia Sávio Figueira[1], Rodrigo R. Provenza[1]; Assumpto Iaconelli Jr.[1], Edson Borges Jr. [1,2]

1 FERTILITY MEDICAL GROUP

2 Associação Instituto Sapientiae

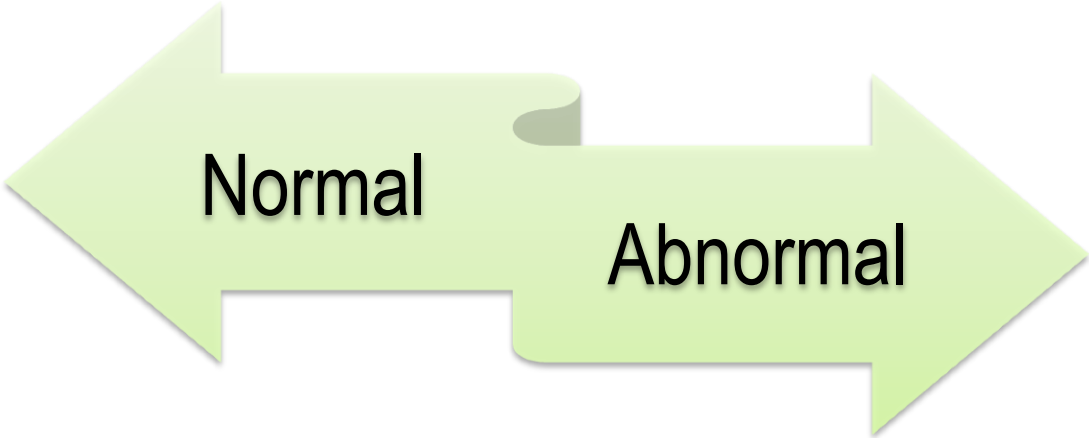
INTRODUCTION

Infertility: 15% of the couples



World Health Organization (WHO)

- Sperm count
- Sperm motility
- Sperm morphology



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INTRODUCTION

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human reproduction update

Temporal trends in sperm count: a systematic review and meta-regression analysis

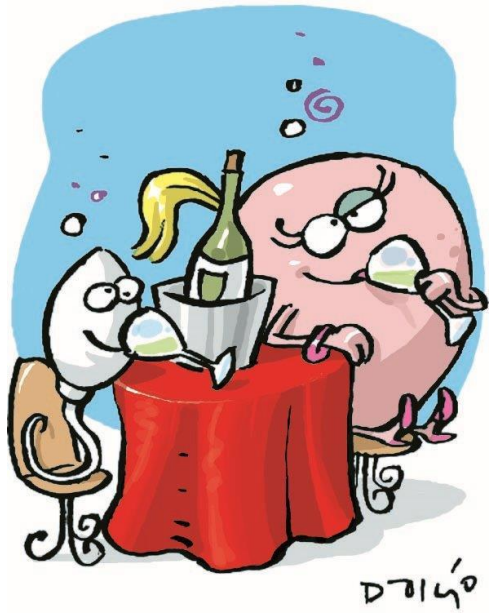
Hagai Levine [1,2,*], Niels Jørgensen [3], Anderson Martino-Andrade[2,4], Jaime Mendiola[5], Dan Weksler-Derri[6], Irina Mindlis[2], Rachel Pinotti[7], and Shanna H. Swan[2]

In this comprehensive meta-analysis, sperm counts whether measured by SC or TSC declined significantly among men from North America, Europe and Australia during 1973–2011, with a 50–60% decline among men unselected by fertility, with no evidence of a 'leveling off' in recent years. These findings strongly suggest a significant

INTRODUCTION

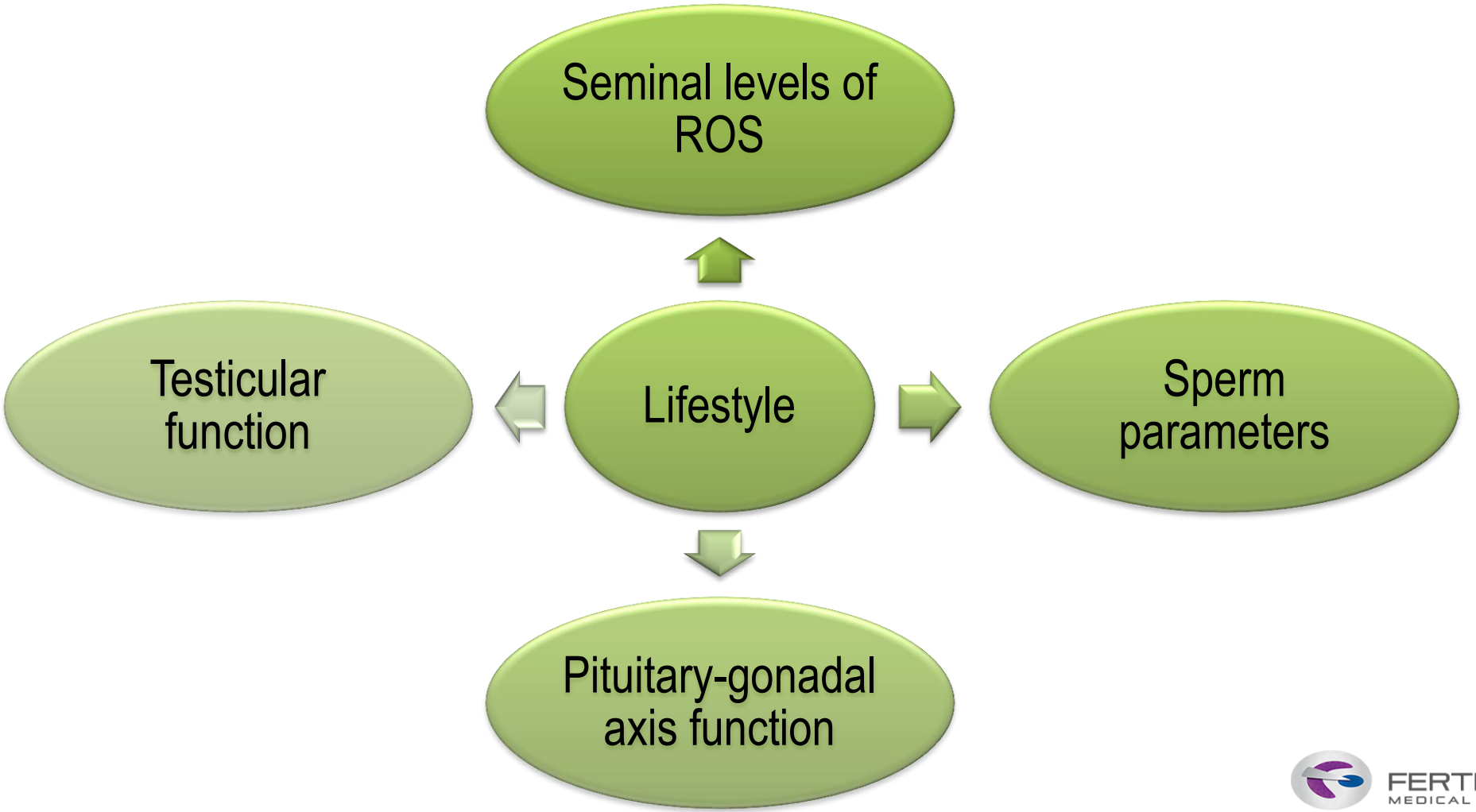
Decline in semen quality → Multifactorial

Lifestyle factors



INTRODUCTION

The role of reactive oxygen species and oxidative stress in semen quality decline has also been investigated



INTRODUCTION

Influenced by sperm-derived factors that may impact ICSI outcomes

- ✓Lifestyle factors are under one's own control and could be modified to improve general health

- ✓Adjusting for their influence may yield valuable information for counseling couples submitted to ICSI

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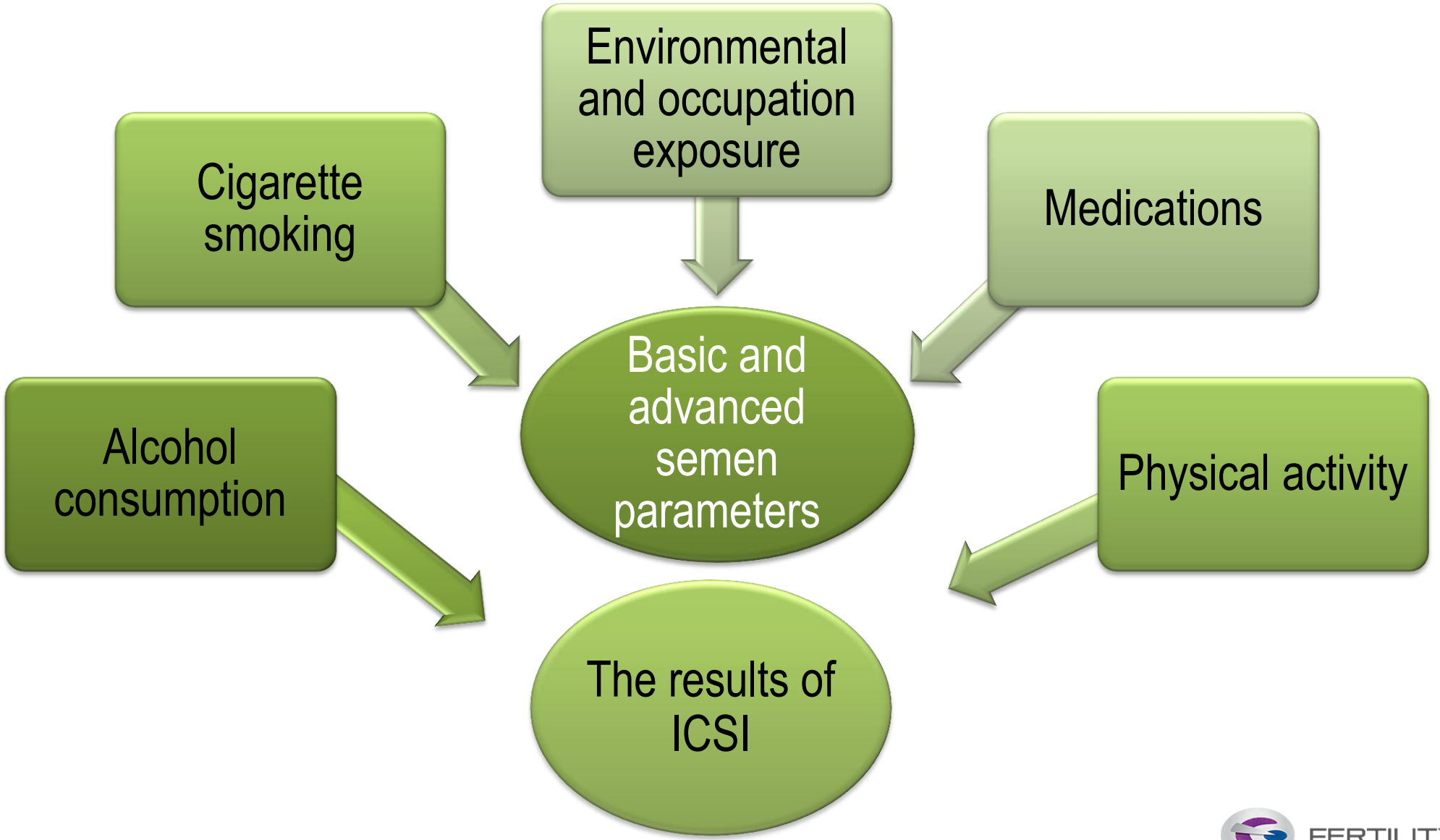
OBJECTIVE



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MATERIALS AND METHODS

- STUDY DESIGN

Prospective cohort study

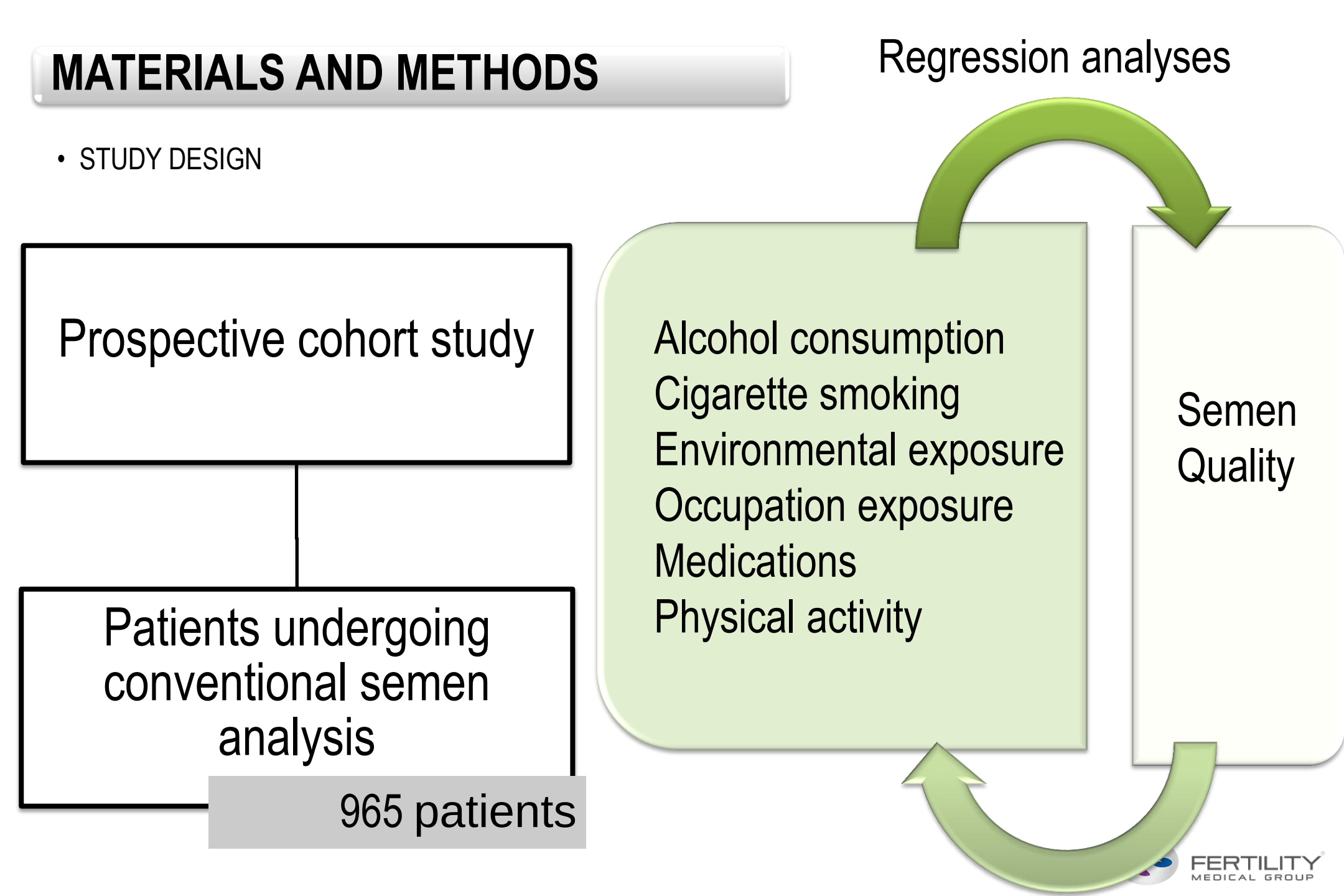
Patients undergoing conventional semen analysis

965 patients

Regression analyses

Alcohol consumption
Cigarette smoking
Environmental exposure
Occupation exposure
Medications
Physical activity

Semen Quality



MATERIALS AND METHODS

- STUDY DESIGN

Prospective cohort study

Patients undergoing conventional semen analysis

965 pacientes

Couples undergoing ICSI

233 couples

Regression analyses

Alcohol consumption
Cigarette smoking
Environmental exposure
Occupation exposure
Medications
Physical activity

ICSI results

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MATERIALS AND METHODS

INCLUSION CRITERIA

- Isolated male infertility (oligozoospermia, astenozoospermia, teratozoospermia)
- First ICSI cycle
- Female partner was ≤ 36 y-old

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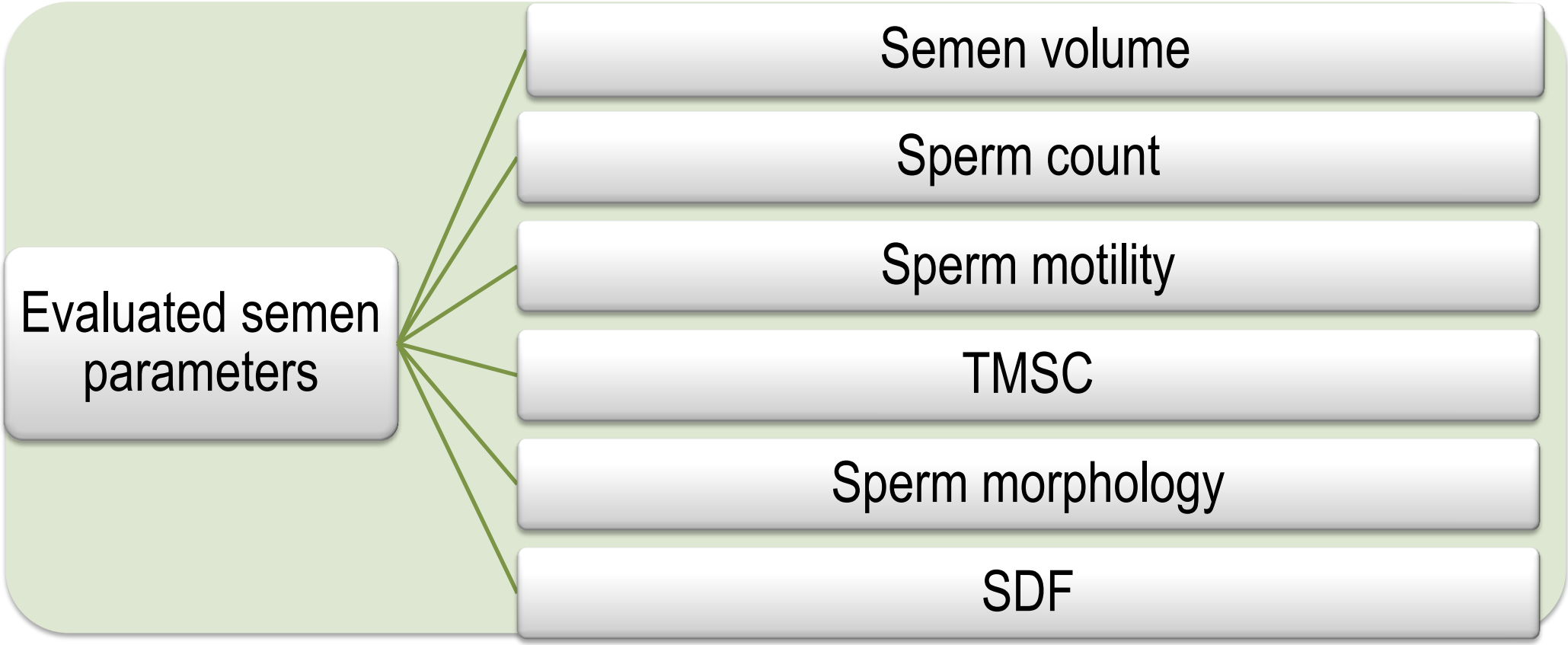
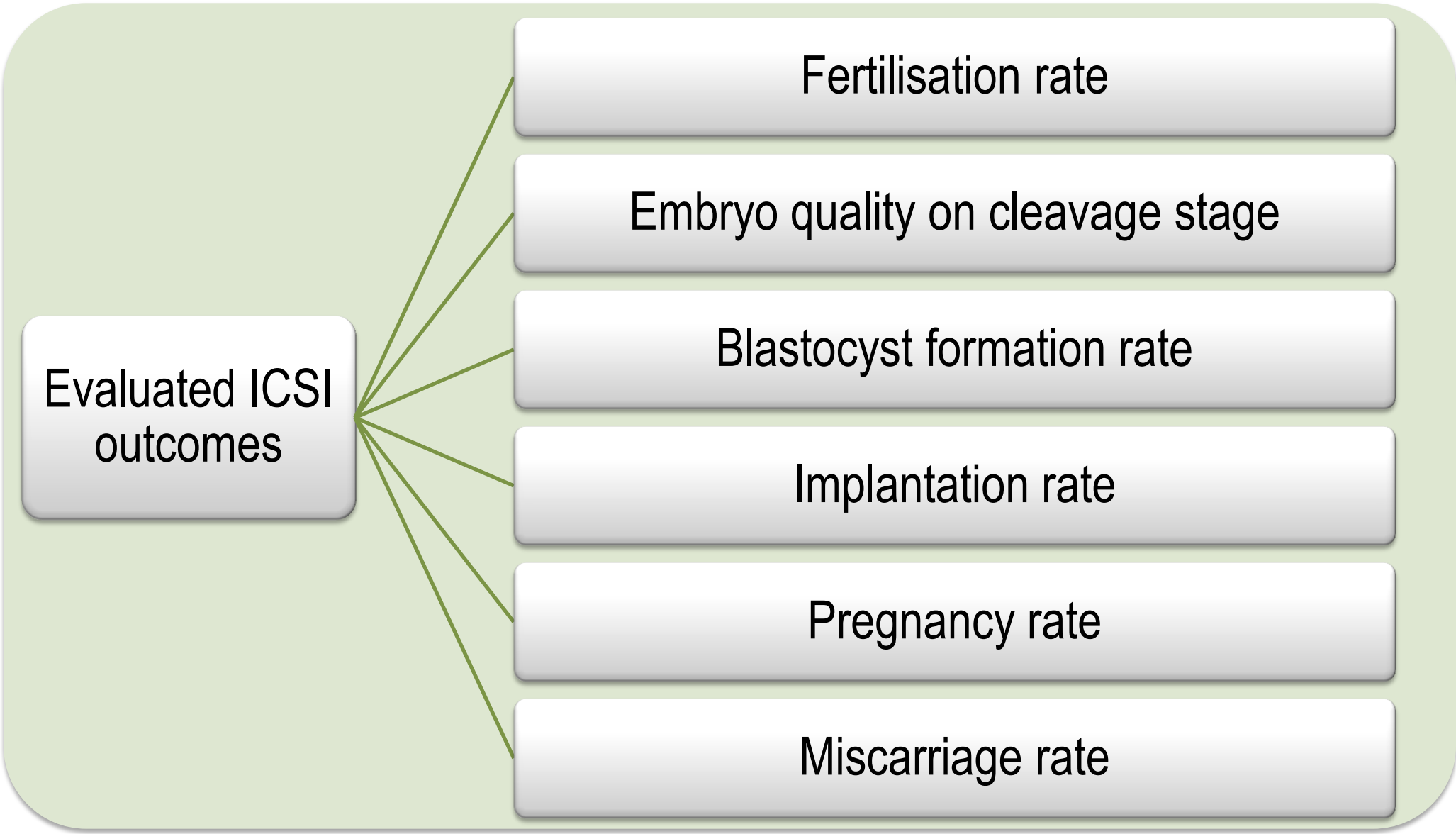
MATERIALS AND METHODS

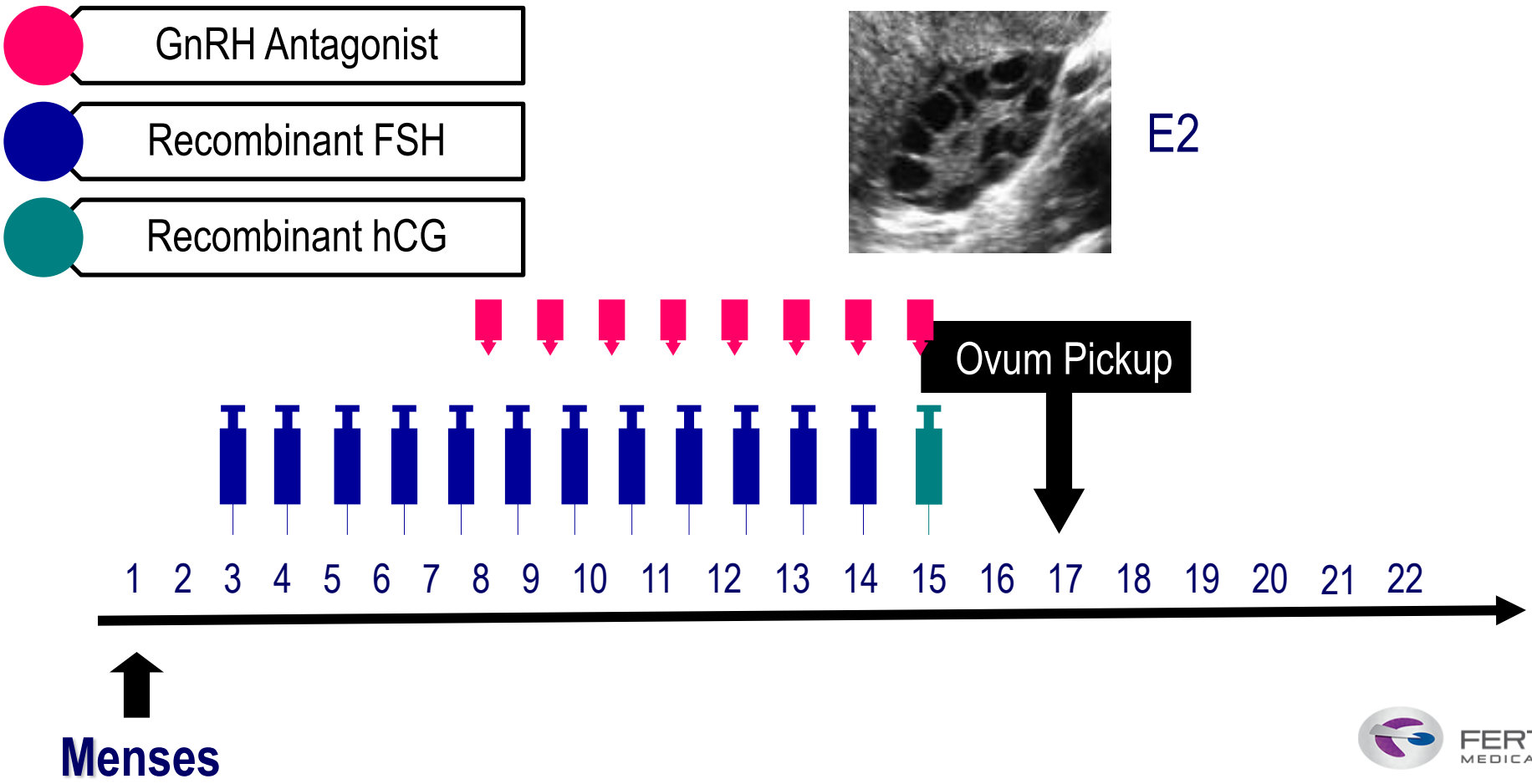


MATERIALS AND METHODS



MATERIALS AND METHODS

Controlled Ovarian Stimulation



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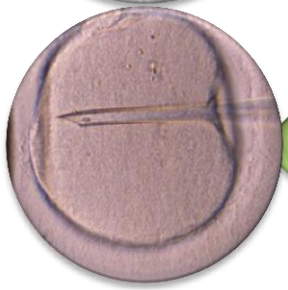
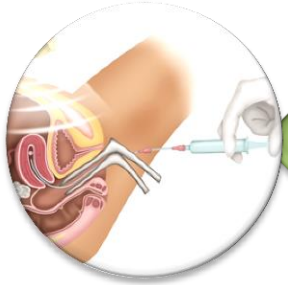
MATERIALS AND METHODS

Incubation, denudation and nuclear maturation evaluation



ICSI - (Palermo et al., 1992)

Embryo culture until day 5



One or two blastocysts transferred

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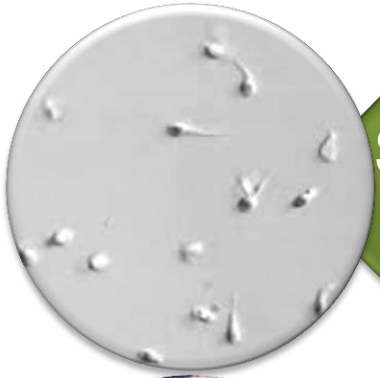
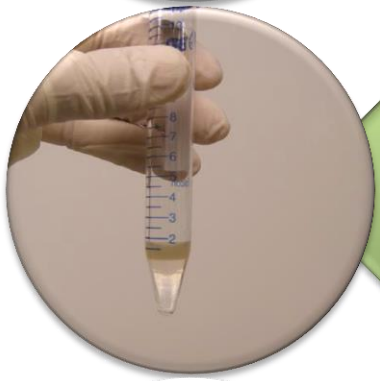
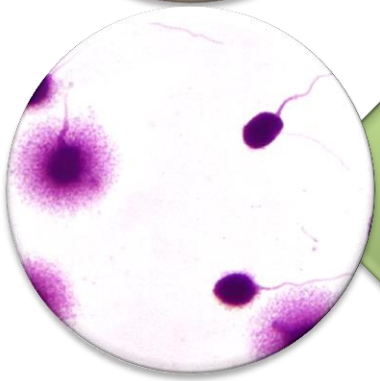
MATERIALS AND METHODS



Semen samples were evaluated according to the threshold values established by the WHO in 2010



Sperm preparation: 2-layered density gradient centrifugation technique



The sperm DNA fragmentation: Sperm chromatin dispersion test

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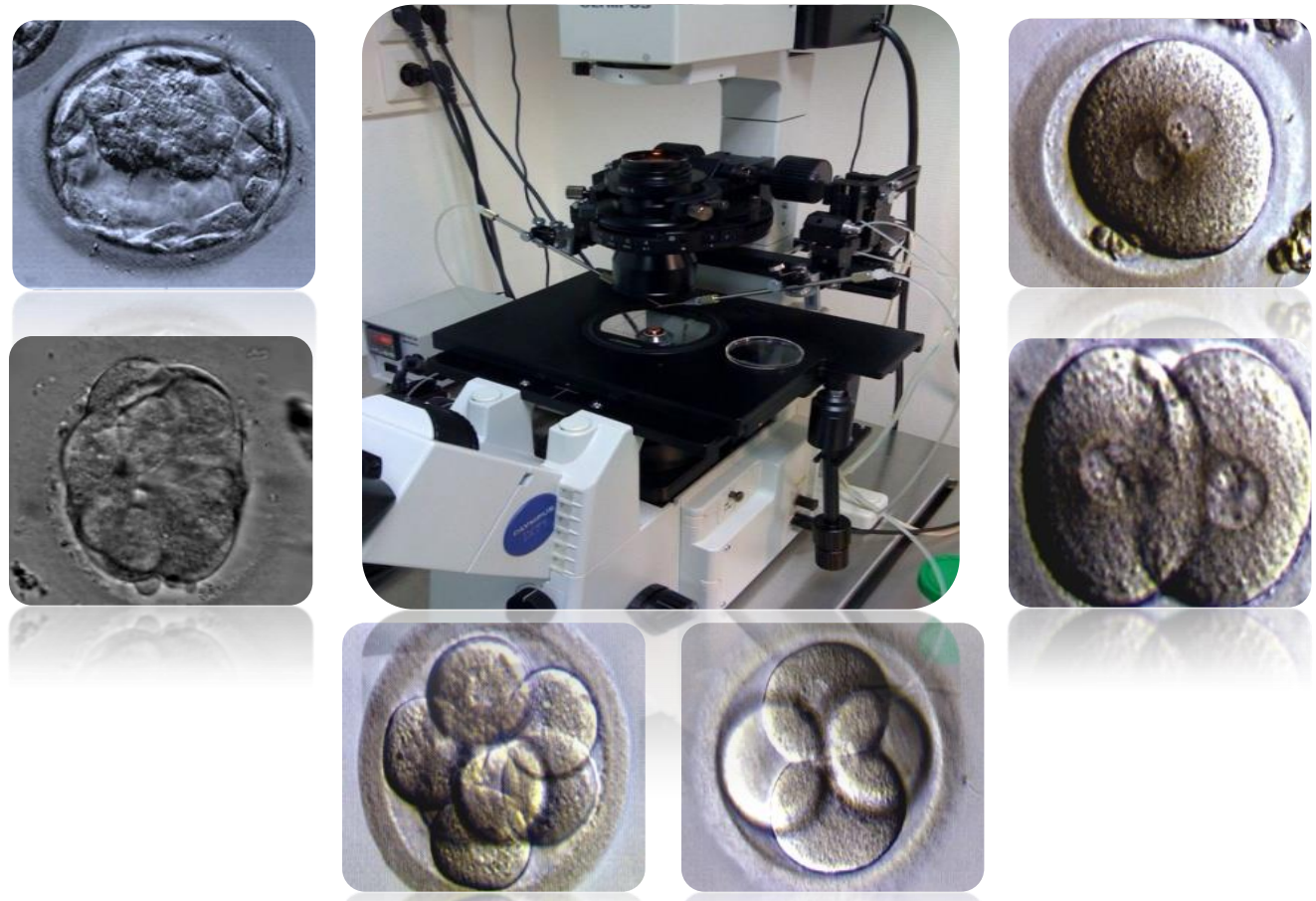
MATERIALS AND METHODS

- EMBRYO MORPHOLOGY AND EMBRYO TRANSFER



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MATERIALS AND METHODS

Paternal lifestyle habits questionnaire

RESULTS

According with the World Health Organization

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RESULTS

General seminal characteristics of men undergoing conventional semen analysis for infertility investigation (n = 965)

Variable	Reference values	Mean	Standard deviation
Male age (years)	-	38.1	6.4
Semen volume (mL)	≥ 1.5	3.1	1.7
Sperm count ($x10^6$/mL)	≥ 15	60.6	50.6
Total sperm count ($x10^6$)	≥ 39	176.6	169.4
Total sperm motility (%)	≥ 40	57.1	18.8
Progressive sperm motility (%)	≥ 32	49.1	18.8
Rapid sperm motility (%)	-	8.1	5.3
Total motile sperm count ($x10^6$)	-	97.6	101.2
Sperm normal morphology (%)	≥ 4	1.3	1.3
Sperm DNA fragmentation (%)	≤ 15	17.8	9.6

RESULTS

Linear regression analyses' results for the influence of paternal lifestyle factors on semen quality (n=965)

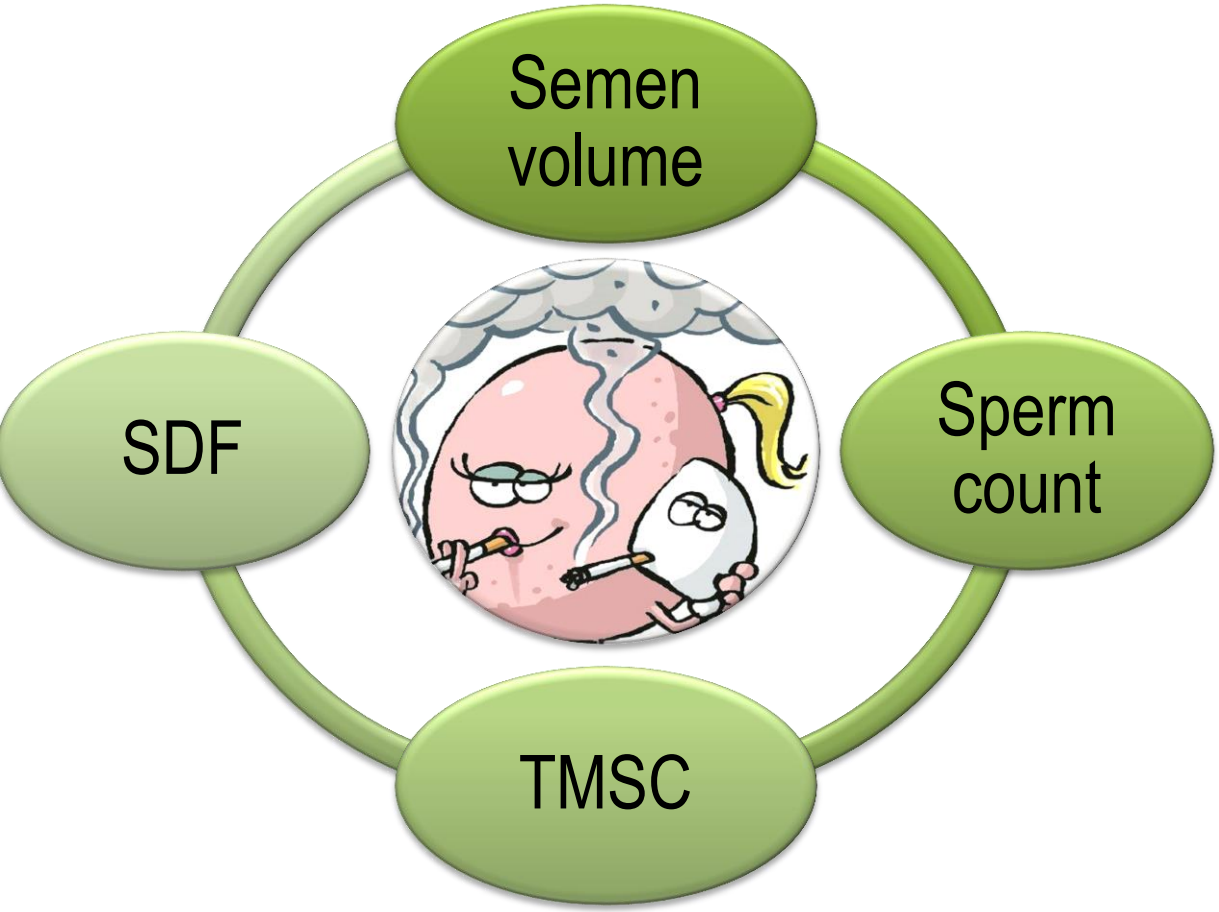
	Cigarette smoking		Alcohol consumption	
	B	p	B	p
Semen volume	-0.417	0.047	-0.1363	0.592
Sperm count/mL	-7.363	0.014	-12.527	0.040
Total sperm count	-4.43	0.023	-34.91	0.156
Total sperm motility	2.316	0.347	0.342	0.895
Progressive sperm motility	-0.369	0.887	2.547	0.240
TMSC	- 1.38	0.045	-16.33	0.278
Sperm morphology	-0.0563	0.779	0.3751	0.180
SDF	0.014	0.033	5.833	0.002

RESULTS

Linear regression analyses' results for the association between paternal lifestyle factors and ICSI outcomes (n=233)

	Cigarette smoking		Alcohol consumption	
	B	p	B	p
Fertilisation rate	-1.349	0.039	-3.617	0.041
High-quality embryos (day 3)	4.383	0.450	9.559	0.166
Blastocyst formation rate	-14.244	0.025	-34.801	0.042
Implantation rate	5.384	0.451	-0.770	0.190

DISCUSSION



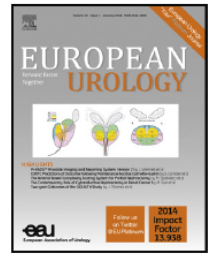
Previous studies

- Smoking is associated with a reduction of nearly 20% in sperm count

DISCUSSION

available at www.sciencedirect.com
journal homepage: www.europeanurology.com

European Association of Urology



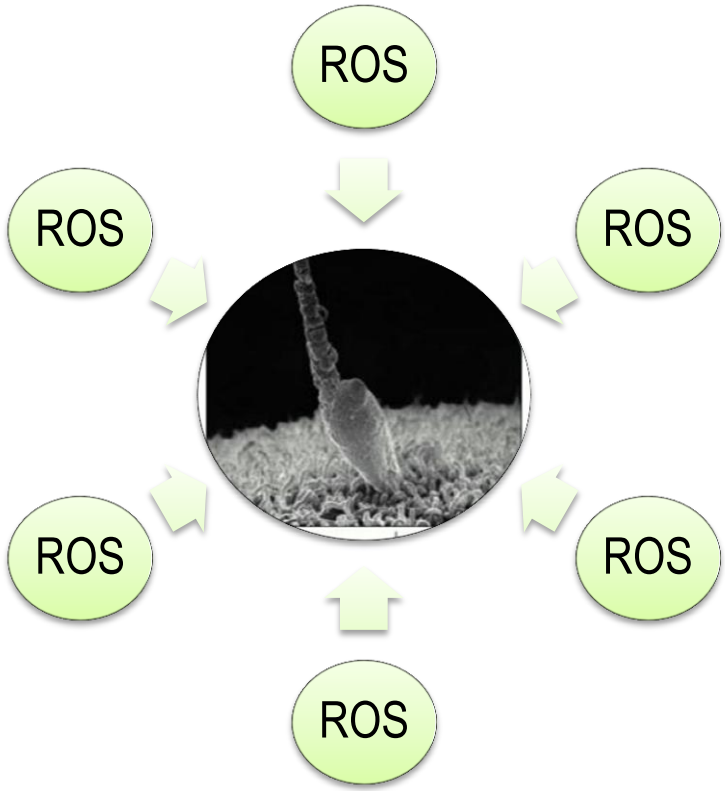
Platinum Priority – Review – Andrology
Editorial by XXX on pp. x–y of this issue

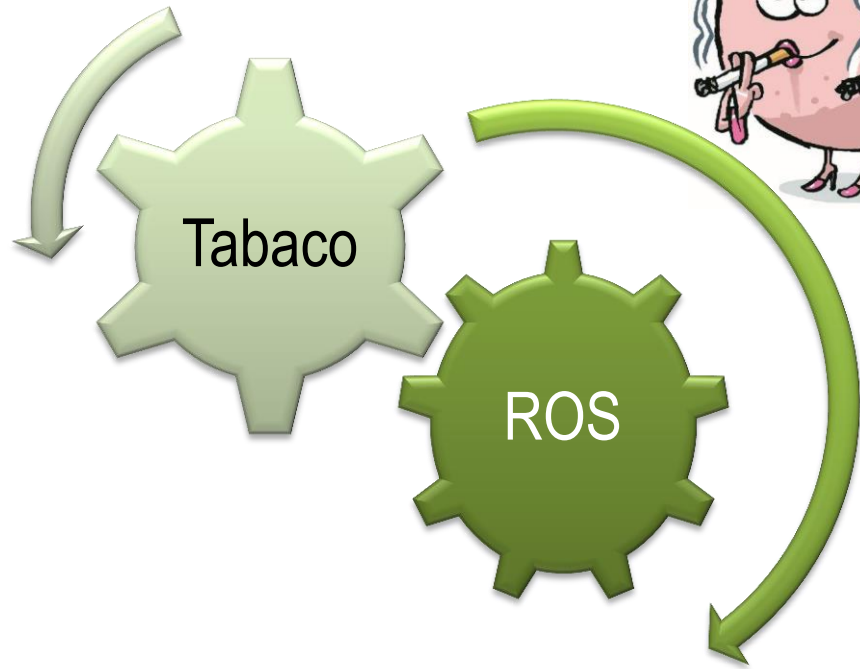
Cigarette Smoking and Semen Quality: A New Meta-analysis Examining the Effect of the 2010 World Health Organization Laboratory Methods for the Examination of Human Semen

Reecha Sharma [a], Avi Harlev [b,c], Ashok Agarwal [c,], Sandro C. Esteves [d]*

- ✓ Smoking reduces sperm count and motility, in a dose-dependent manner
- ✓ In our study we failed to determine a dose–response relationship between cigarette smoking and semen quality

DISCUSSION





Excessive ROS → Increased antioxidant capacity → Aerobic injury of seminal plasma → Oxidative stress → Sperm DNA damage

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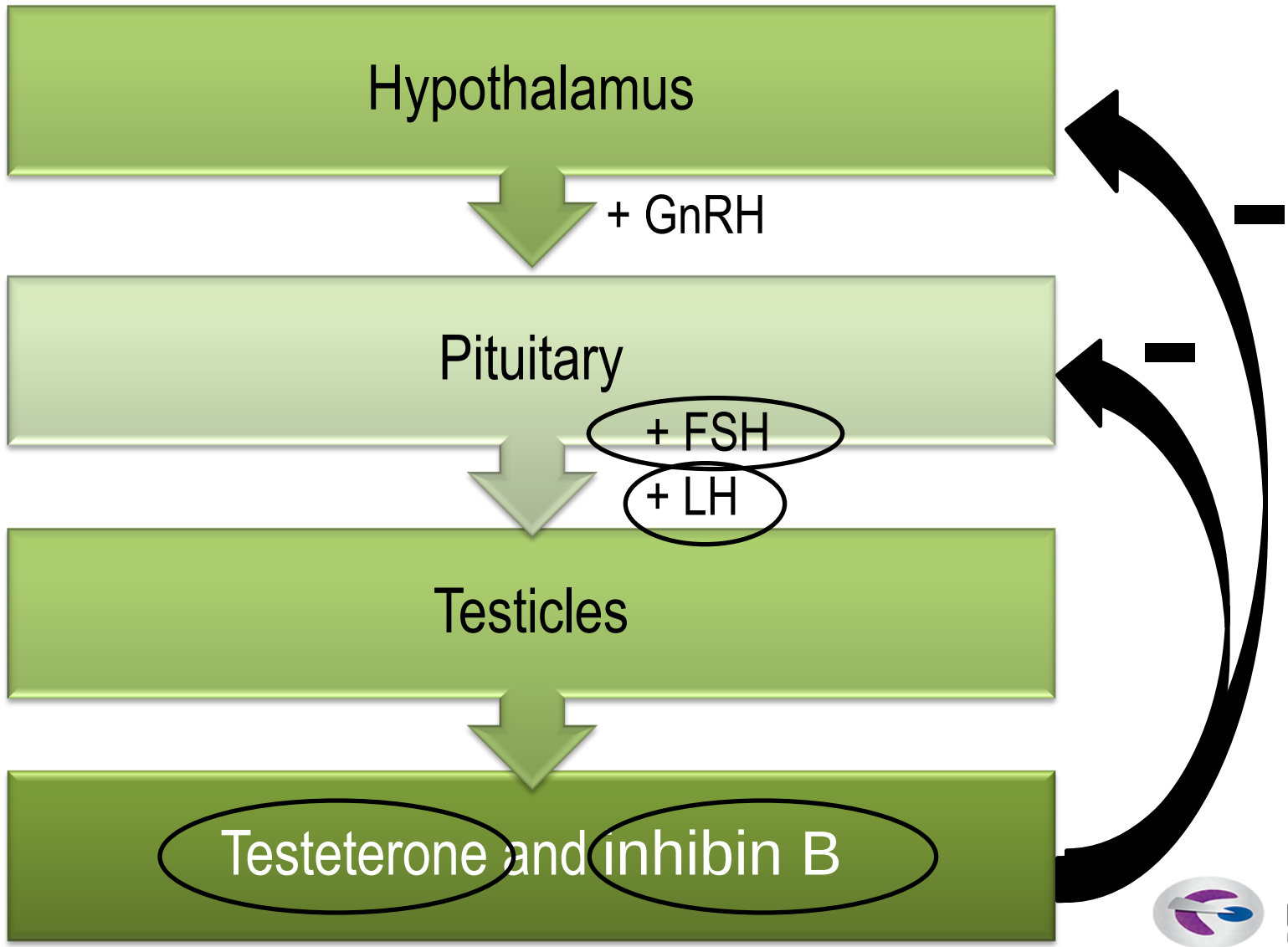
DISCUSSION



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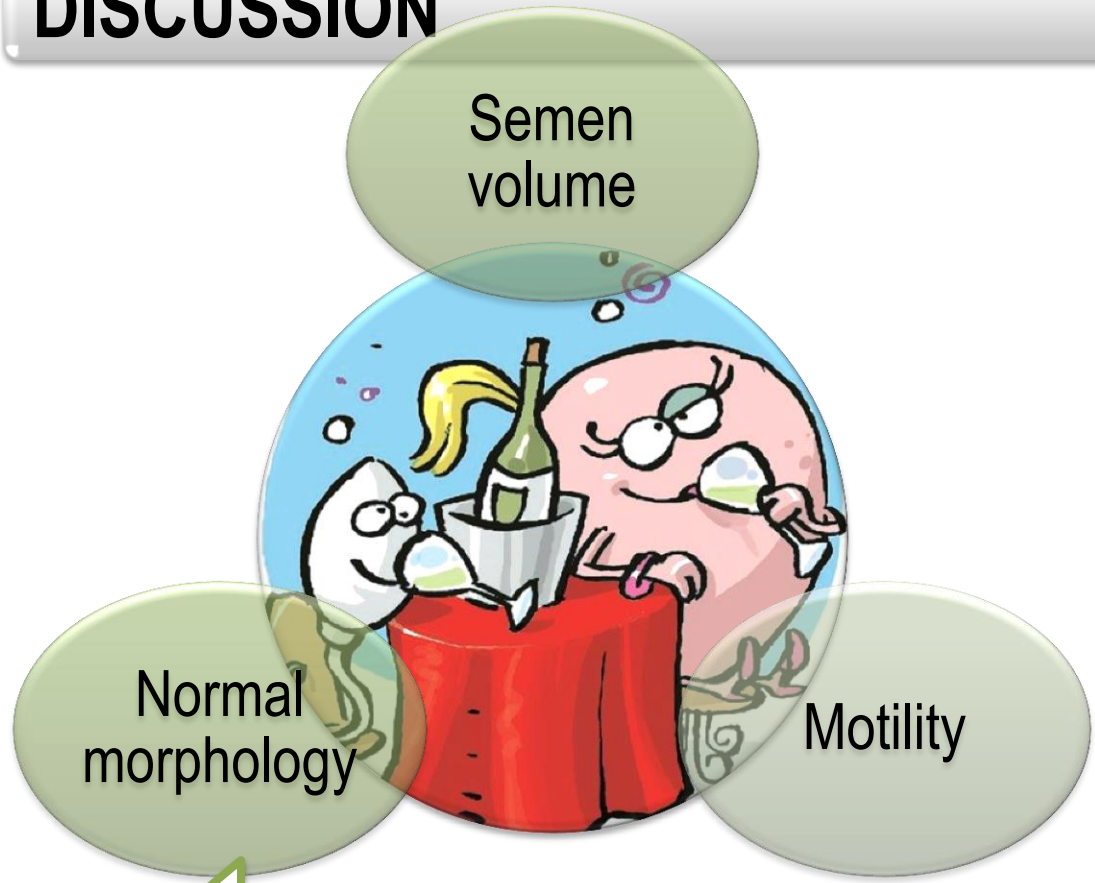
DISCUSSION



Testosterone metabolism

Spermatogenesis

Free testosterone

Free estradiol

Spermatogenesis arrest

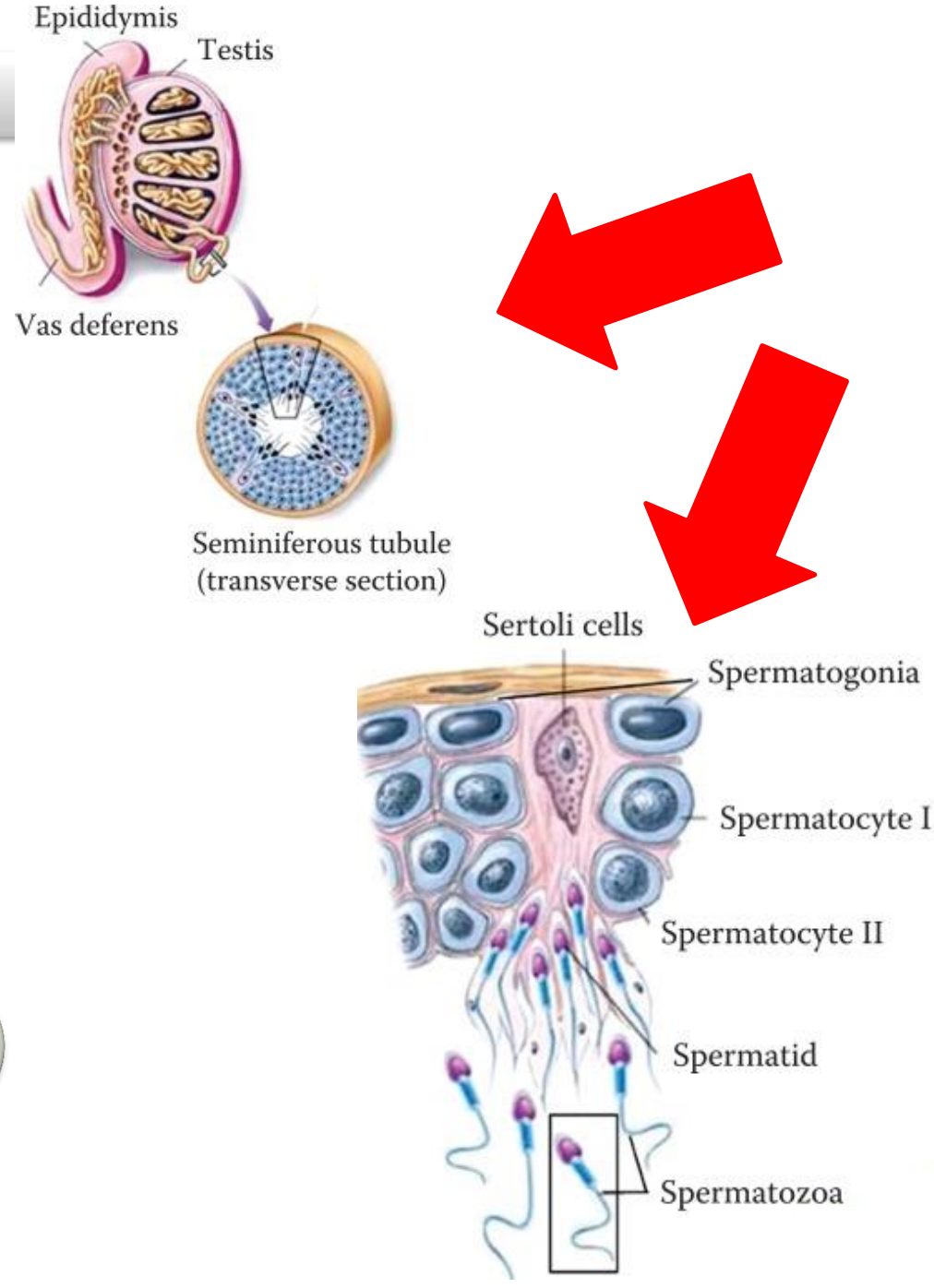
Sertoli-cell-only syndrome

DISCUSSION

ICSI outcomes

Cigarette smoking

Alcohol consumption



CONCLUSION

Smoking and alcohol drinking habits seem to reduce semen quality, fertilization and blastocyst formation rates. Thus, it would be wise to recommend male partners to reconsider their lifestyle during *in vitro* reproduction treatments

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