

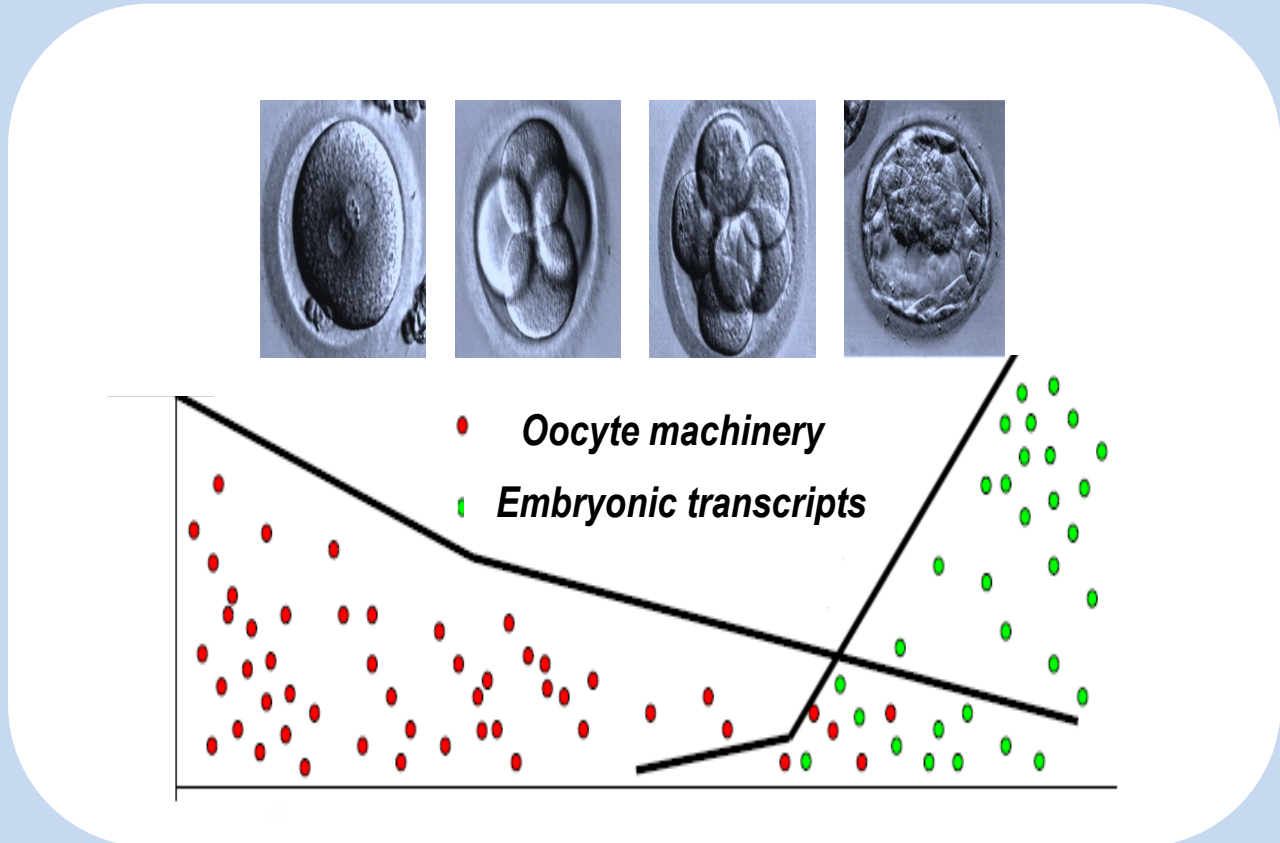
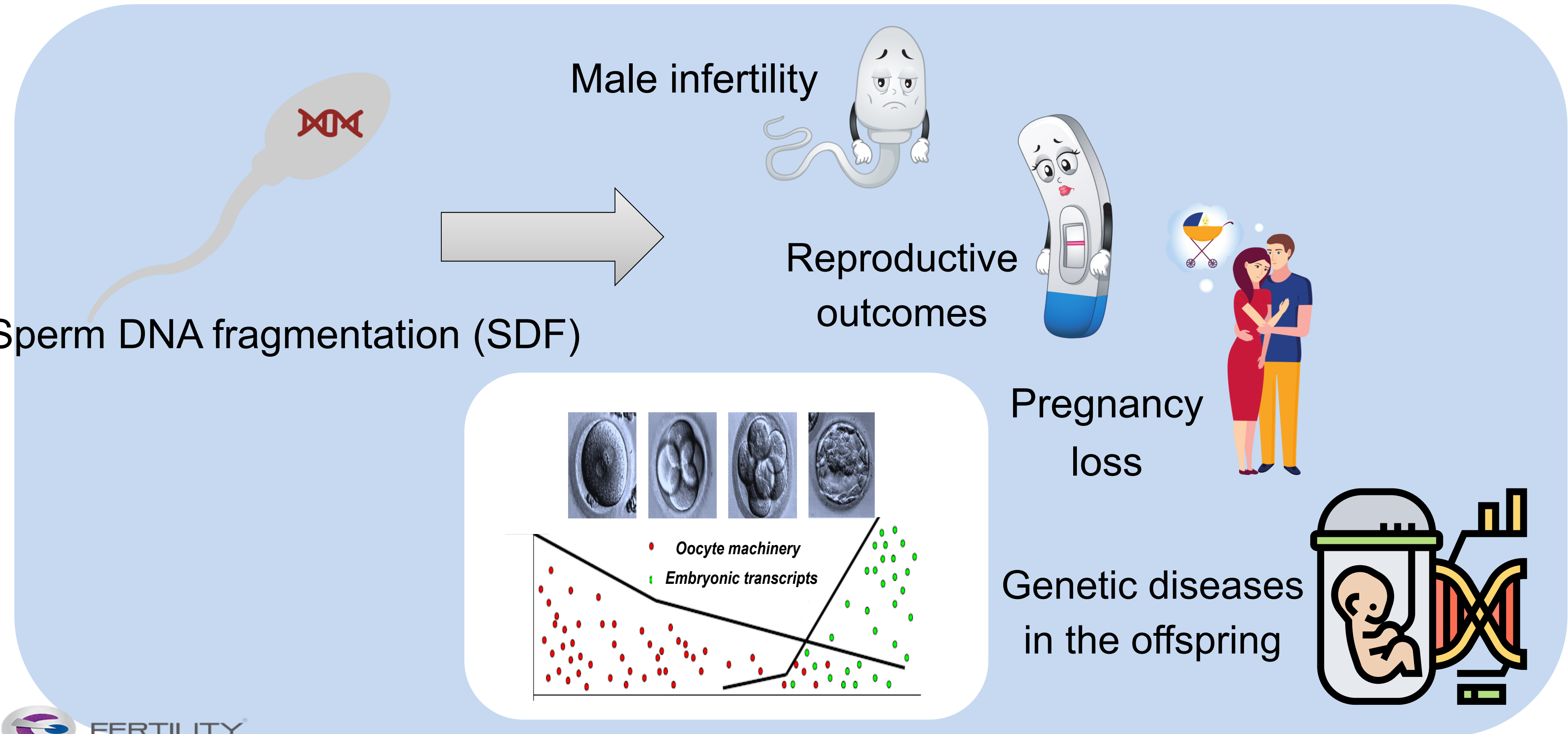


FERTILITY[®]
MEDICAL GROUP

HIGH SPERM DNA FRAGMENTATION INDEX NEGATIVELY IMPACTS EMBRYO MORPHOKINETICS, BUT NOT EMBRYO MORPHOLOGY AND DEVELOPMENT RATES: THE IMPORTANCE OF TIME-LAPSE IMAGING SYSTEM

Edson Borges Jr., Amanda Setti, Daniela Paes de Almeida Ferreira Braga, Rodrigo Rosa Provenza, Patrícia Guilherme, Assumpto Iaconelli Jr.

INTRODUCTION



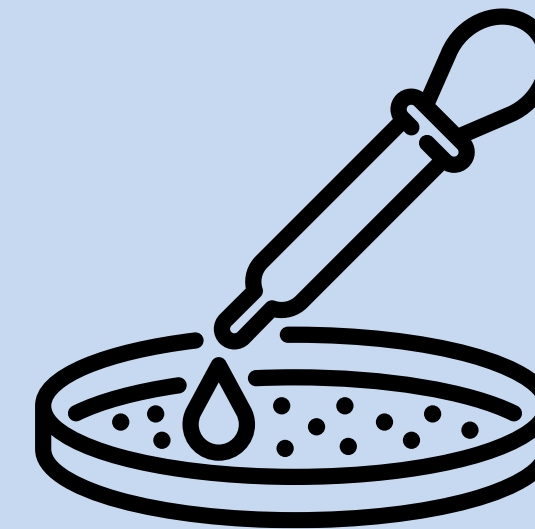
INTRODUCTION



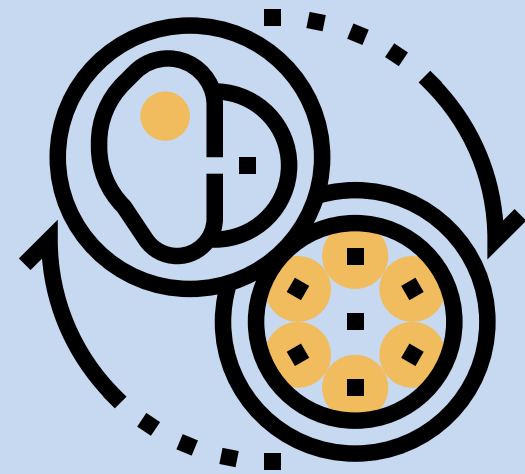
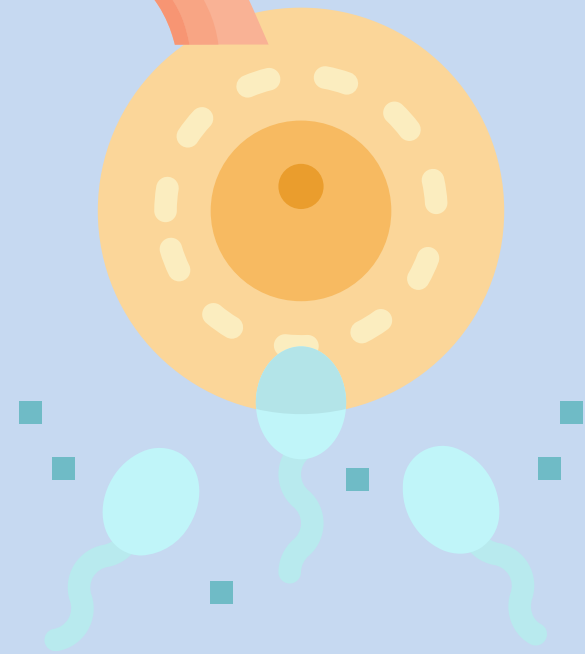
Parental age



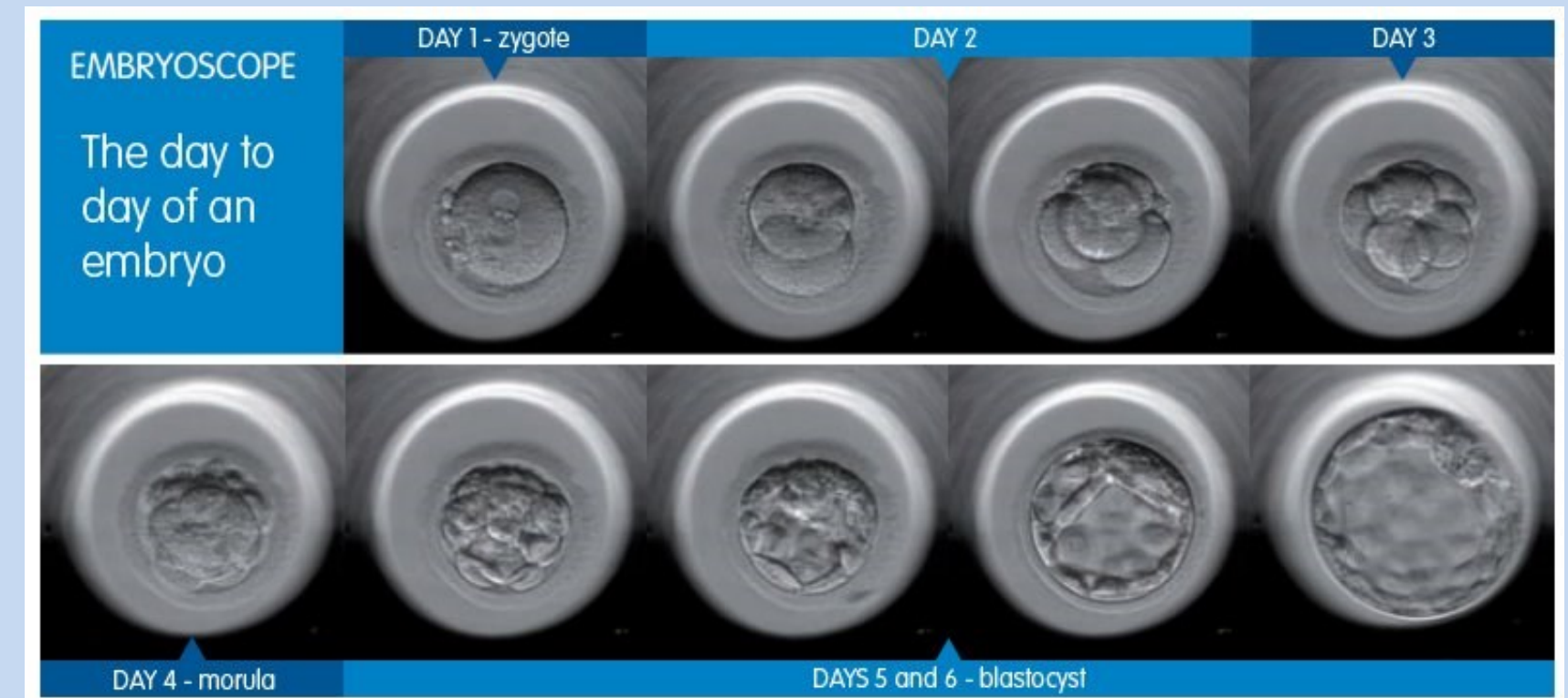
COS



Culture media



Intrinsic embryonic quality



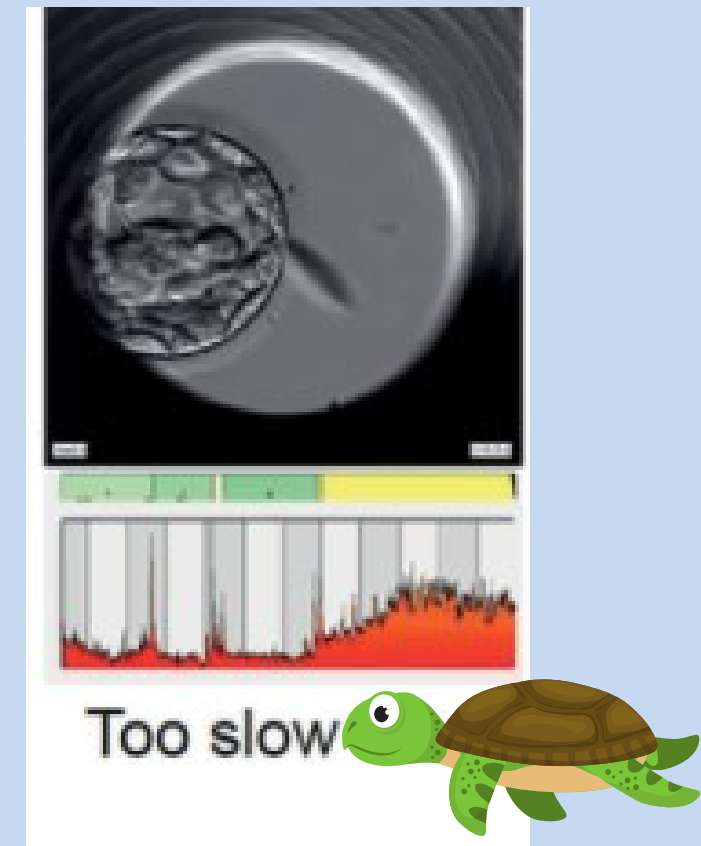
Time-lapse imaging (TLI)

INTRODUCTION



Hypothesis

DNA fragmentation may interfere with speed and pattern of cell divisions

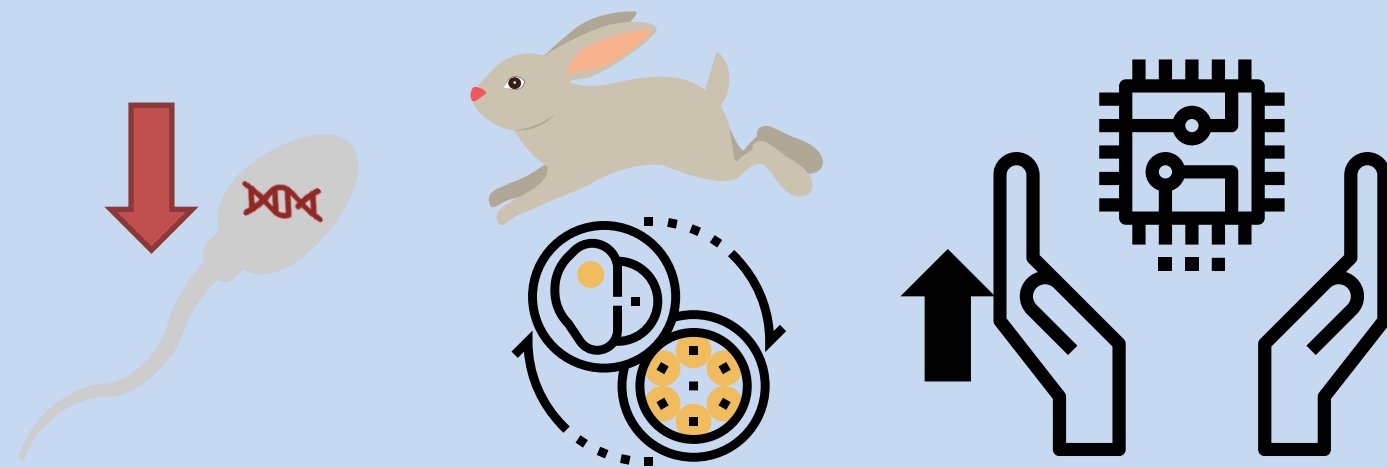


INTRODUCTION

> *Reprod Biol.* 2015 Jun;15(2):94-100. doi: 10.1016/j.repbio.2015.03.003. Epub 2015 Apr 2.

The effect of sperm DNA fragmentation on the dynamics of the embryonic development in intracytoplasmic sperm injection

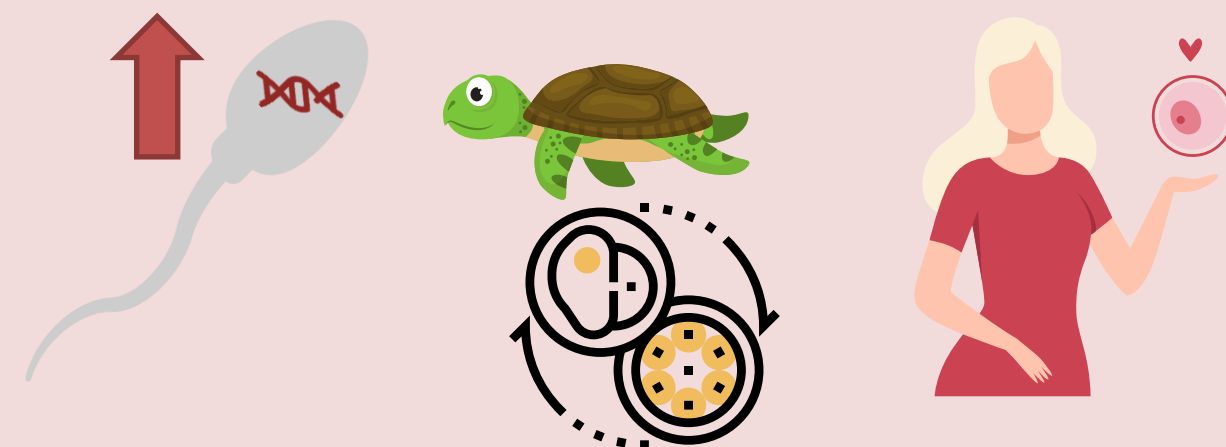
Artur Wdowiak¹, Szymon Bakalczuk², Grzegorz Bakalczuk³



> *Andrology.* 2018 Sep;6(5):697-706. doi: 10.1111/andr.12551. Epub 2018 Sep 26.

High sperm DNA fragmentation delays human embryo kinetics when oocytes from young and healthy donors are microinjected

M Esbert¹, A Pacheco², S R Soares³, D Amorós¹, M Florensa¹, A Ballesteros¹, M Meseguer⁴

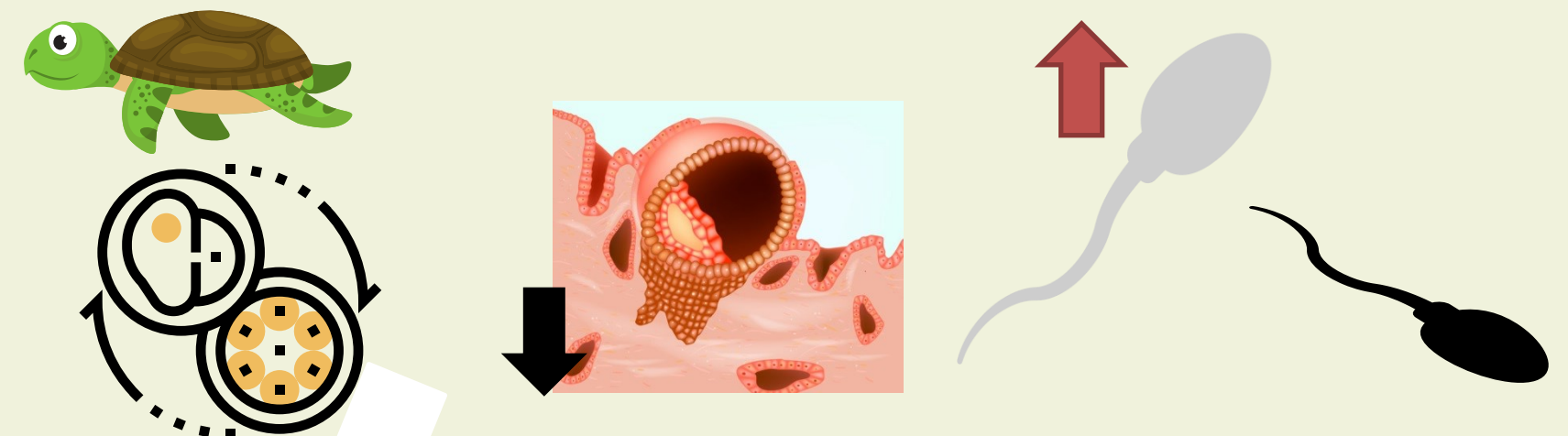


Observational Study > *Fertil Steril.* 2019 Apr;111(4):699-707.e1.

doi: 10.1016/j.fertnstert.2018.11.035. Epub 2019 Feb 28.

Double-stranded sperm DNA damage is a cause of delay in embryo development and can impair implantation rates

Aida Casanovas¹, Jordi Ribas-Maynou², Sandra Lara-Cerrillo², Ana Raquel Jimenez-Macedo¹, Olga Hortal¹, Jordi Benet³, Joan Carrera¹, Agustín García-Peiró⁴



OBJECTIVE

To investigate if TLI can identify morphokinetic events impacted by high DFI, irrespective of conventional morphological embryo assessment and development rate

MATERIAL AND METHODS

Study desing

Historical cohort

March 2019 - August 2020

Private university-affiliated IVF center

1st attempt

118 ICSI cycles

Idiopathic male factor infertility

978 embryos

< 30% SDF
n=84

≥ 30% SDF
n=34

Oligo

Astheno

Terato

TLI incubator

D5

Or any combination

Timing of specific events

MATERIAL AND METHODS

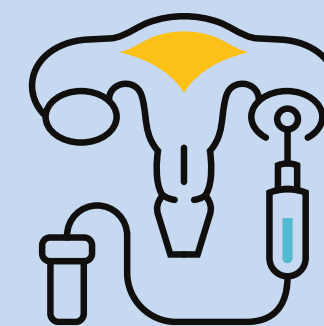
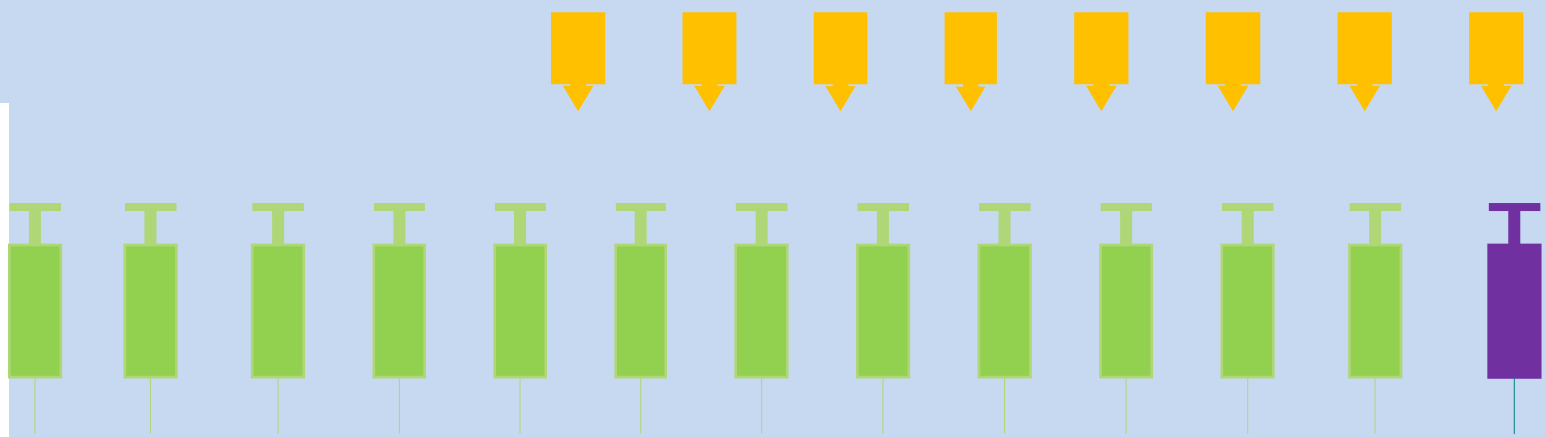
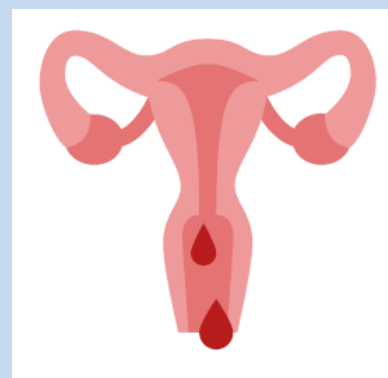
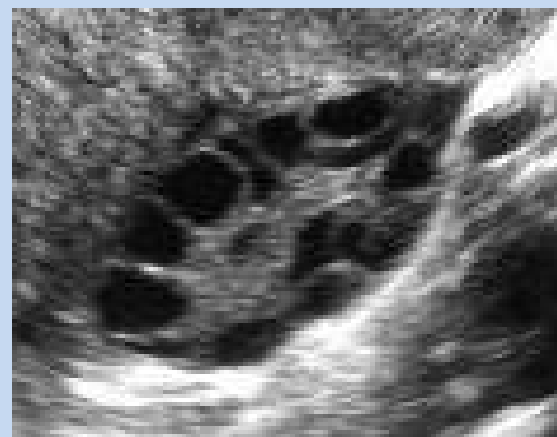
Controlled ovarian stimulation

GnRH Antagonist

Recombinant FSH

Recombinant hCG

E2

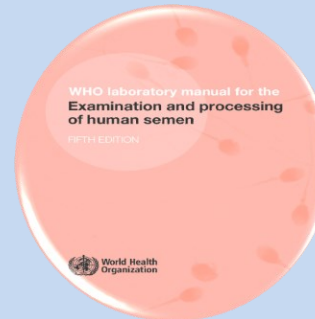
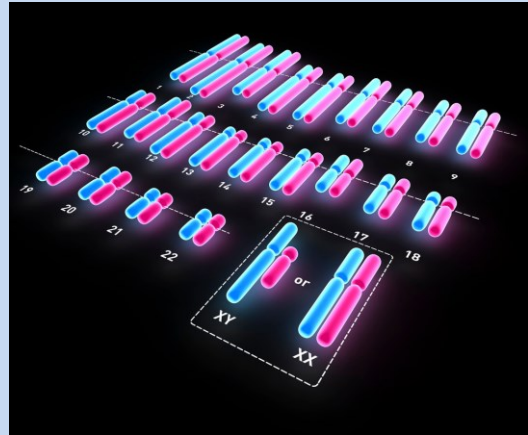


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22

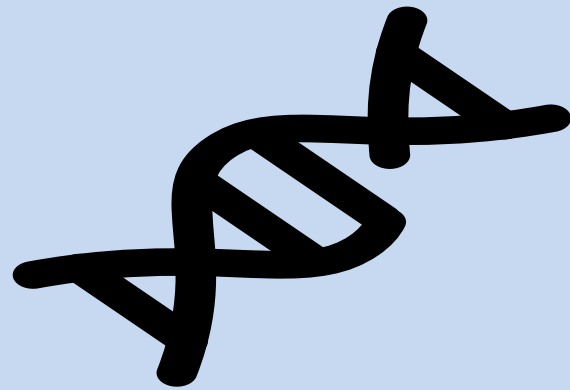


MATERIAL AND METHODS

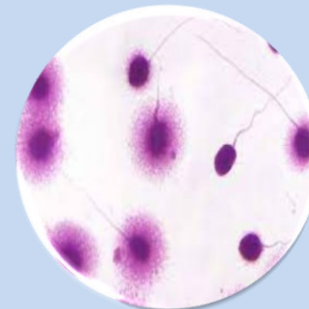
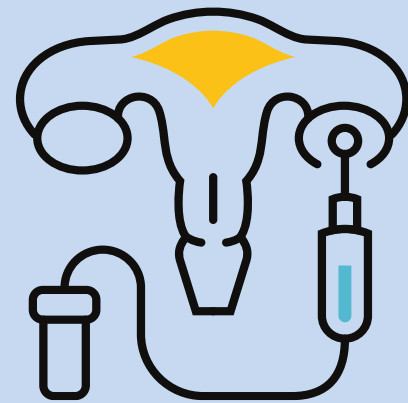
Male partner workup



WHO guidelines, 2010



2-layered density gradient centrifugation



Sperm chromatin dispersion (SCD) test

MATERIAL AND METHODS

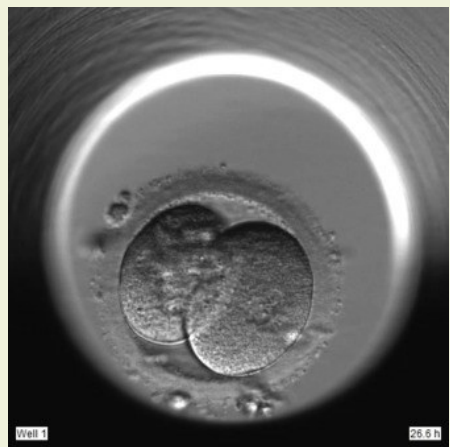
Embryo culture



Until day 5

11 focal planes

Every 10 minutes



Multinucleation

Abnormal cleavage patterns



One or two embryos transferred

MATERIAL AND METHODS

Data analysis and statistics

Post hoc power analysis



GPower 3.1

α 5%



IBM SPSS
Statistics

GzLM

Independent: DFI groups

527
blastocysts

Effect
tB

Bonferroni post hoc

Dependent: kinetic markers

Superior to 80%

Timing of specific events

Covariates: maternal and paternal
ages, retrieved oocytes, EA

Mean \pm SD

OR with 95% CI

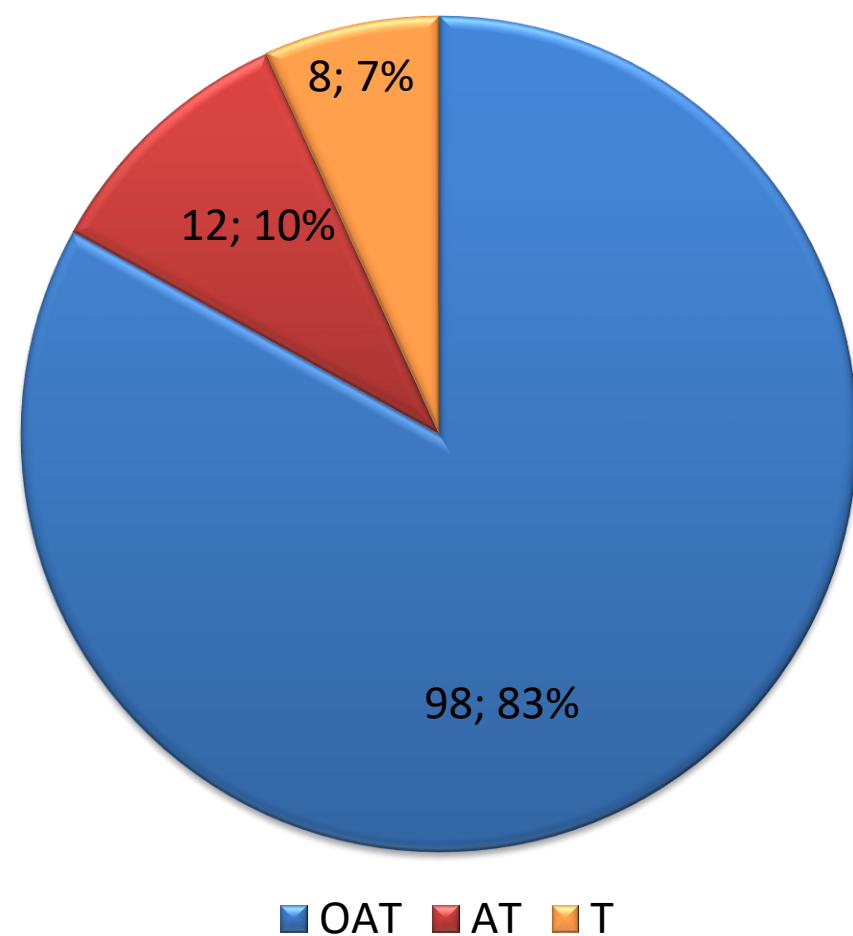
p-values (5%)



RESULTS

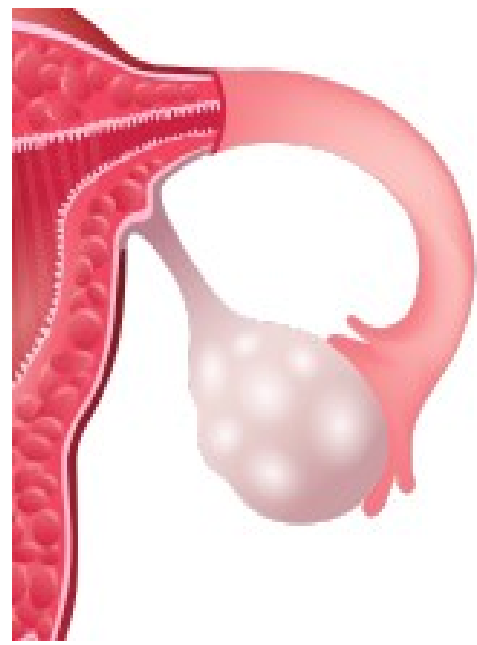


Semen analysis



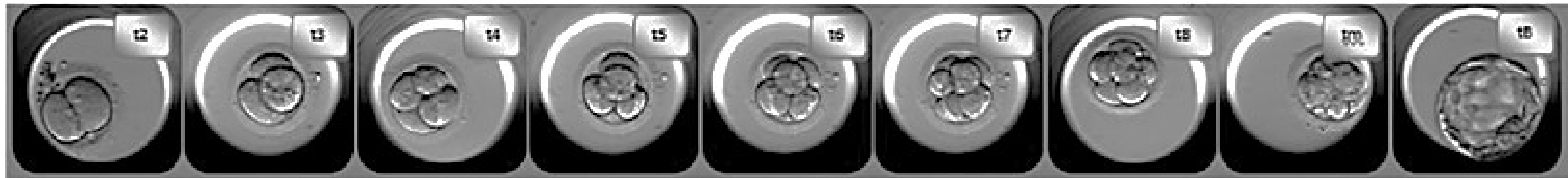
Variable	<30% DFI (n=84)	≥30% DFI (n=34)	p-value
Semen analysis			
Male age (years)	39.7 ± 5.0	38.8 ± 6.6	0.457
Ejaculatory abstinence length (days)	2.4 ± 0.9	2.6 ± 0.6	0.092
Sperm DFI (%)	18.2	42.8	<0.001
Semen volume (mL)	3.0 ± 2.9	2.6 ± 0.9	0.430
Sperm concentration (x10 ⁶ /mL)	8.9 ± 12.7	9.1 ± 11.1	0.961
Sperm count (x10 ⁶)	34.3 ± 87.9	24.7 ± 31.3	0.416

RESULTS



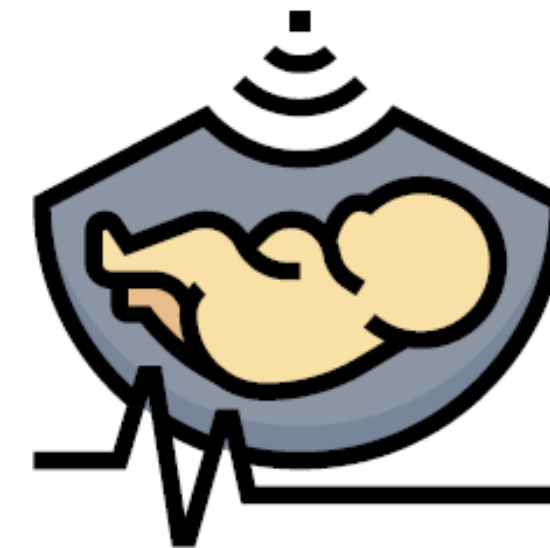
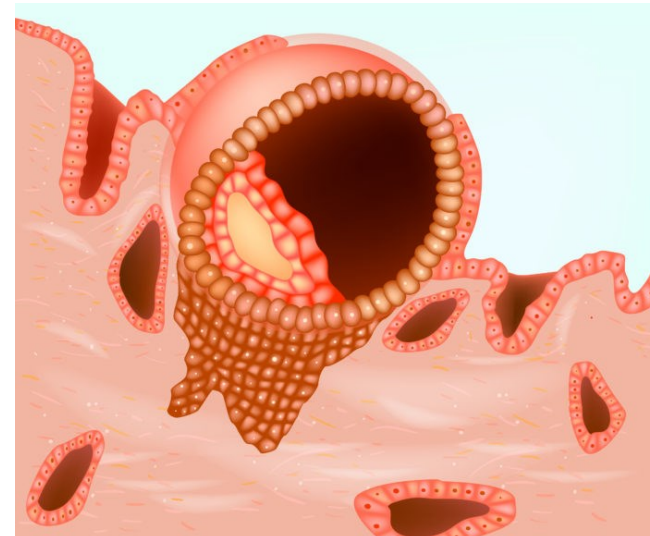
Variable	<30% DFI (n=84)	≥30% DFI (n=34)	p-value
Female age (years)	35.9 ± 4.2	36.9 ± 1.9	0.078
Female BMI	24.0 ± 3.3	24.6 ± 4.8	0.466
<i>COS outcomes</i>			
Total dose of FSH (IU)	2731.9 ± 905.7	2528.1 ± 726.9	0.265
Estradiol level on hCG trigger (pg/mL)	2560.0 ± 1444.0	2442.1 ± 1983.1	0.804
Follicles (n)	15.8 ± 5.9	16.3 ± 9.6	0.754
Retrieved oocytes (n)	11.6 ± 5.7	11.3 ± 5.6	0.842
Mature oocyte rate (%)	78.5	82.4	0.195
<i>IVF lab outcomes</i>			
Fertilization rate (%)	73.0	76.6	0.416

RESULTS



Morphokinetic data (hours)	<30% DFI (n=592)	≥30% DFI (n=386)	p-value
tPNa	6.1 ± 0.2	6.8 ± 0.2	0.030
tPNf	23.0 ± 0.3	24.2 ± 0.3	0.009
t2	25.4 ± 0.3	26.9 ± 0.3	0.002
t3	34.8 ± 0.3	37.3 ± 0.4	<0.001
t4	37.5 ± 0.4	39.3 ± 0.4	0.003
t5	46.2 ± 0.5	49.5 ± 0.6	<0.001
t6	49.7 ± 0.5	52.8 ± 0.6	0.001
t7	52.4 ± 0.6	55.6 ± 0.7	0.001
t8	56.2 ± 0.7	58.9 ± 0.8	0.017
tSB	97.5 ± 1.5	105.9 ± 1.7	0.002
tB	108.6 ± 0.8	112.4 ± 1.2	0.016

RESULTS

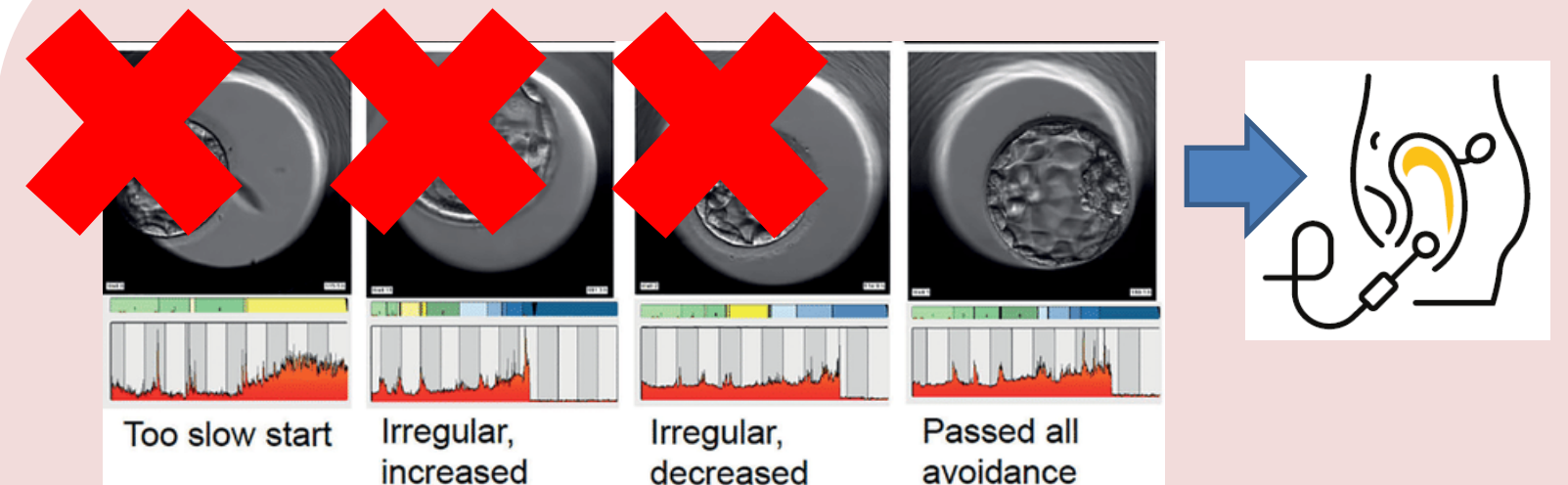


Variable	<30% DFI (n=84)	≥30% DFI (n=34)	p-value
<i>Clinical outcomes</i>			
Transferred embryos (n)	1.5 ± 0.5	1.5 ± 0.5	0.775
Implantation rate (%)	25.6	25.0	0.922
Pregnancy rate (%)	40/70 (57.1)	14/25 (56.0)	0.921
Miscarriage rate (%)	7/40 (17.5)	3/14 (21.4)	0.708

WIDER IMPLICATIONS OF THE FINDINGS

The findings presented here highlight the importance of TLI in the presence of high sperm DFI.

Variable	<30% DFI	≥30% DFI
Blastocyst development (%)	53.1	55.1
High-quality blastocyst rate (%)	87.9	86.2



Clinical outcomes (%)	<30% DFI	≥30% DFI
Implantation rate	25.6	25.0
Pregnancy rate	57.1	56.0
Miscarriage rate	17.5	21.4

> [Hum Reprod.](https://doi.org/10.1093/humrep/der256) 2011 Oct;26(10):2658-71. doi: 10.1093/humrep/der256. Epub 2011 Aug 9.

The use of morphokinetics as a predictor of embryo implantation

Marcos Meseguer¹, Javier Herrero, Alberto Tejera, Karen Marie Hilligsøe, Niels Birger Ramsing, Jose Remohí

CONCLUSION

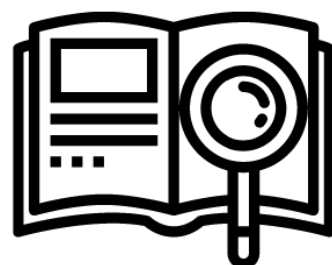
Embryo morphokinetic parameters are negatively impacted by high sperm DFI, resulting in delayed cell cleavage and blastulation, whereas conventional morphological embryo assessment and blastocyst development rate are not related to DNA integrity

STAFF



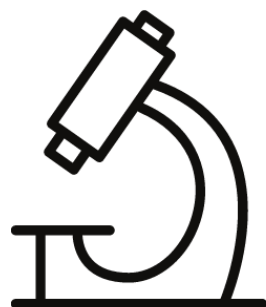
Clinical Board

Assumpto Iaconelli Júnior
Edson Borges Junior



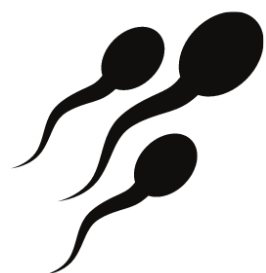
Research and Education

Amanda Setti Raize
Christina Rumi Morishima
Daniela Paes De Almeida F. Braga
Joana Nogueres Simas



IVF Laboratory

Kelly C. Pinheiro Precipito
Livia Silvia Vingris
Patrícia Guilherme
Tatiana Nunes de Melo



Andrology Laboratory

Rodrigo Rosa Provenza



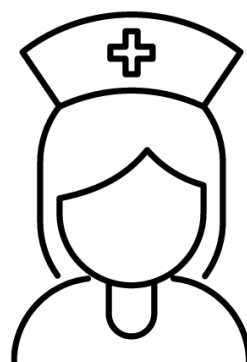
Psychology

Rose Marie Massaro Melamed



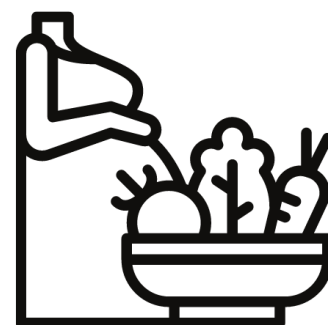
Support

Edson Pinheiro Ribeiro
Janaína Gomes Pinho da Silva
Katia Rodrigues
Lorrana de Souza Anjos
Lucácio de Souza Anjos
Marcos Vinícius de Sousa
Simone de S. Carvalho
Leonardo S. Lopes



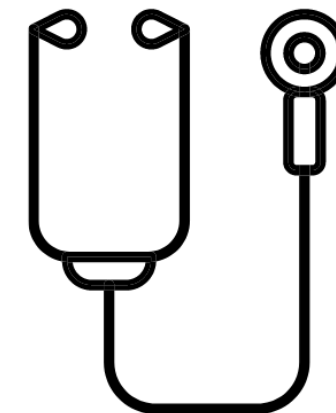
Nursing Team

Larissa Rodrigues Gonçalves
Maria Regina Soares da Silva
Rosieli Patricia A. da Silva
Vera Lucia Alves
Ariele Raiane B. Araujo
Gabriela Lima Almeida
Stefany N. Coelho



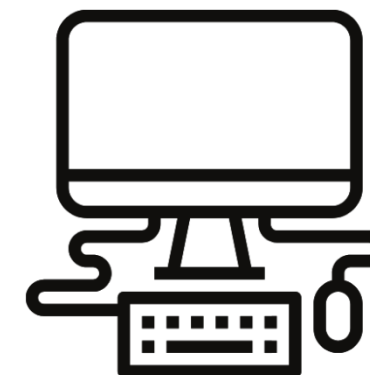
Nutrition

Gabriela Halpern



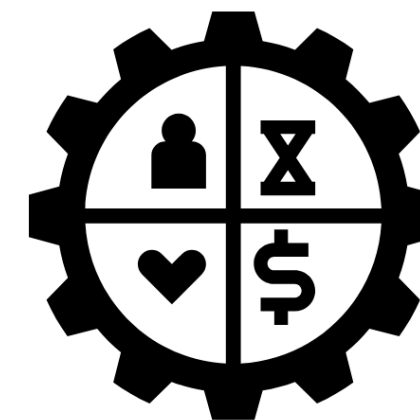
Clinical Body

Assumpto Iaconelli Júnior
Edson Borges Junior
Barbara Brigati
Carla Iaconelli
Edward Carrilho
Fernanda Montenegro
Graziela C. Chaves Carvalho
Mauro Bibancos De Rose
Natalia Grandini Tannous
Paula Ferreiro Vieira



Information Technology

Marcelo Alexandre Baptista



Administration

Margaret Meira
Fabiana Garcia



Pharmacy

Maria das Neves Fernandes