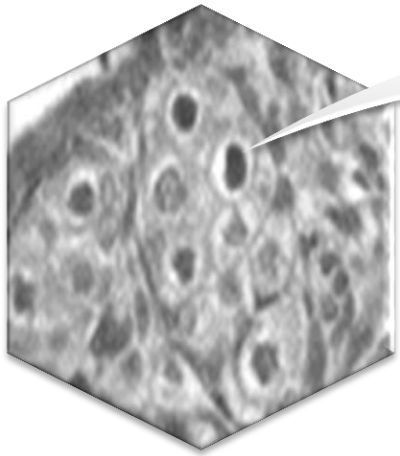
IMMATURE OOCYTE INCIDENCE: CONTRIBUTING FACTORS AND EFFECTS ON INTRACYTOPLASMIC SPERM INJECTION CYCLES

Bianca Ferrarini Zanetti[1,2], Daniela Paes de Almeida Ferreira Braga[1,2] , Rita de Cássia Sávio Figueira[1], Assumpto Iaconelli Jr.[1]Edson Borges Jr[1,2,];

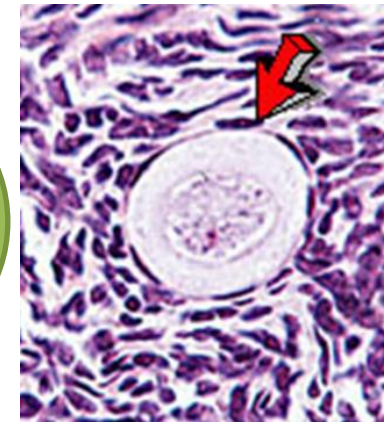
1 FERTILITY MEDICAL GROUP

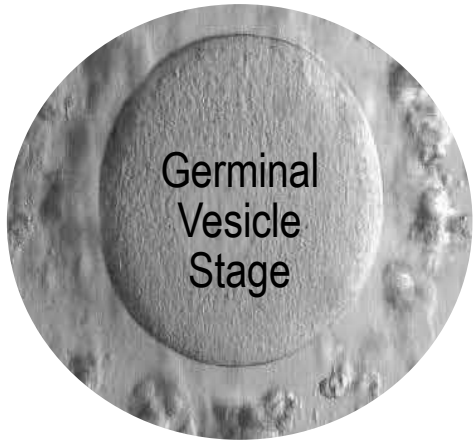
2 Associação Instituto Sapientiae

INTRODUCTION



Pool of quiescent primordial follicles

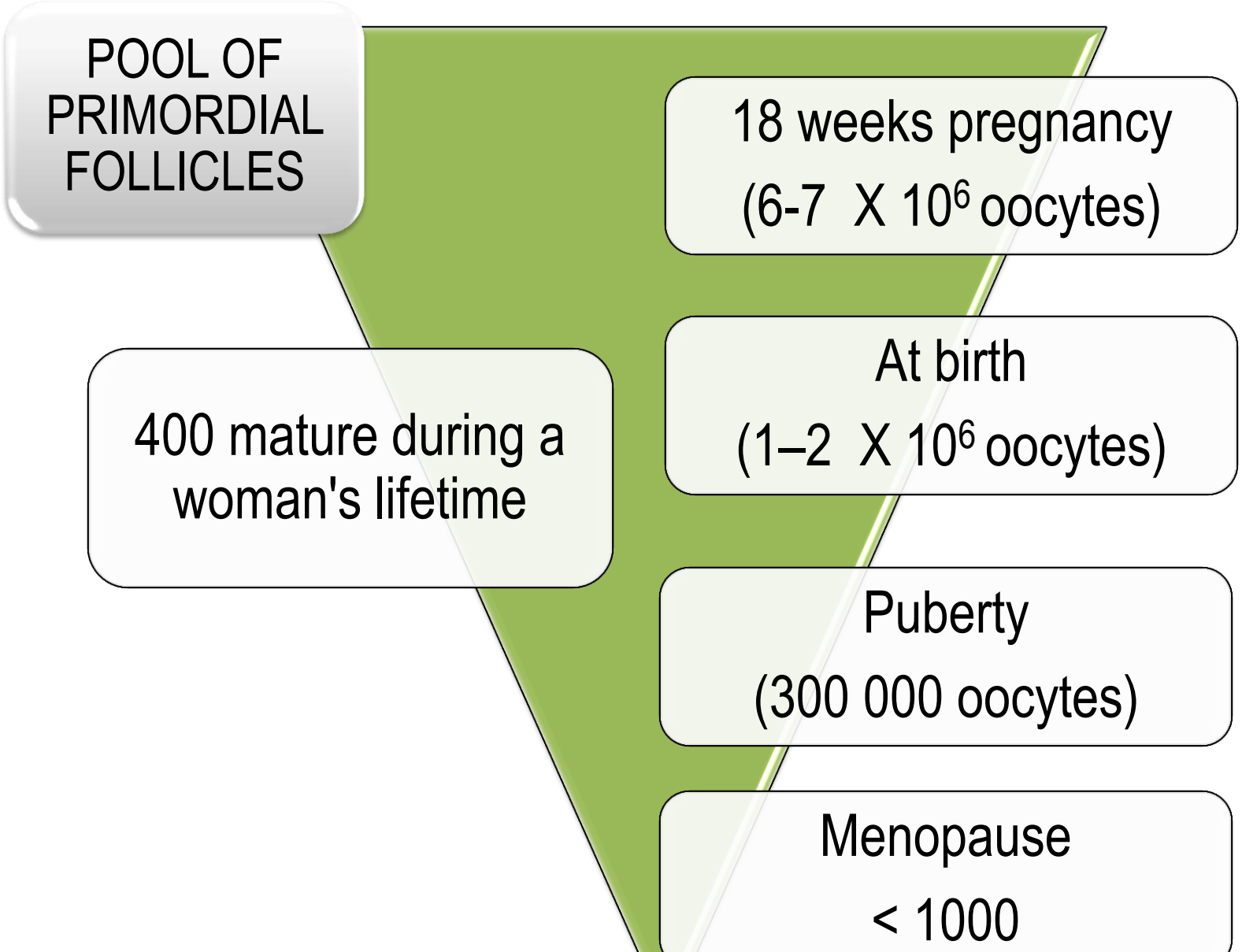




Fate of each follicle controlled by endocrine as well as paracrine factors

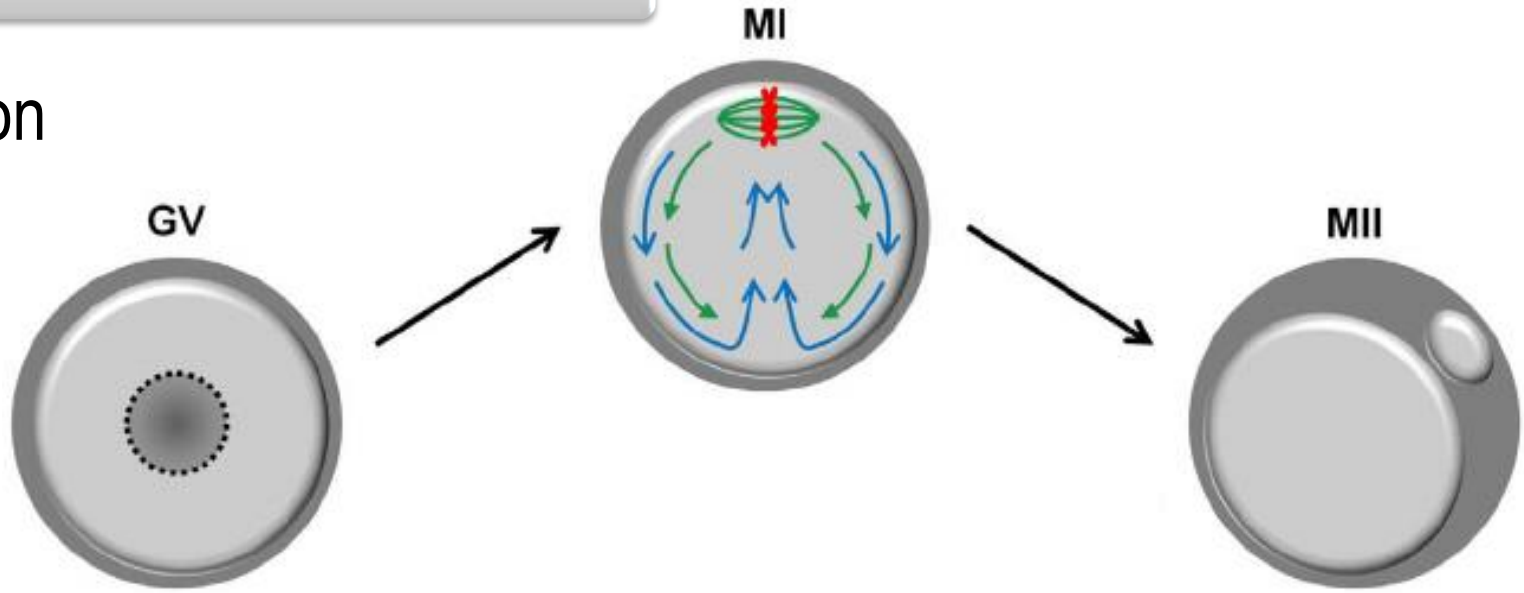
FERTILITY MEDICAL GROUP

INTRODUCTION



INTRODUCTION

✓ Oocyte maturation



Nuclear maturation

Cytoplasmic maturation

- Cytoplasmic enzymes
- mRNAs
- Organelles
- Metabolic substrates

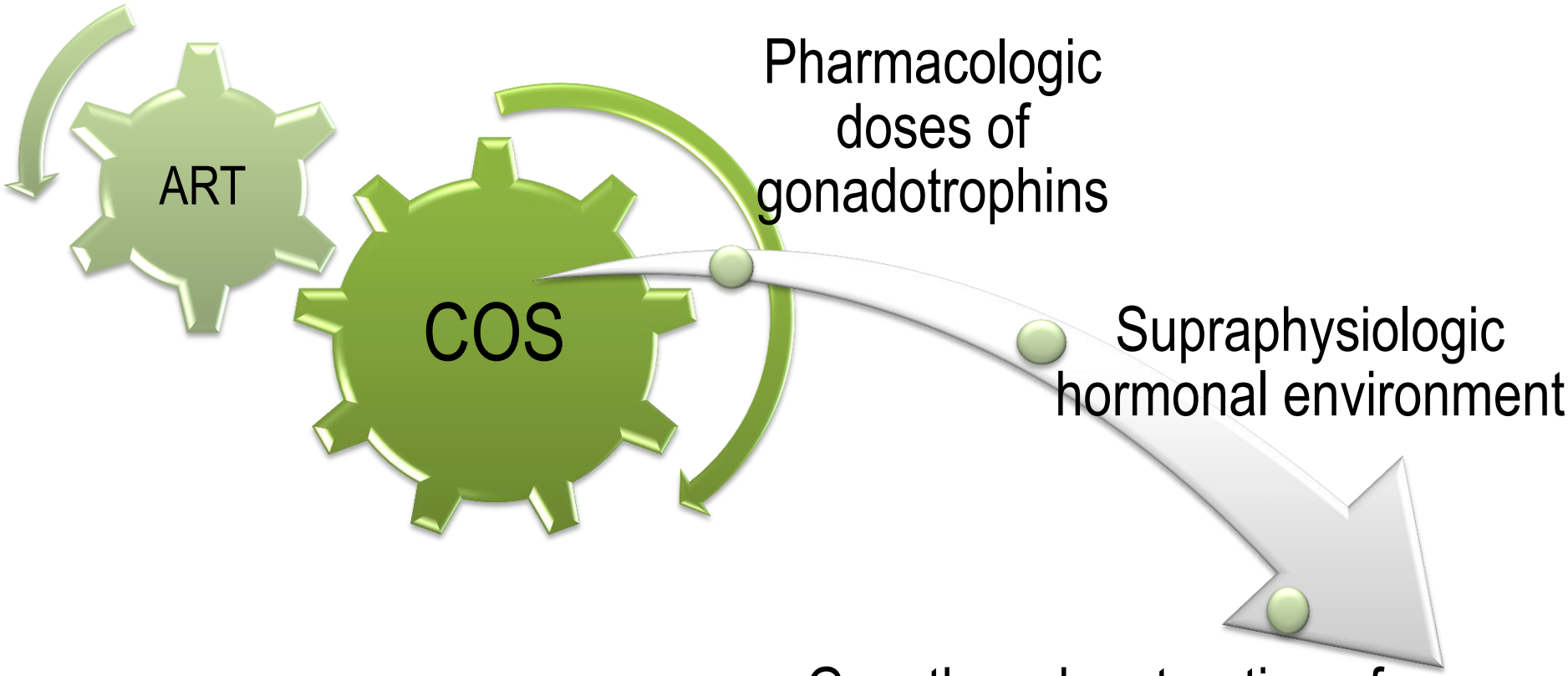
Fertilization

Early embryonic development

FERTILITY MEDICAL GROUP

INTRODUCTION

✓ Controlled Ovarian Stimulation (COS)

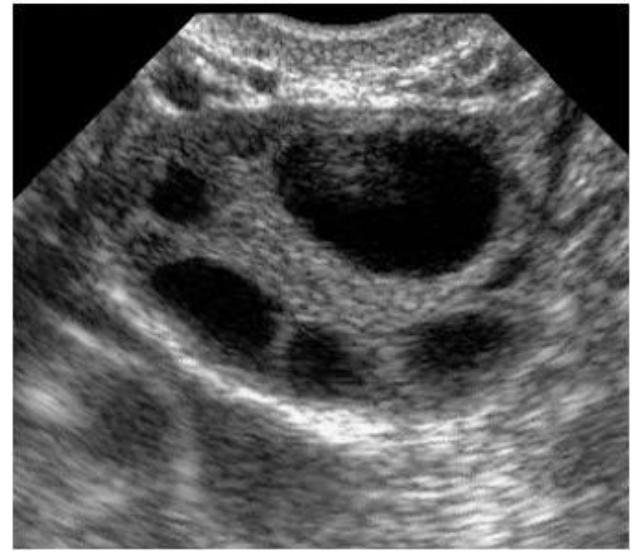


INTRODUCTION

Follicular asynchrony

Different COS protocols

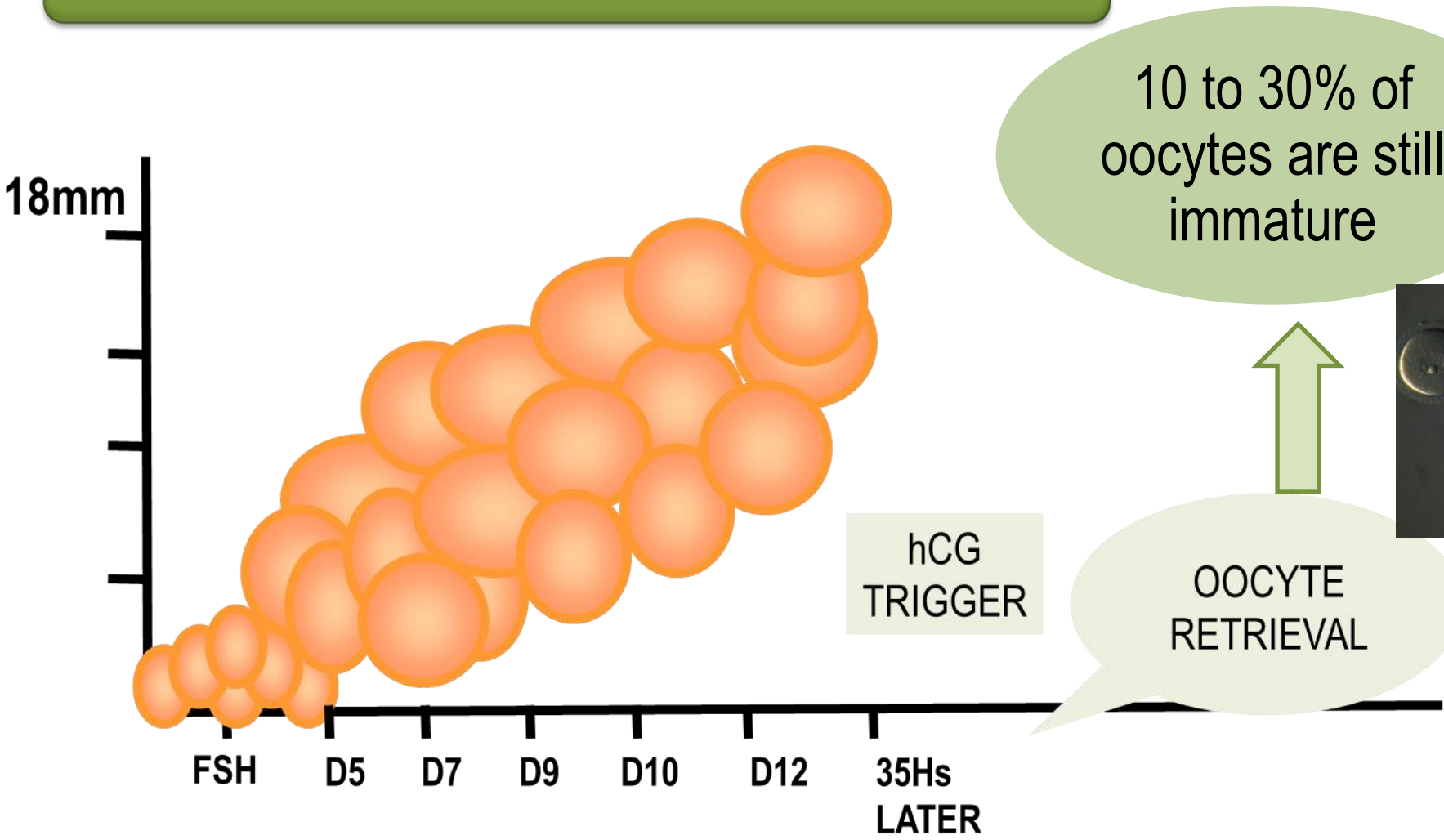
Variations in oocyte number and quality

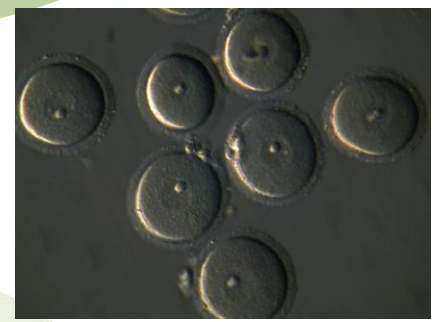


FERTILITY MEDICAL GROUP

INTRODUCTION

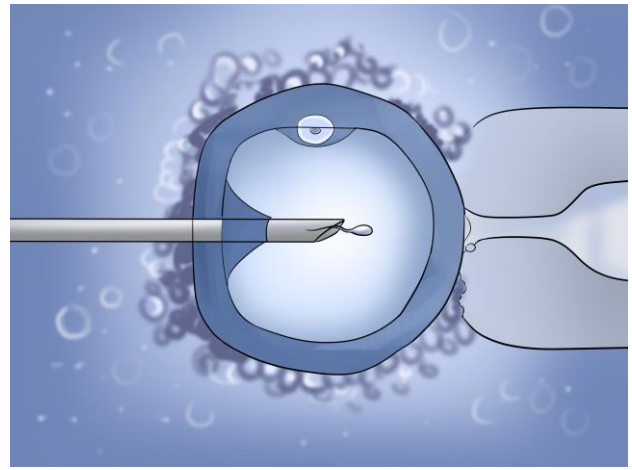
CONTROLLED OVARIAN STIMULATION

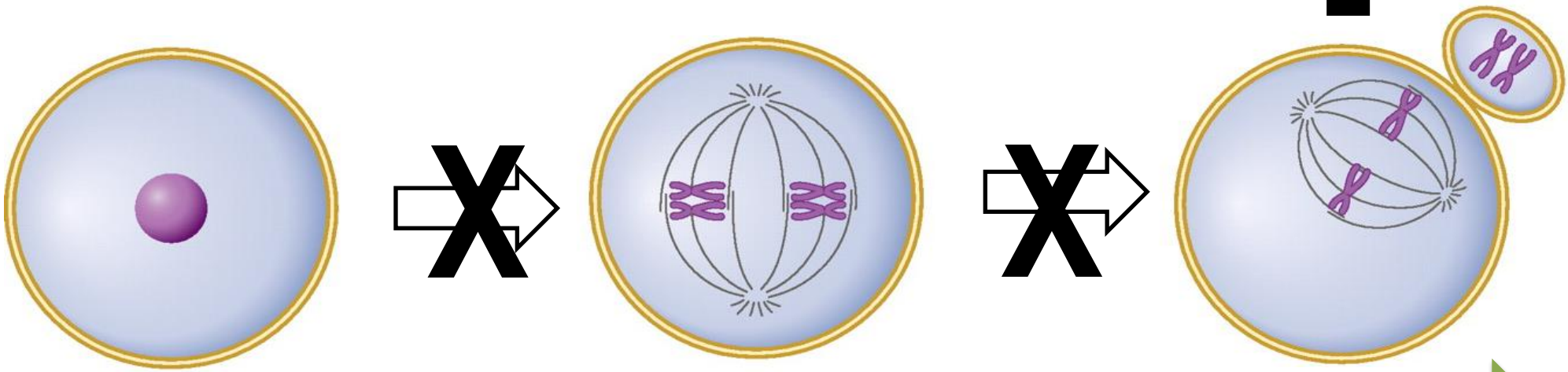




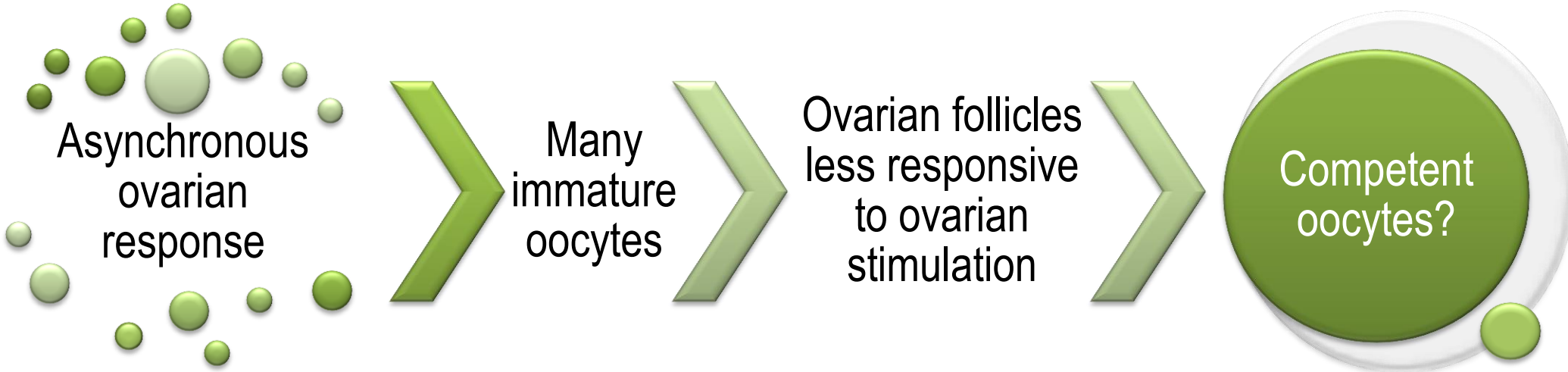
FERTILITY MEDICAL GROUP

INTRODUCTION





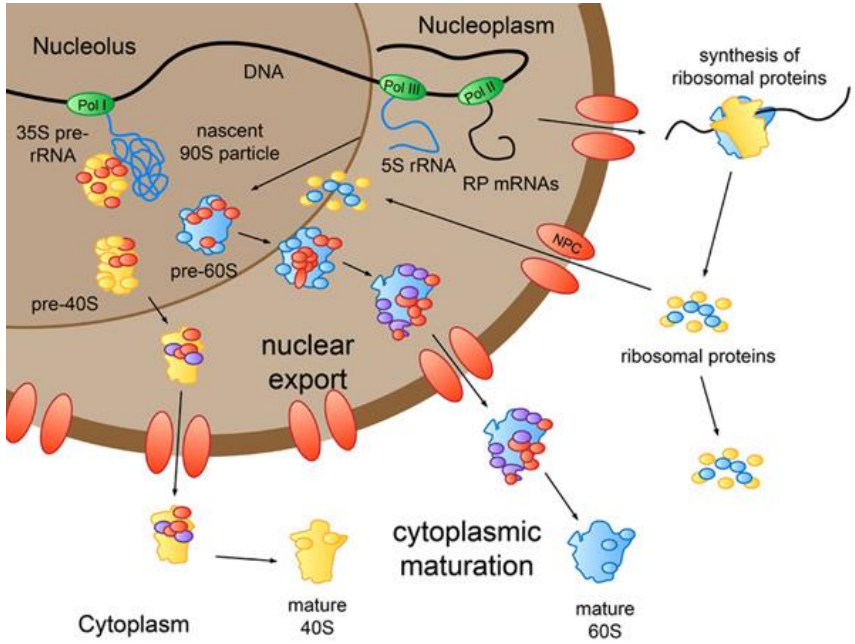
INTRODUCTION



Oocytes considered mature in the same cohort may not be fully competent for fertilization and embryo development

FERTILITY MEDICAL GROUP

INTRODUCTION



Cytoplasmic maturation completion

- No macroscopic markers
- No single observable factor

✓ Data about the impact of higher immature oocytes incidence in the developmental competence of the MII oocytes from the same cohort are scarce

FERTILITY MEDICAL GROUP

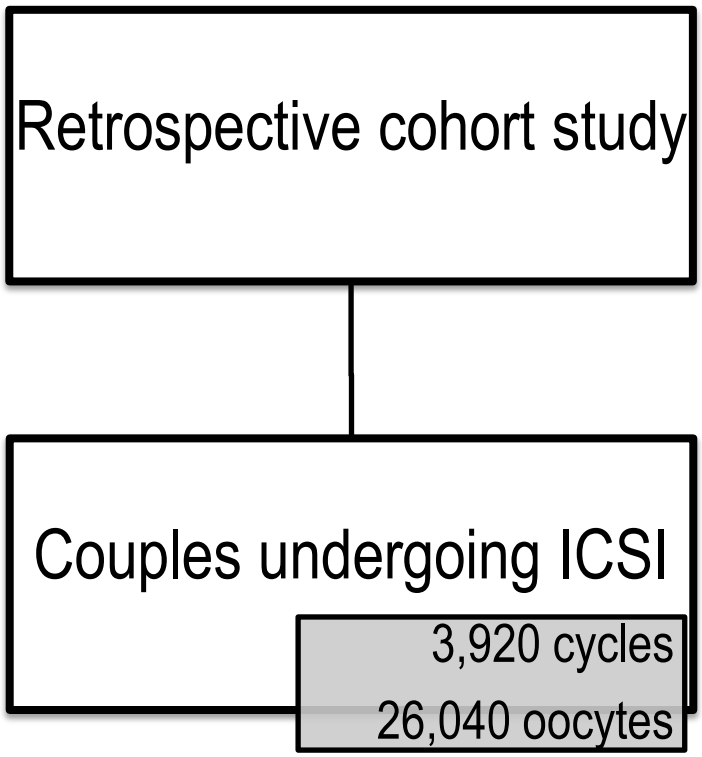
OBJECTIVE

To investigate which factors contribute to the incidence of immature oocytes

To investigate how immature oocytes impact the outcomes of mature oocytes from the same cohort

MATERIALS AND METHODS

- STUDY DESIGN



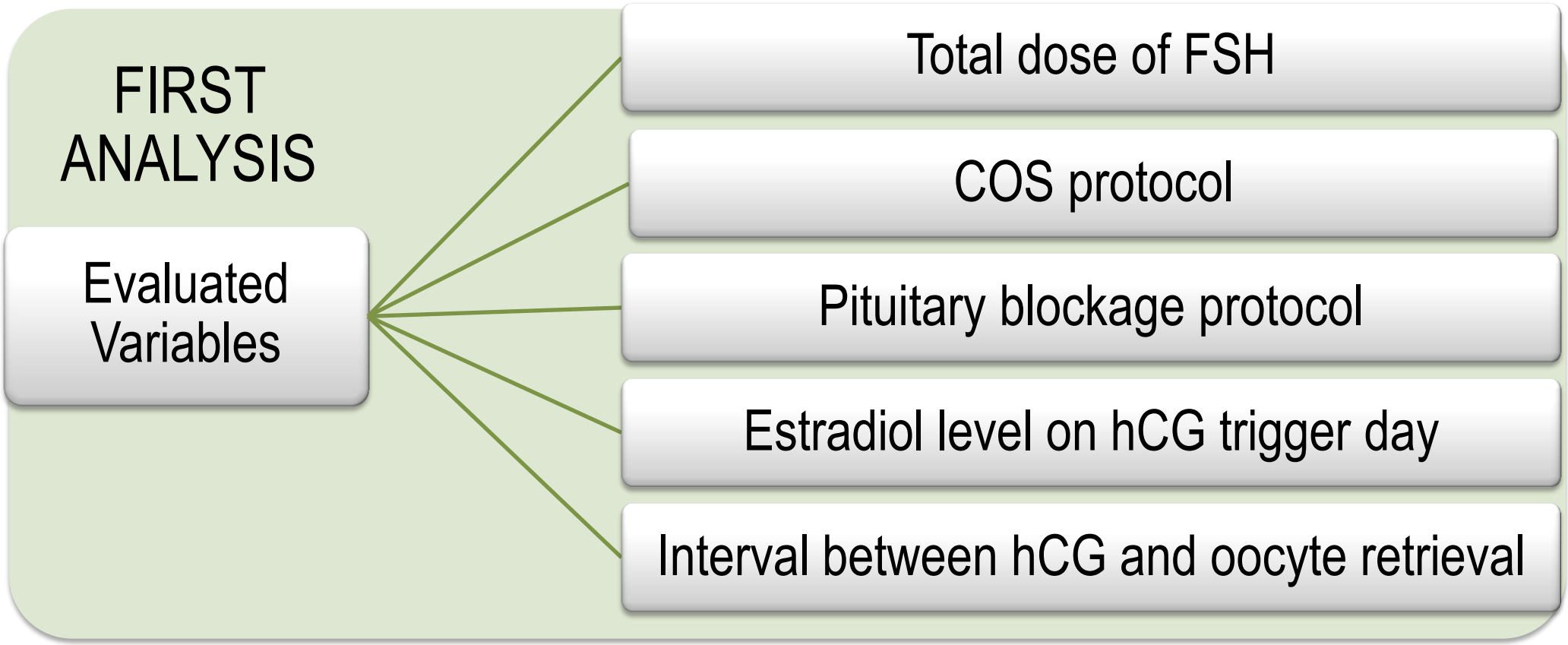
Generalized linear models

- Correlation of COS protocols and doses on immature oocyte incidence and rates

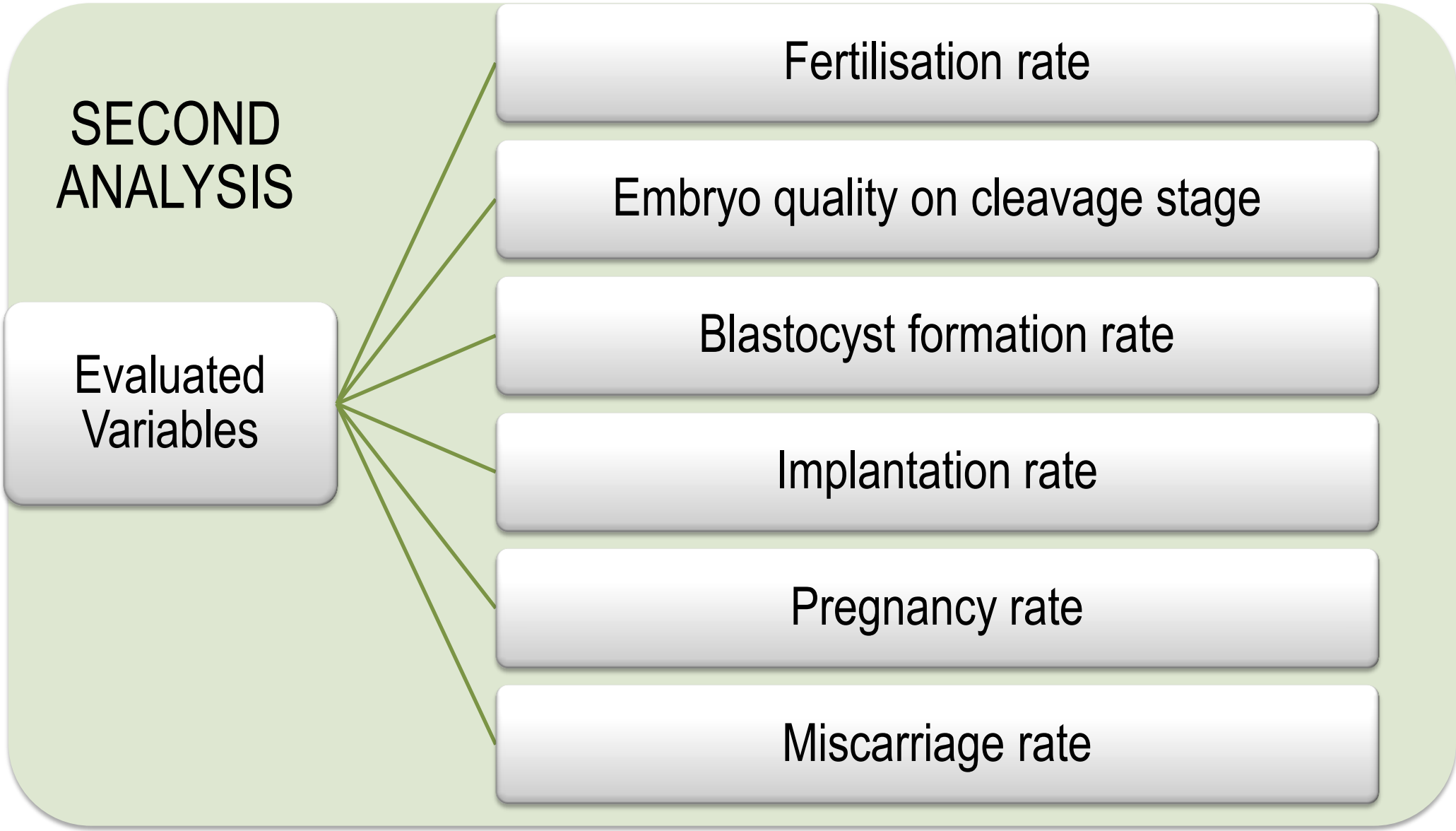
Regression models

- The effects of immature oocytes rates on ICSI outcomes

MATERIALS AND METHODS



MATERIALS AND METHODS



MATERIALS AND METHODS

Discriminant analysis for pregnancy outcome prediction

- MI/oocyte rate
- GV/oocyte rate
- Female age
- Total FSH dose
- Number of retrieved oocytes
- Number of transferred embryos
- Endometrial thickness

Data grouped according with established cut-off for MI/oocyte rate

General Linear Model followed by Tukey post hoc

MATERIALS AND METHODS

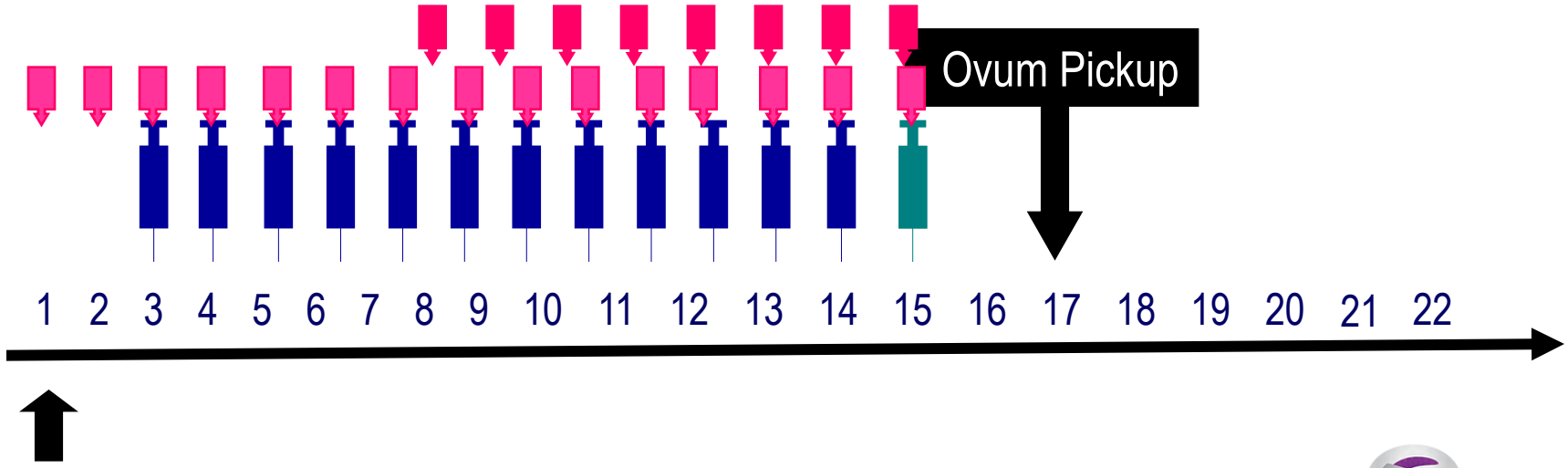
Controlled Ovarian Stimulation

GnRH Antagonist or Agonist

rFSH or rFSH + rLH

rhCG

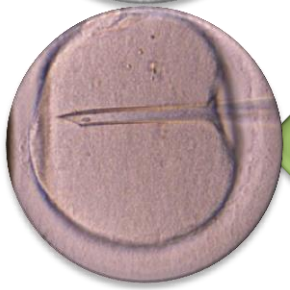
E2



FERTILITY MEDICAL GROUP

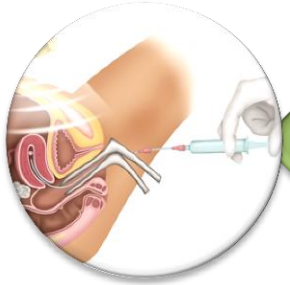
MATERIALS AND METHODS

Incubation, denudation and nuclear maturation evaluation



ICSI - (Palermo et al., 1992)

Embryo culture until day 5

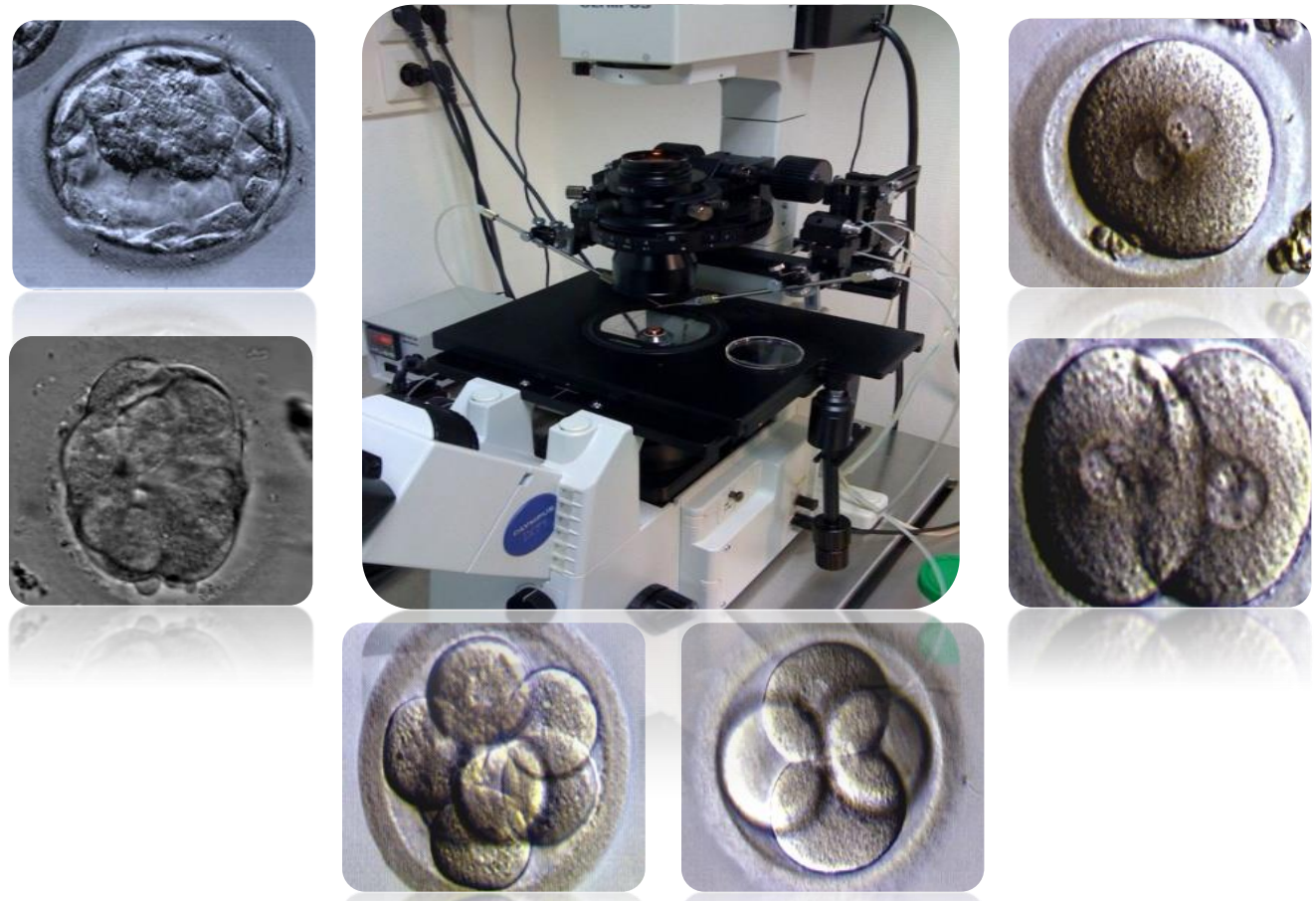


One or two blastocysts transferred

FERTILITY MEDICAL GROUP

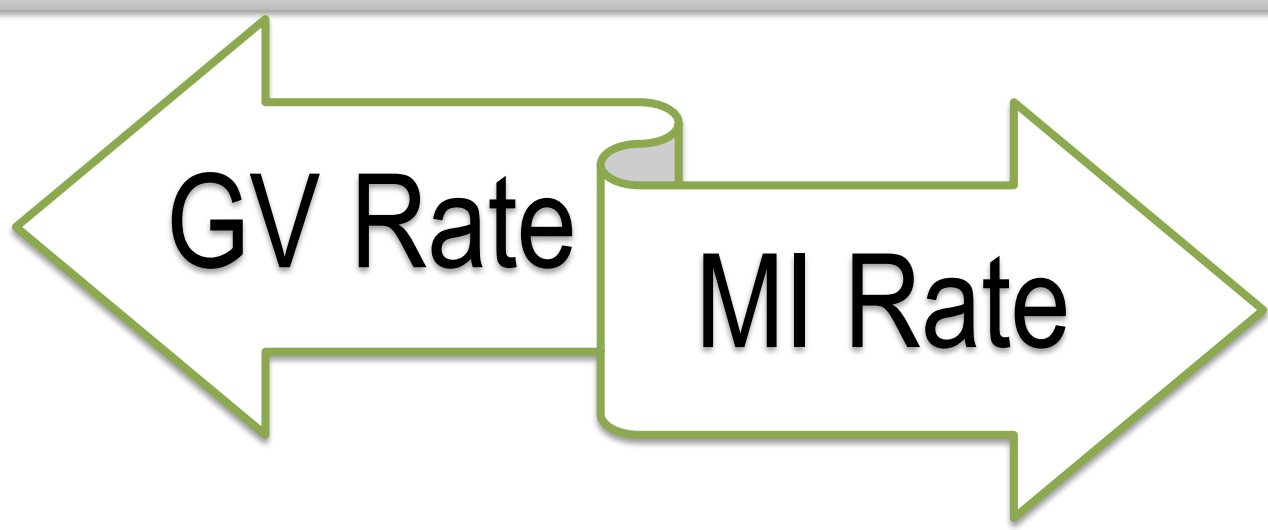
MATERIALS AND METHODS

- EMBRYO MORPHOLOGY AND EMBRYO TRANSFER



FERTILITY MEDICAL GROUP

RESULTS



(Pearson's r= -0.079 p<0.001)

Each rate was evaluated separately.

FERTILITY MEDICAL GROUP

RESULTS

Linear model analysis of the contributing factors for the number of immature oocytes and immature oocytes rates (n=3,920).

	GV incidence			MI incidence		
	R^2	β	p	R^2	β	p
FSH dose	0.050	-0.035	0.029	0.042	-0.046	0.004
E2 levels	0.155	0.342	<0.001	0.146	0.324	<0.001
hCG interval	0.050	-0.014	0.385	0.042	-0.015	0.368
	GV / retrieved oocytes			**MI / retrieved oocytes**		
	R2	β	p	R2	β	p
FSH dose	0.002	0.009	0.592	0.001	-0.009	0.567
E2 levels	0.003	0.034	0.107	0.001	0.015	0.491
hCG interval	0.003	-0.015	0.356	0.002	-0.025	0.135

RESULTS

Effect of the pituitary blockage and COS protocol on the number of immature oocytes and immature oocytes rates (n=3,920).

	GnRH antagonist			GnRH agonist		
	rFSH (n=1570)	rFSH + rLH (n=980)	p	rFSH (n=658)	rFSH + rLH (n=712)	p
MI	1.13±0.03	1.12±0.05	0.928	1.45±0.10	0.38±0.68	0.119
GV	1.33±0.05	1.36±0.08	0.731	1.46±0.14	0.40±0.93	0.263
MI/oocyte	10.75±0.36	11.33±0.59	0.405	13.40±0.91	6.32±6.19	0.147
GV/oocyte	11.01±0.36	5.93±5.40	0.042	11.52±1.12	1.86±2.10	<0.001

RESULTS

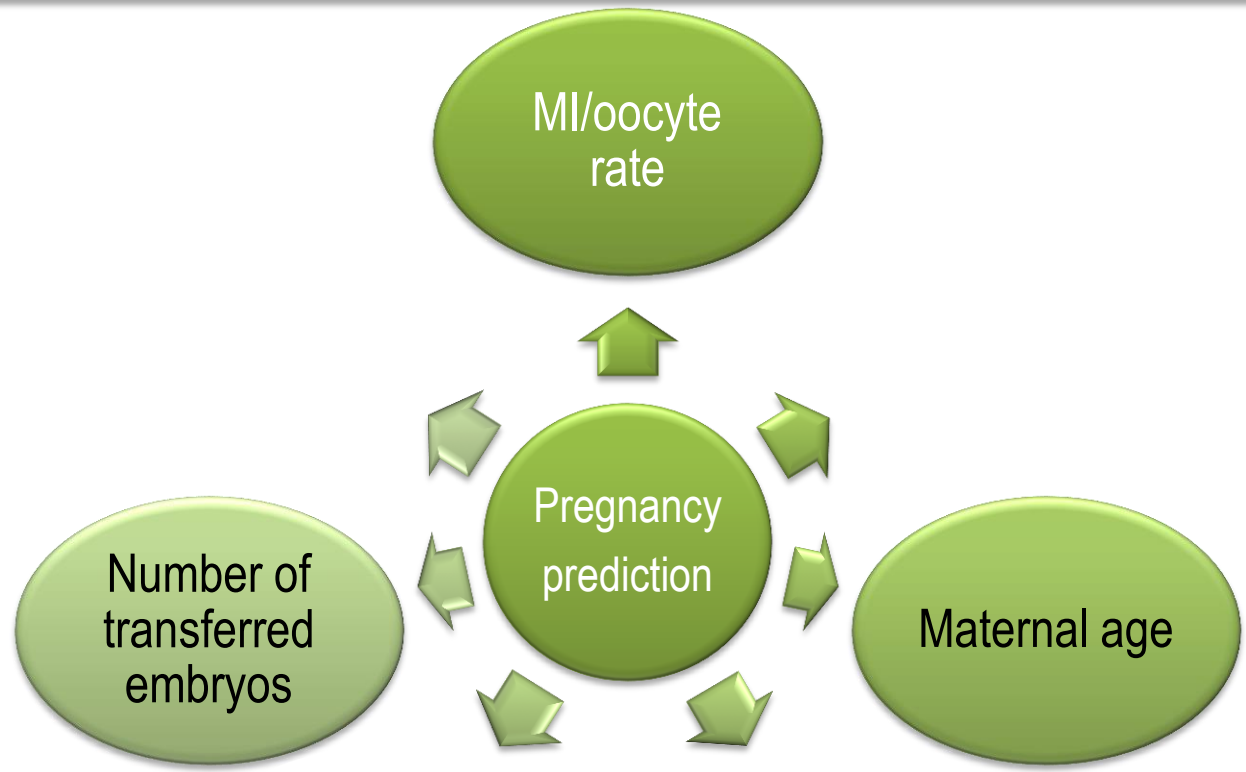
Regression analysis of the association between immature oocytes rate and ICSI outcomes

	MI/oocyte			GV/oocyte		
	R^2	β	p	R^2	β	p
Fertilization rate	0.035	-0.096	<0.001	0.029	-0.059	<0.001
High-quality embryos rate D2	0.014	-0.102	<0.001	0.008	-0.066	<0.001
High-quality embryos rate D3	0.020	-0.090	<0.001	0.020	-0.087	<0.001
Blastocyst rate	0.073	-0.066	<0.001	0.071	-0.053	<0.001
Implantation rate	0.059	-0.074	<0.001	0.056	-0.042	0.033
	B	OR	p	B	OR	p
Pregnancy rate	-0.011	0.989	0.002	-0.009	0.992	0.013
Miscarriage rate	0.010	1.011	0.220	0.006	0.944	0.418

FERTILITY MEDICAL GROUP

RESULTS

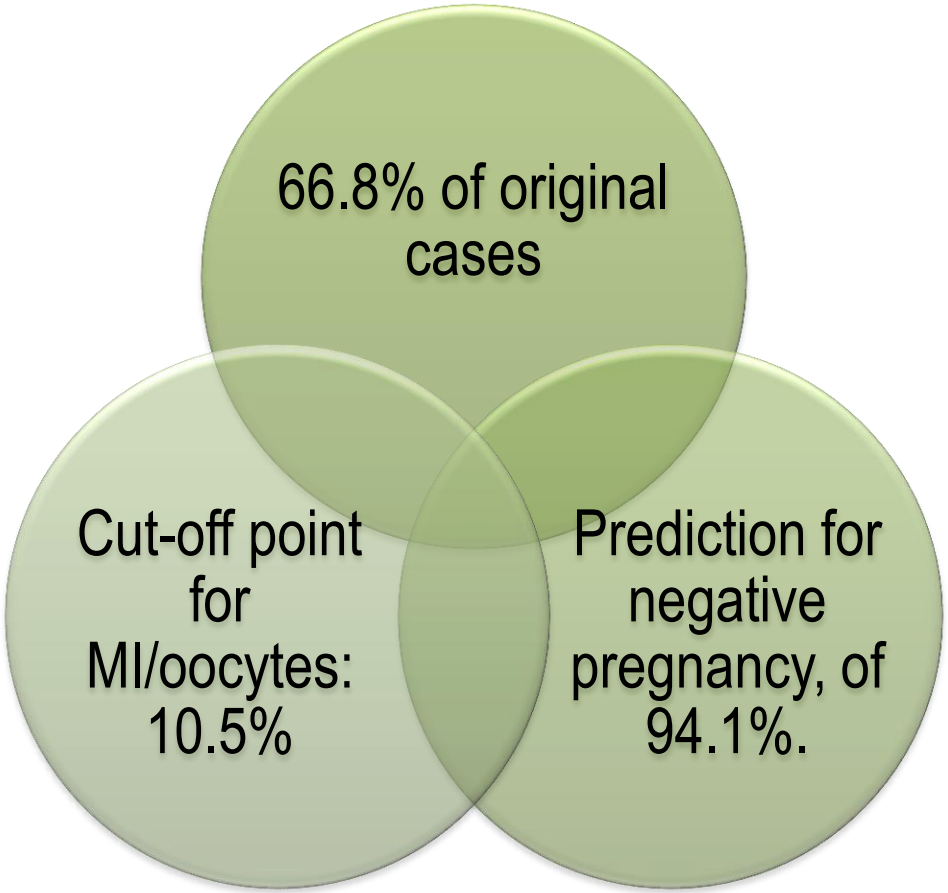
Discriminant analysis for pregnancy outcome prediction

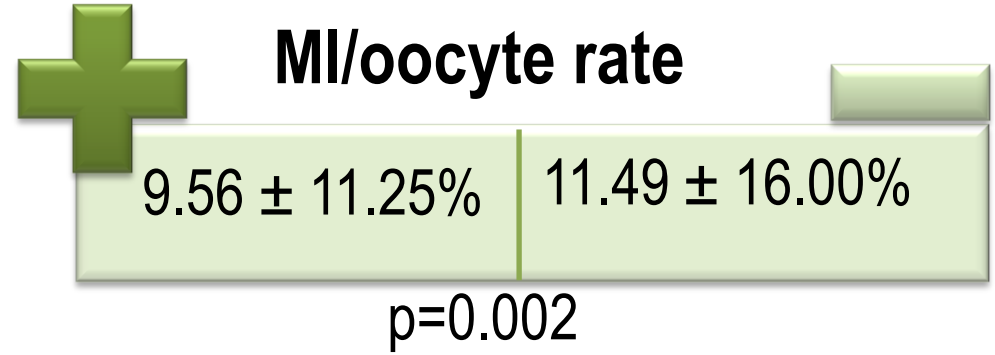


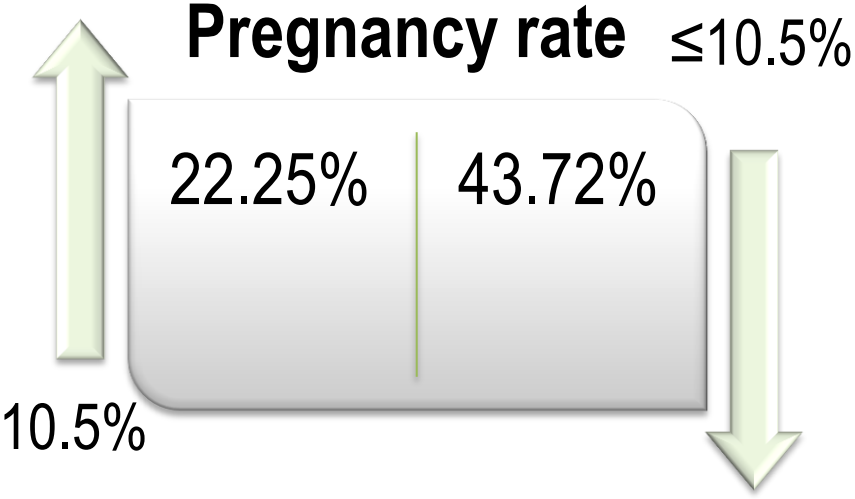
FERTILITY MEDICAL GROUP

RESULTS

Discriminant analysis for pregnancy outcome prediction







CONCLUSION

The immature oocyte incidence is affected by the COS protocol and gonadotrophin dose

Immature oocyte incidence negatively impacts laboratorial and clinical ICSI outcomes

FERTILITY MEDICAL GROUP

WIDER IMPLICATIONS OF THE FINDINGS

The incidence of immature oocytes may reflect the competence of the whole cohort

Mature oocytes derived from cycles with higher incidence of immature oocytes may have poor embryo development and low implantation potential

These findings highlight the importance of the COS protocol and the gonadotrophin dose for the outcomes of assisted reproduction cycles

FERTILITY MEDICAL GROUP

FERTILITY®
MEDICAL GROUP

www.fertility.com.br