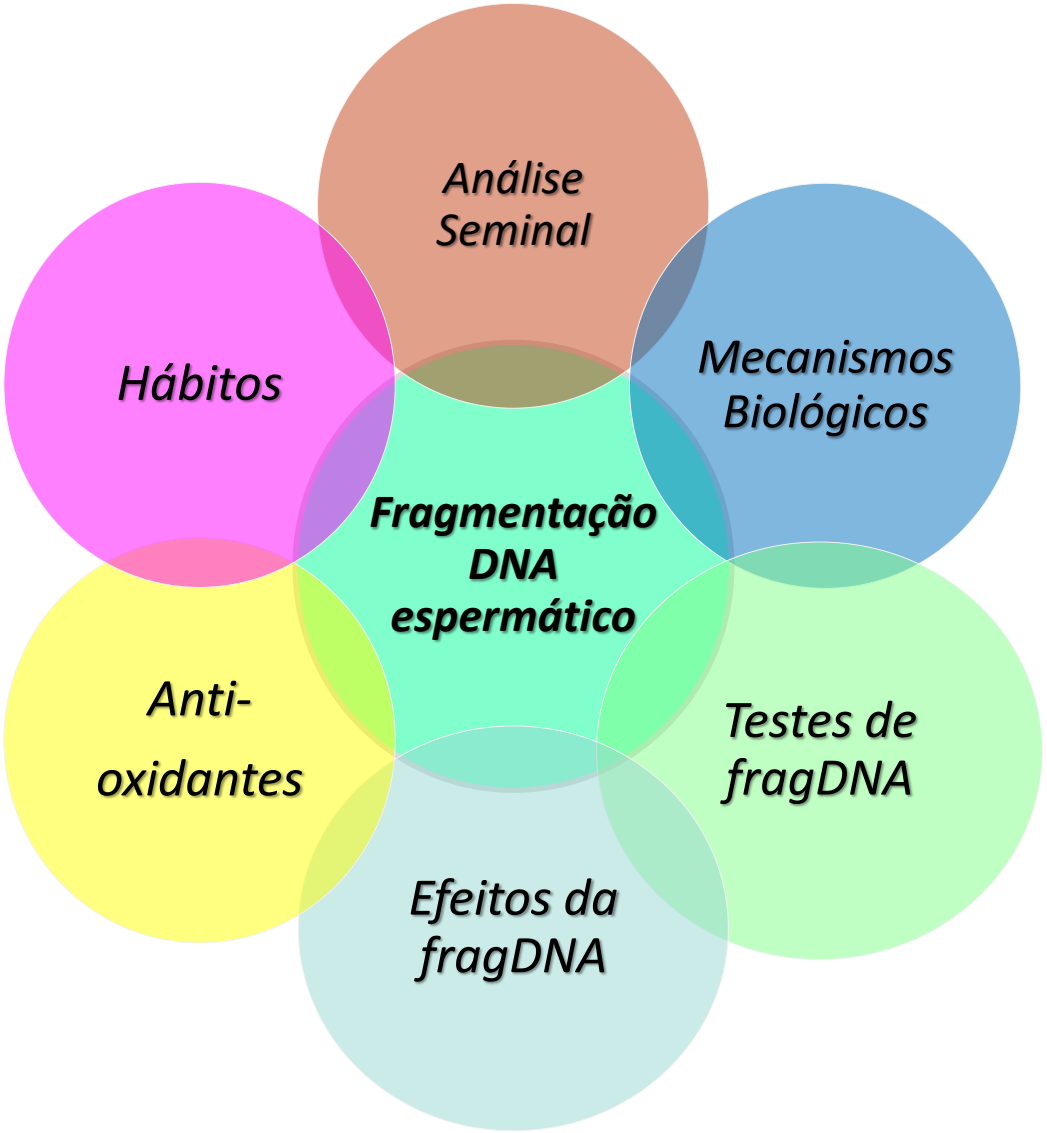
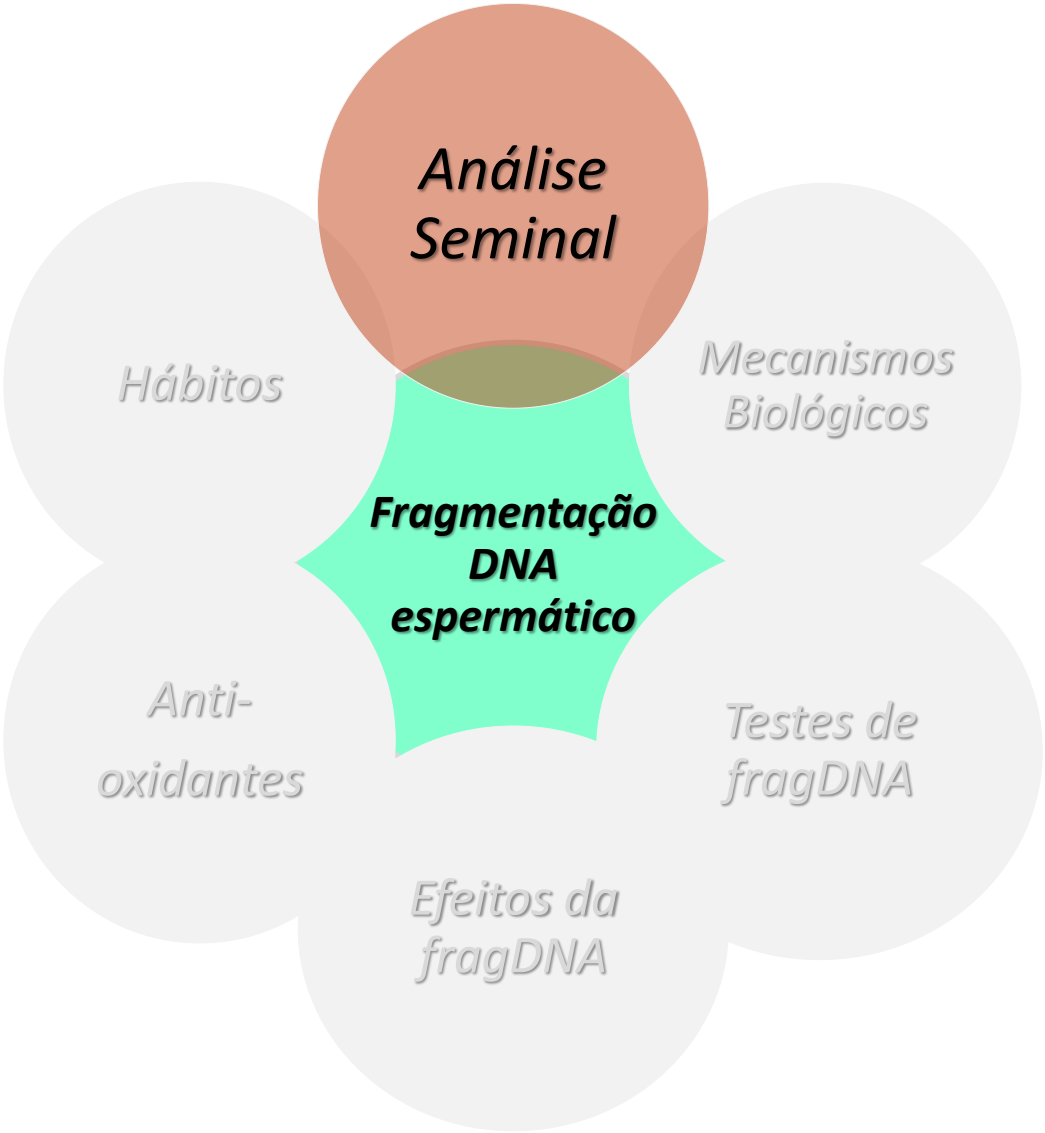
Fragmentação do DNA espermático

Edson Borges Jr.

FERTILITY


Análise Seminal
Hábitos
Mecanismos Biológicos
Fragmentação DNA espermático
Anti-oxidantes
Testes de fragDNA
Efeitos da fragDNA

FERTILITY


Análise Seminal
Hábitos
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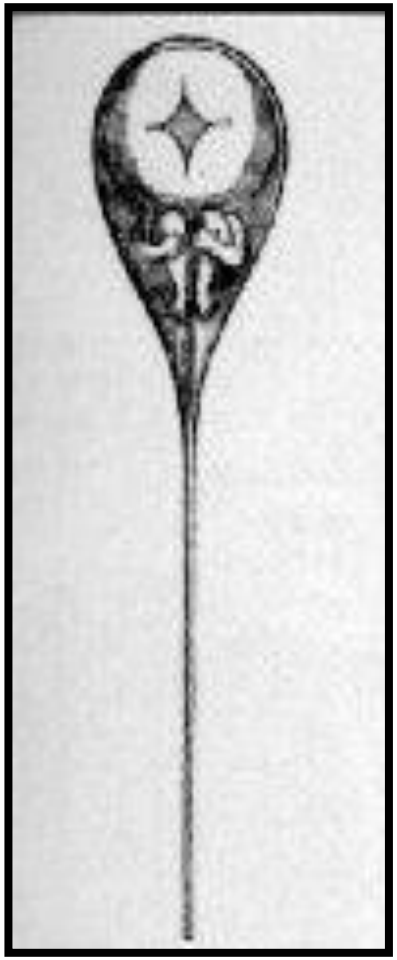
Fragmentação DNA espermático
Anti-oxidantes
Testes de fragDNA
Efeitos da fragDNA

FERTILITY

Análise Seminal

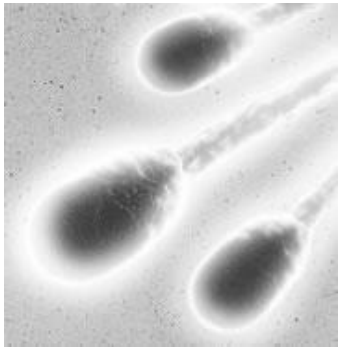
- *Análise Macroscópica*
  cor, viscosidade, pH, volume, liquefação
- *Análise Microscópica*
  concentração, motilidade, morfologia



FERTILITY

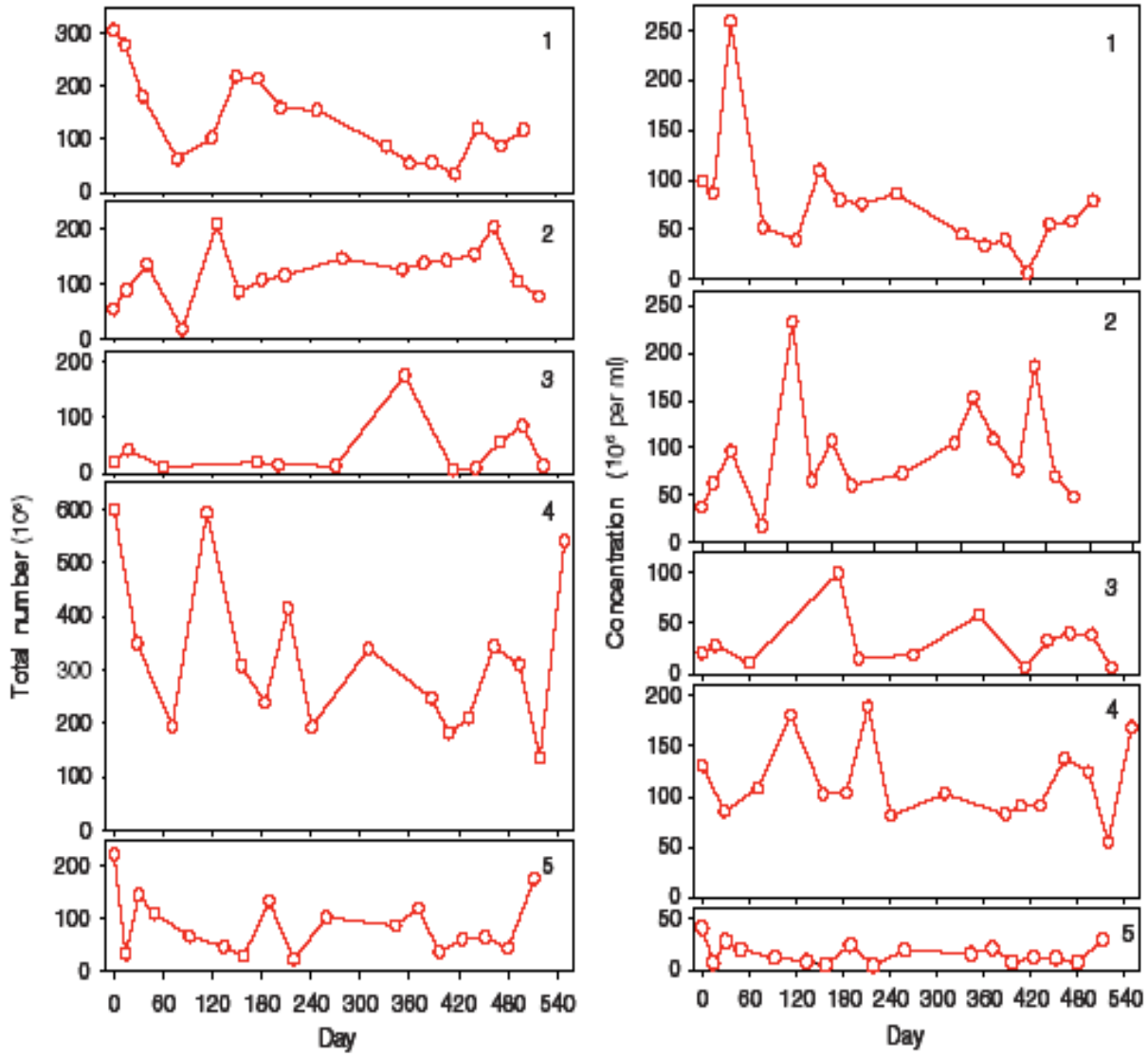
Análise Seminal

Não é um teste de fertilidade!



Avaliação do *status* funcional do testículo no momento da coleta

FERTILITY



FERTILITY

Approaches to improve the diagnosis and management of infertility

human reproduction update

P. Devroey[1,4], B.C.J.M. Fauser[2] and K. Diedrich[3] on behalf of the Evian Annual Reproduction (EVAR) Workshop Group 2008†

Human Reproduction Update, Vol.15, No.4 pp. 391–408, 2009

- ***AS adequada para alterações seminais graves; para alterações moderadas/leves: <u>inadequada</u>***

EDITOR'S CORNER

Evaluation of sperm damage: beyond the World Health Organization criteria

Nabil Aziz, M.R.C.O.G., M.D.,[a] *and Ashok Agarwal, Ph.D., H.C.L.D.*[b]

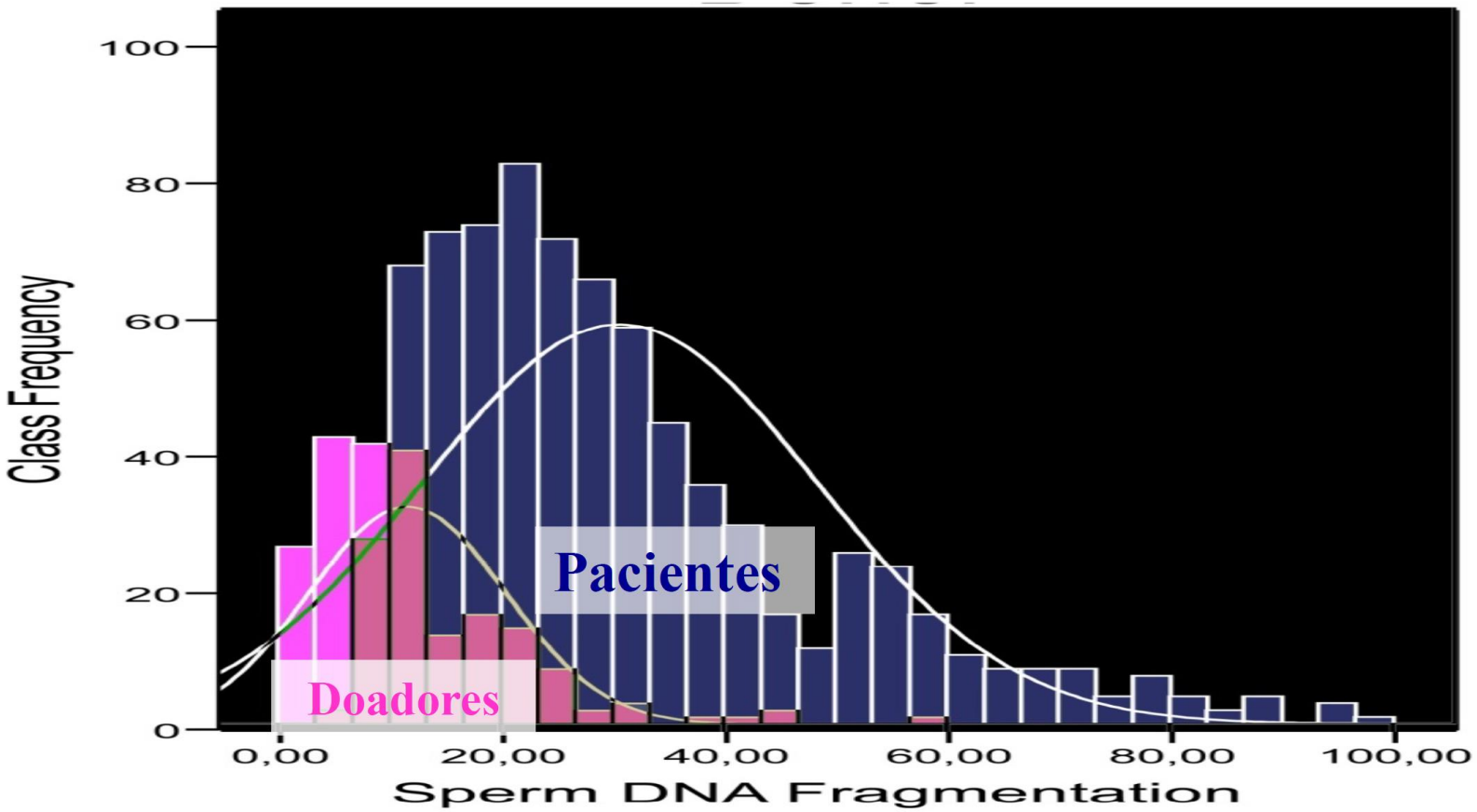
Fertility and Sterility® Vol. 90, No. 3, September 2008

- ✓ *grande flutuação na concentração, motilidade e morfologia*
- ✓ *variação intra / inter observador*
- ✓ *AS não investiga as propriedades biológicas e subcelulares do sptz*

☛ ***necessidade de outros testes funcionais mais específicos***

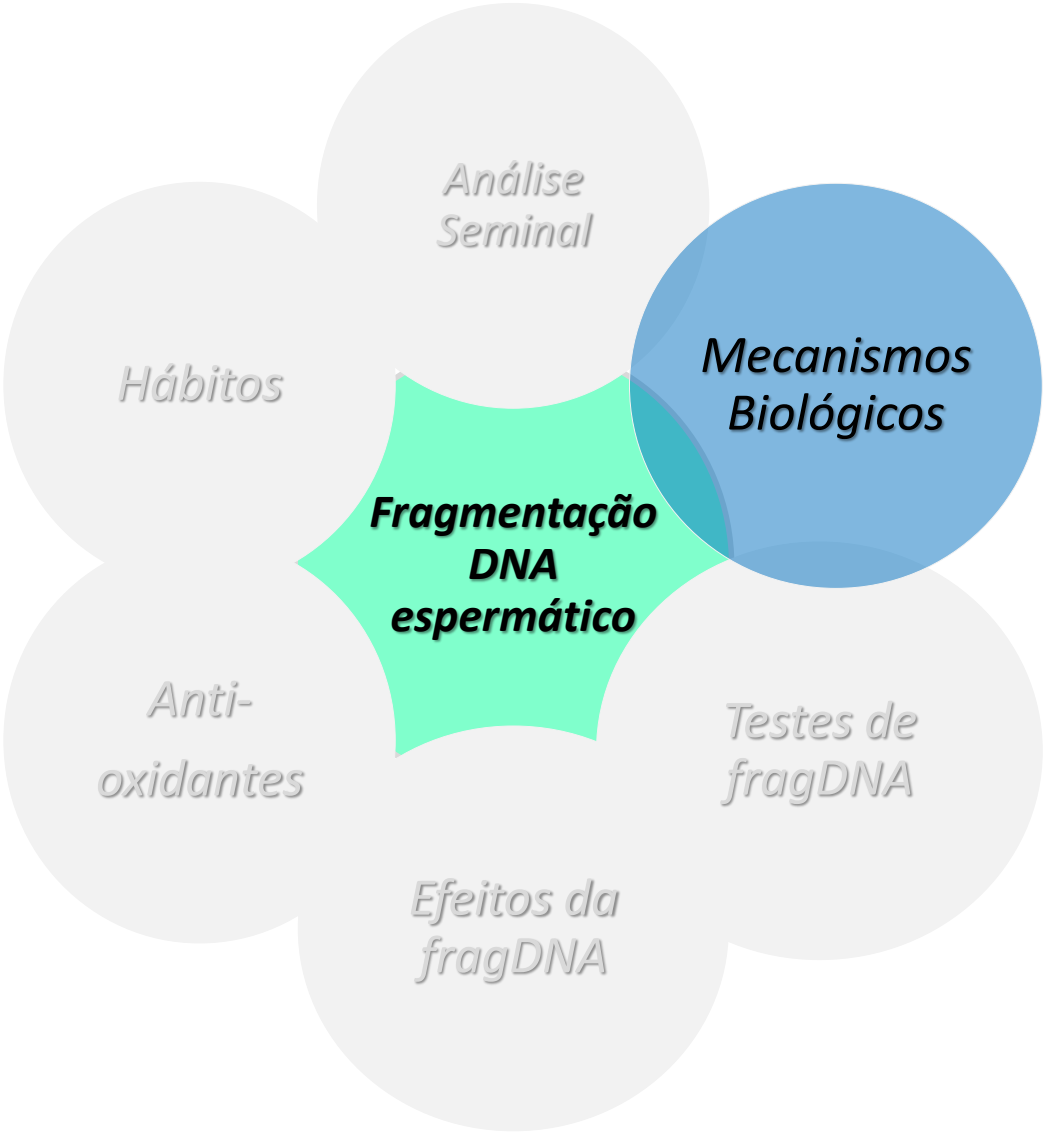
FERTILITY

Taxa de Fragmentação do DNA espermático



Gosalvez et al. J *Reprod Biotechnol Fertil*. 2015

FERTILITY


Análise Seminal
Hábitos
Mecanismos Biológicos
Fragmentação DNA espermático
Anti-oxidantes
Testes de fragDNA
Efeitos da fragDNA

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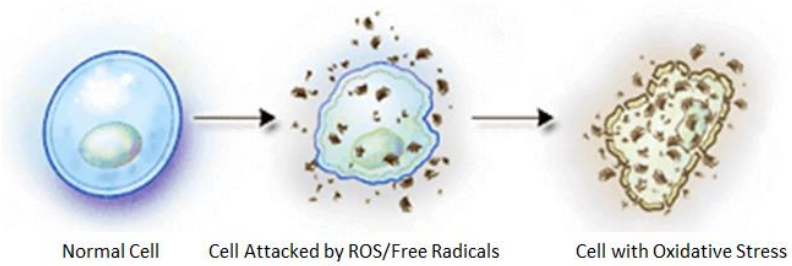
Mecanismos biológicos da Fragmentação do Espermatozoide

- ***ALTERAÇÃO DA PROTAMINA***
- ***APOPTOSE ABORTIVA***
- ***ESTRESSE OXIDATIVO***



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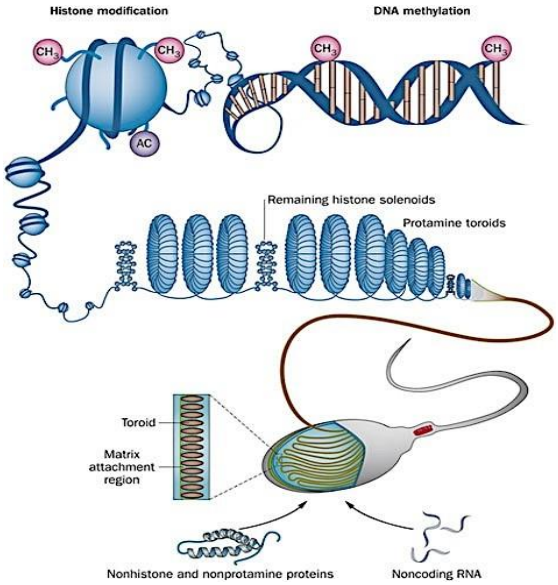
- ***ALTERAÇÃO DA PROTAMINA***

✓ Substituição de histona/protamina durante a espermiogênese

Condensação da cromatina

(Histonas ⟶ Protaminas)

1 - compactação do núcleo do espermatozoide
2 - proteção do DNA durante a passagem no trato genital
3 - estabilidade da cromatina (fragmentação do DNA e apoptose)



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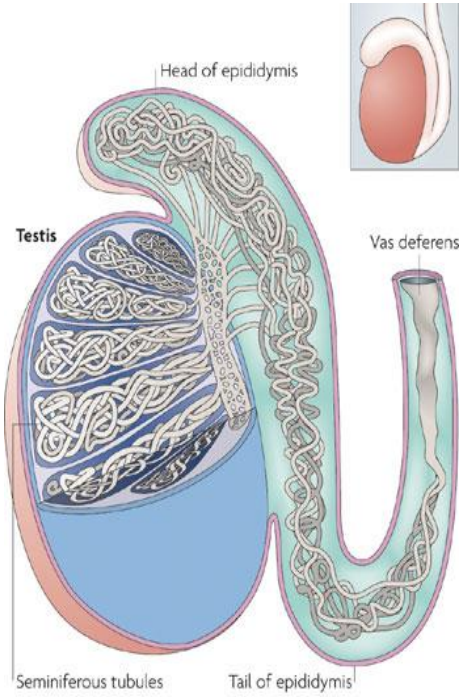
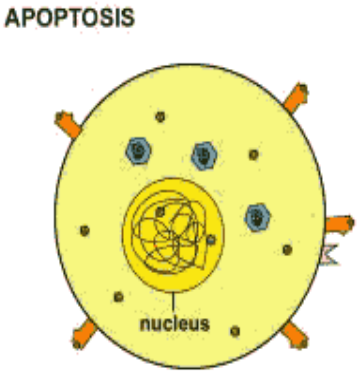
- ***APOPTOSE ABORTIVA***

✓ Durante a maturação espermática (testículo e epidídimo)





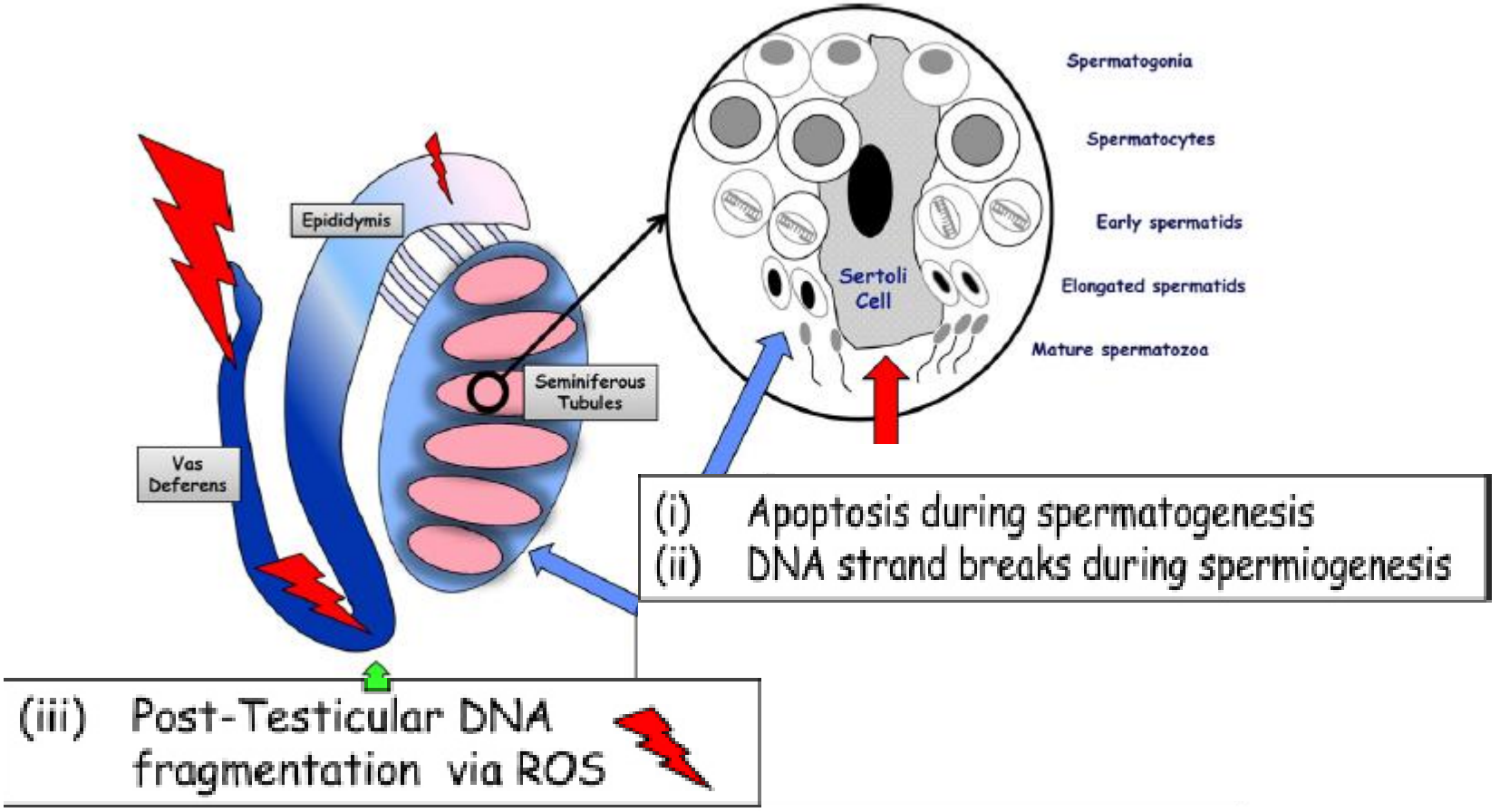
FERTILITY

- ***ESTRESSE OXIDATIVO***

✓ ***Trânsito no testículo e epidídimo***

✓ ***Pós-ejaculação:***

. leucócitos, espermatozoides imaturos, níveis anormais de antioxidantes no plasma seminal



Sakkas. Sperm DNA fragmentation. Fertil Steril 2010.

3. Lifestyle:

- smoking
- alcohol
- obesity
- stress
- advanced paternal age
- poor diet

4. Environmental

- heat
- pollution
- heavy metals
- plasticizers
- pesticide/ herbicides

5. Infection

- genito-urinary tract
- systemic infection

6. Autoimmune

- vasectomy
- torsion
- chronic prostatitis

7. Testicular

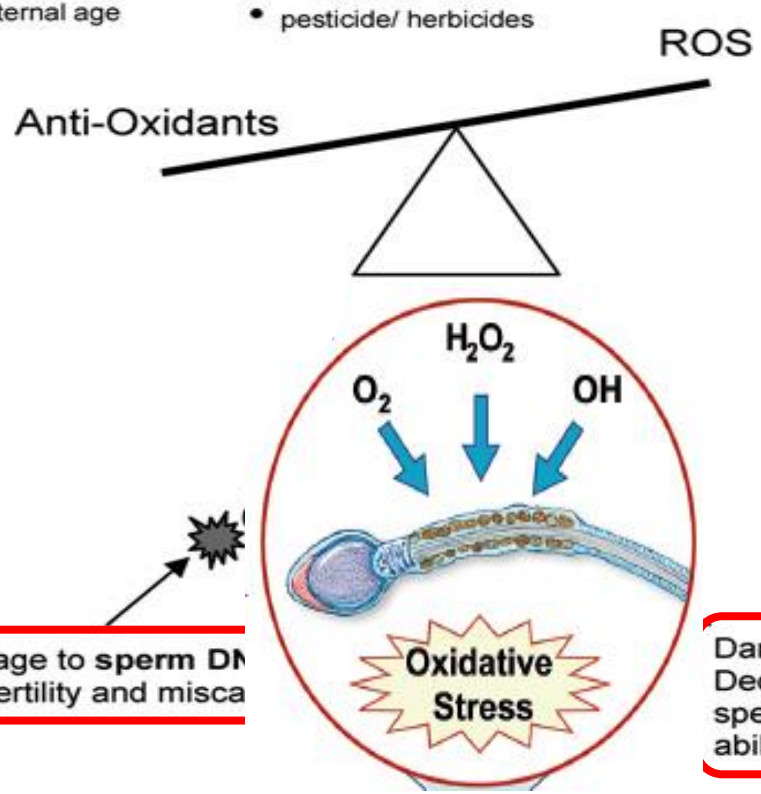
8. Chronic Disease

- diabetes
- CRF
- haemaglobinopathies
- hyperhomocysteinaemia

2. Iatrogenic

- centrifugation
- medications

1.Idiopathic



Damage to **sperm DN**
In infertility and misca

Damage to **sperm membrane**
Decreases motility and the sperm's
ability to fuse with oocyte

Kelton Tremellen; Human Reproduction Update, Vol.14, No.3 pp. 243–258, 2008

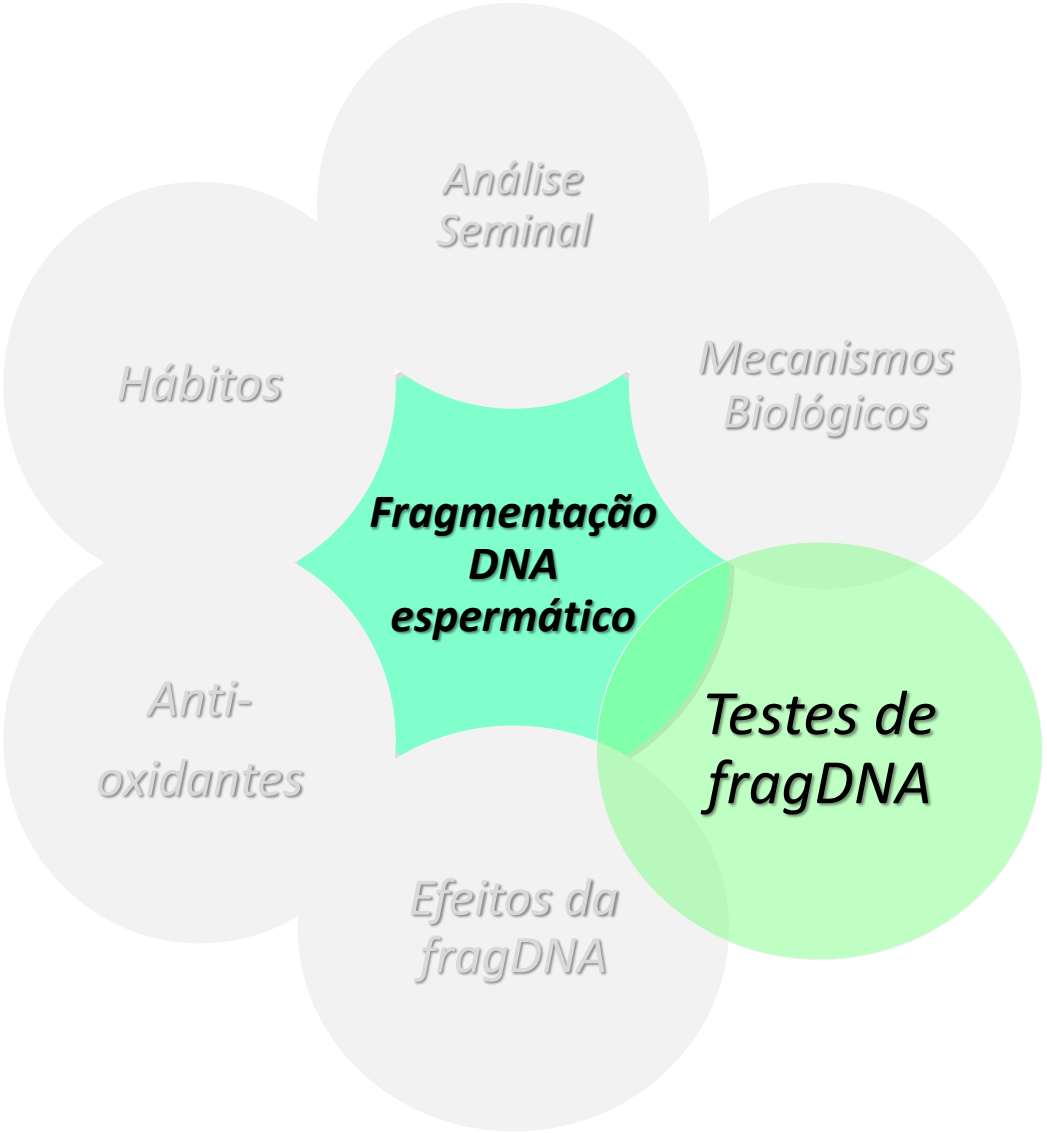

Análise Seminal
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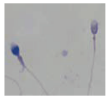
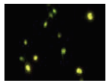
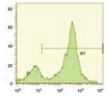
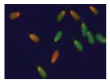
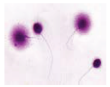
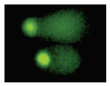
Table 1 Sperm DNA fragmentation (SDF) testing methods

	Test	Principle	Advantage	Disadvantage
 [1]	AO test	Metachromatic shift in fluorescence of AO when bound to single strand (ss)DNA. Uses fluorescent microscopy	Rapid, simple and inexpensive	Inter-laboratory variations and lack of reproducibility
 [2]	AB staining	Increased affinity of AB dye to loose chromatin of sperm nucleus. Uses optical microscopy	Rapid, simple and inexpensive	Inter-laboratory variations and lack of reproducibility
 [3]	CMA3 staining	CMA3 competitively binds to DNA indirectly visualizing protamine deficient DNA. Uses fluorescent microscopy	Yields reliable results as it is strongly correlated with other assays	Inter-observer variability
 [4]	TB staining	Increased affinity of TB to sperm DNA phosphate residues. Uses optical microscopy	Rapid, simple and inexpensive	Inter-observer variability
 [5]	TUNEL	Quantifies the enzymatic incorporation of dUTP into DNA breaks. Can be done using both optical microscopy and fluorescent microscopy. Uses optical microscopy, fluorescent microscopy and flow cytometry	Sensitive, reliable with minimal inter-observer variability. Can be performed on few sperm	Requires standardization between laboratories
 [6]	SCSA	Measures the susceptibility of sperm DNA to denaturation. The cytometric version of AO test. Uses flow cytometry	Reliable estimate of the percentage of DNA-damaged sperm	Requires the presence of expensive instrumentation (flow cytometer) and highly skilled technicians
 [7]	SCD or Halo test	Assess dispersion of DNA fragments after denaturation. Uses optical or fluorescent microscopy	Simple test	Inter-observer variability
 [8]	SCGE or comet assay	Electrophoretic assessment of DNA fragments of lysed DNA. Uses fluorescent microscopy	Can be done in very low sperm count. It is sensitive and reproducible	Requires an experienced observer. Inter-observer variability

[1] Acridine orange (AO) stains normal DNA fluoresces green; whereas denatured DNA fluoresces orange-red. [2] Aniline blue (AB) staining showing sperm with fragmented DNA and normal sperm. [3] Chromomycin A3 (CMA3) staining: protamine deficient spermatozoa appear bright yellow; spermatozoa with normal protamine appear yellowish green. [4] Toulidine blue (TB) staining: normal sperm appear light blue and sperm with DNA fragmentation appear violet. [5] Terminal deoxynucleotidyl transferase dUTP nick end labeling (TUNEL) assay fluorescent activated cell sorting histogram showing percentage of SDF. [6] Sperm chromatin structure assay (SCSA): flow cytometric version of AO staining. [7] Sperm chromatin dispersion (SCD) test: spermatozoa with different patterns of DNA dispersion; large-sized halo; medium-sized halo [2]; very small- sized halo. [8] Comet images showing various levels of DNA damage.

FERTILITY

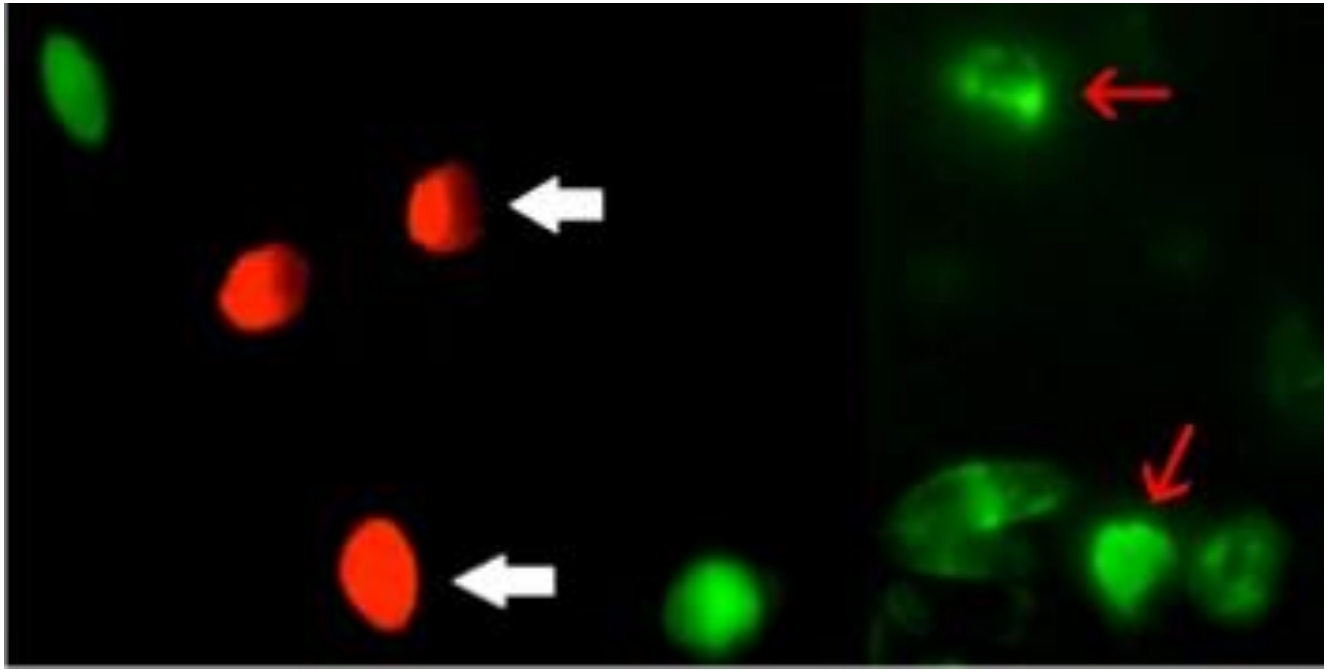
Testes de Fragmentação do DNA espermático

- TUNEL *(TdT-mediated dUTP nick end-labeling)*
- SCSA (*sperm chromatin structure assay*)
- ENSAIO COMETA
- TESTE DE DISPERSÃO DA CROMATINA
  (SCD – halosperm)

FERTILITY

TUNEL (TdT-mediated dUTP nick end-labeling)

- Célula marcada visualizada diretamente por microscopia de fluorescência ou quantificada por citometria de fluxo.

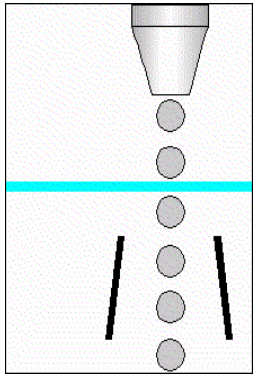


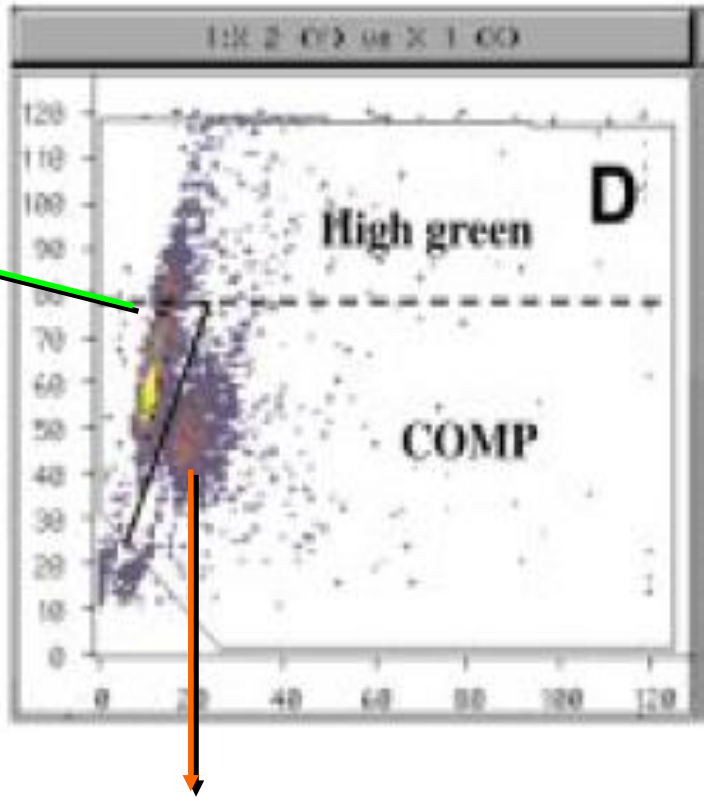
FERTILITY

SCSA (SPERM CHROMATIN STRUCTURE ASSAY)

- Leitura em citômetro de fluxo

Cromatina íntegra

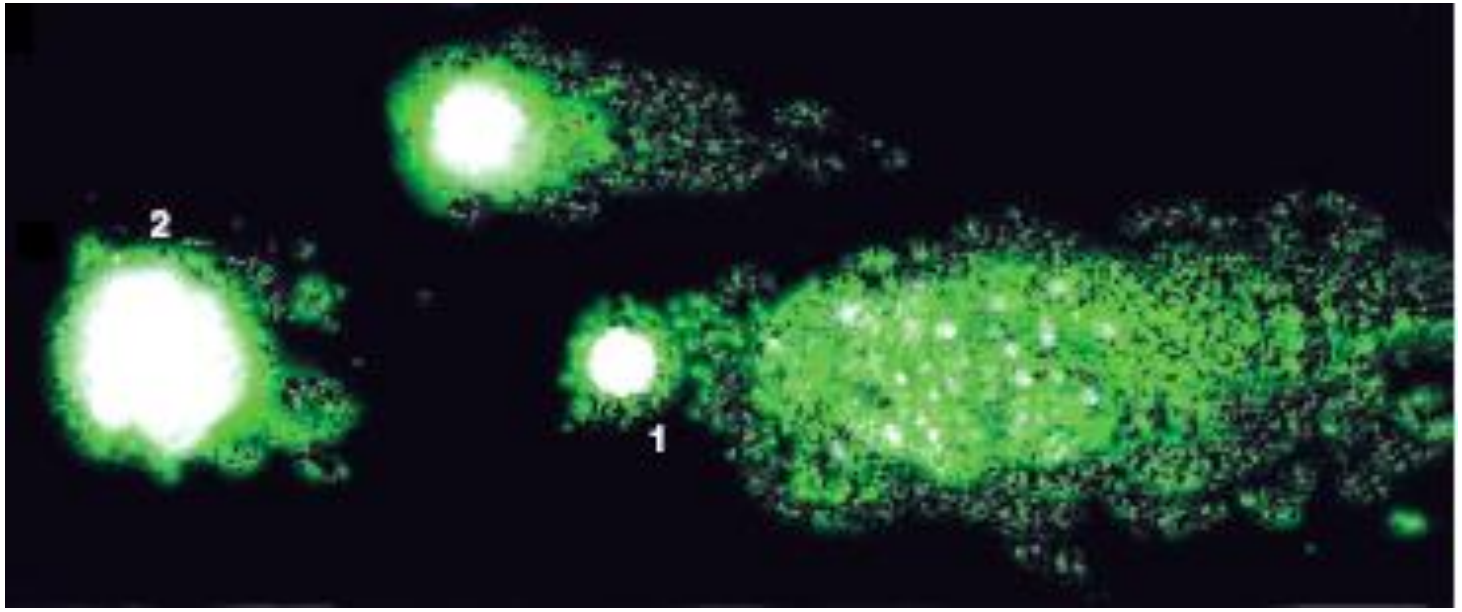




Cromatina frágil

FERTILITY

ENSAIO COMETA

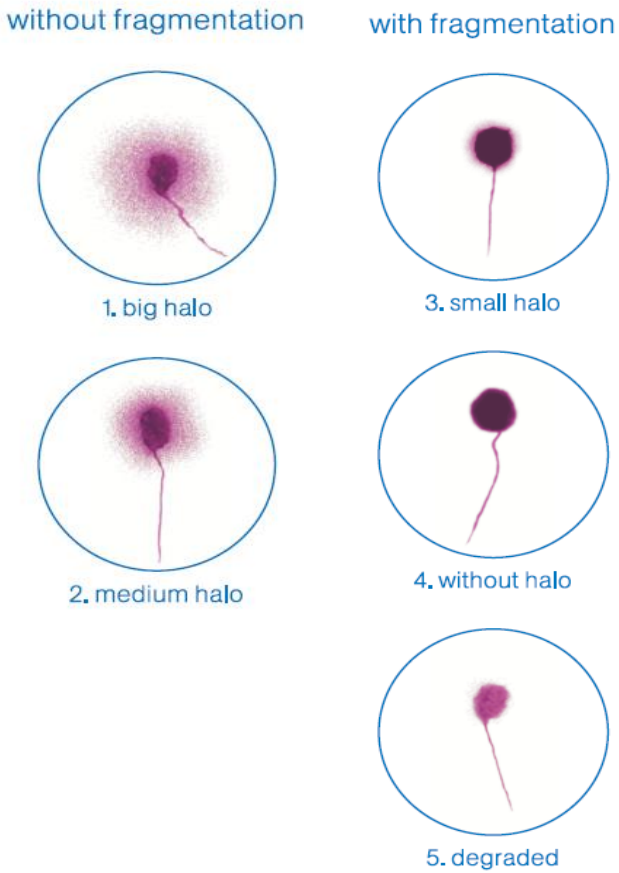


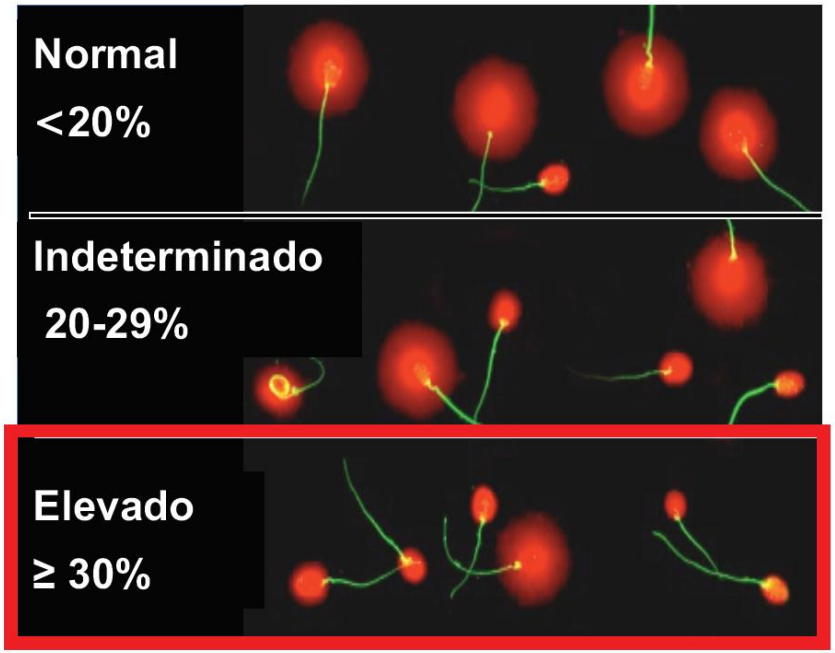
1- espermatozóide com DNA intacto ,
2- espermatozóide com DNA fragmentado

FERTILITY

TESTE DE DISPERSÃO DA CROMATINA - halosperm

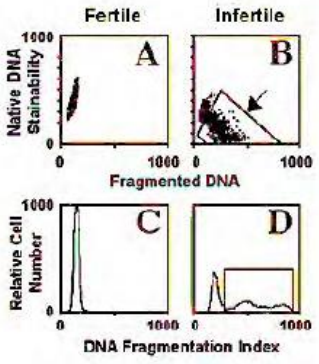
- Microscopia óptica

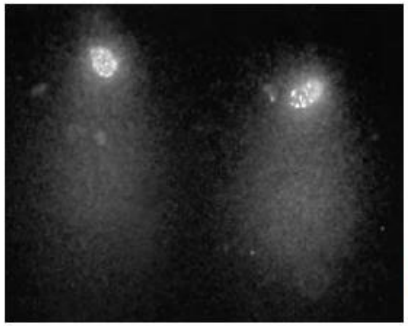


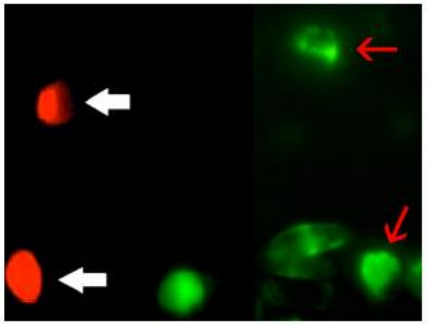


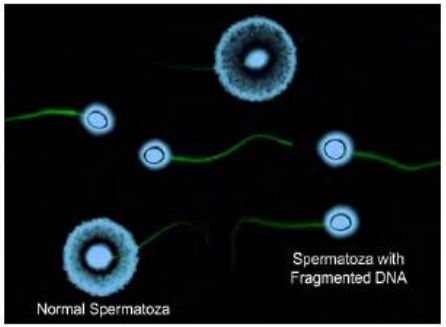
FERTILITY

	Labor-intensive	Expensive equipment	Analysis Subjectivity	Validation & Standardization
TUNEL	++++	+++	++	++
SCSA	++	++++	+	++++
Comet	++++	+++	+++	+
SCD	+	+	++	+++









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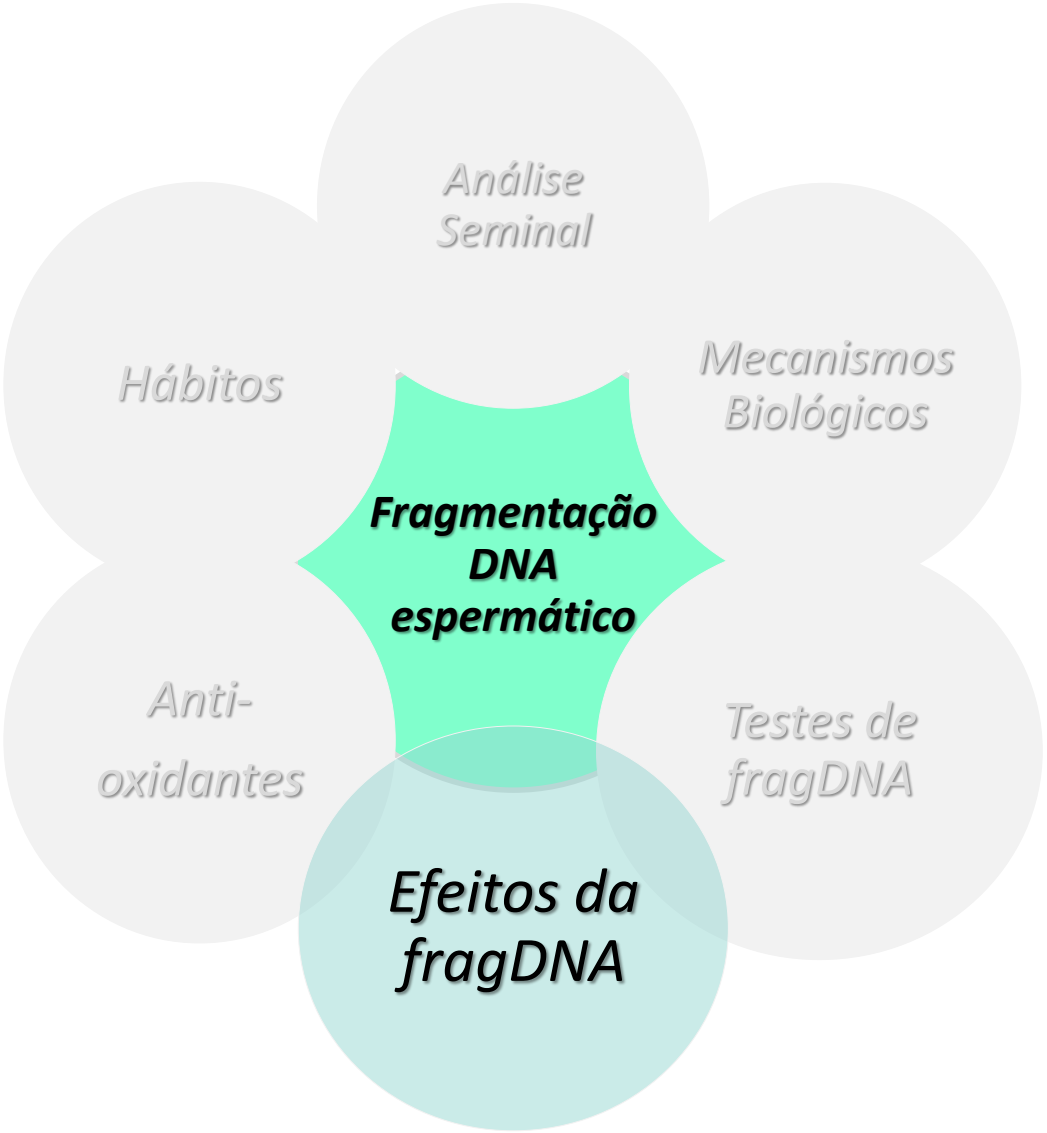
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Fragmentação DNA espermático

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Reproductive BioMedicine Online (2015) 30, 120–127

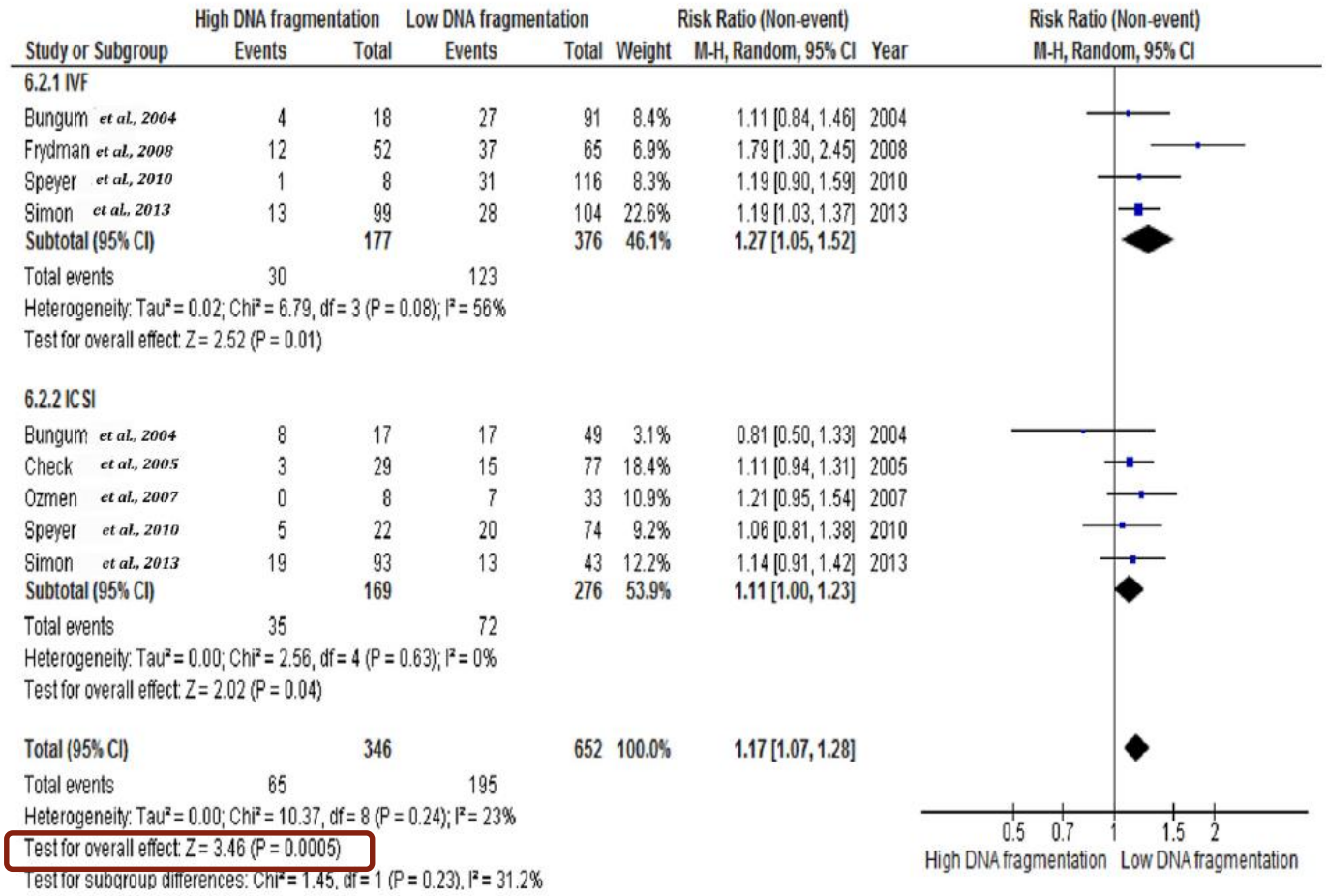
www.sciencedirect.com
www.rbmonline.com

REVIEW

The effect of sperm DNA fragmentation on live birth rate after IVF or ICSI: a systematic review and meta-analysis

A Osman *, H Alsomait, S Seshadri, T El-Toukhy, Y Khalaf

Assisted Conception Unit, Guys Hospital, Great Maze Pond, SE1 9RT, UK



Live birth rate in high and low sperm DNA fragmentation groups. ICSI = intracytoplasmic sperm injection.

Asian Journal of Andrology (2017) 19, 80–90
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www.asiaandro.com; www.ajandrology.com

Open Access

ORIGINAL ARTICLE

Sperm Biology

A systematic review and meta-analysis to determine the effect of sperm DNA damage on *in vitro* fertilization and intracytoplasmic sperm injection outcome

Luke Simon[1,*], Armand Zini[2,*], Alina Dyachenko[2], Antonio Ciampi[2], Douglas T Carrell[1,3,4]

- **41 articles (with a total of 56 studies)**
- **16 IVF studies, 24 ICSI studies, and 16 mixed (IVF + ICSI) studies**
- **23 SCSA, 18 TUNEL, 8 SCD, and 7 Comet**
- **8068 treatment cycles (3734 IVF, 2282 ICSI and 2052 mixed IVF + ICSI)**

FERTILITY

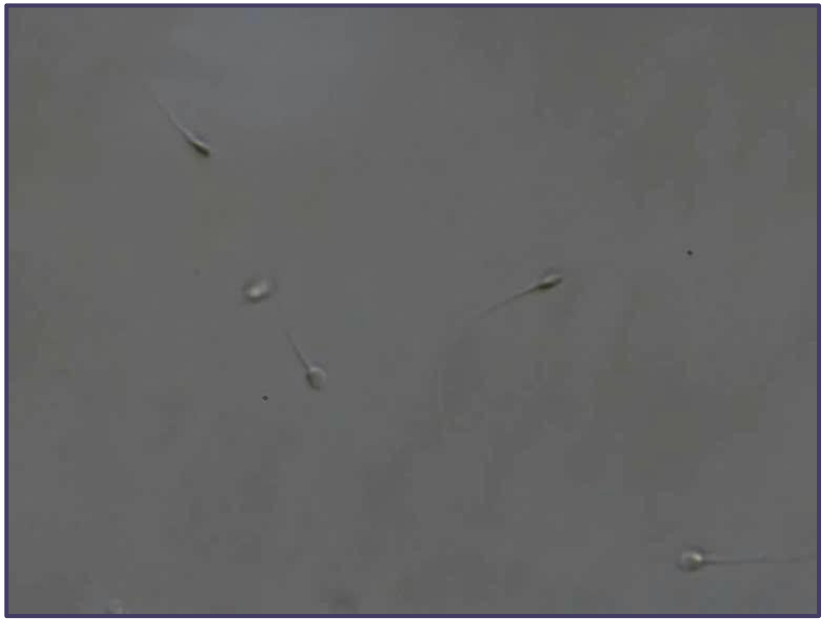
Table 3: Meta-analysis summary: Overall and subgroup odds ratios of studies on sperm DNA damage and pregnancy

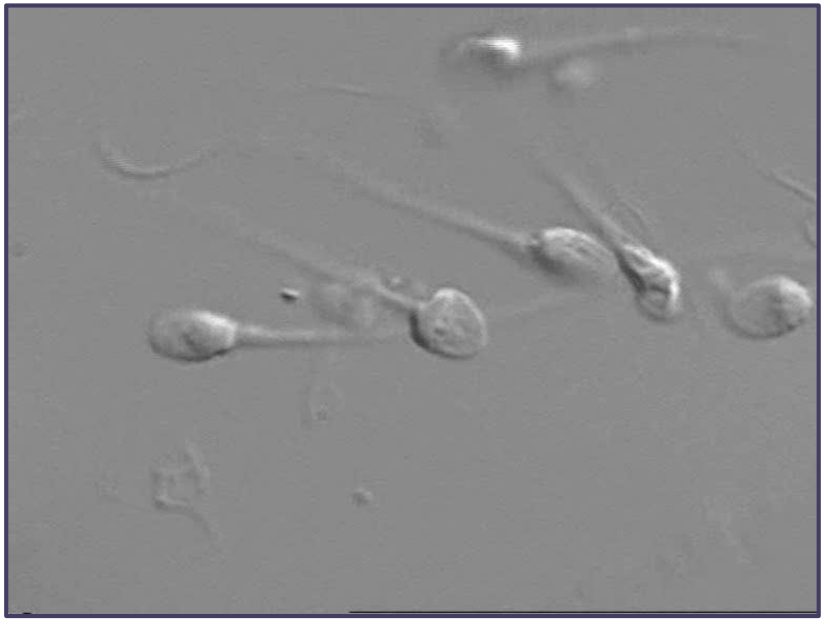
Effect	*Number of studies*	*Fixed effects model*		*Random effects model*	
		OR (95% CI)	*P*	*OR (95% CI)*	*P*
Overall effect	56	1.68 (1.49–1.89)	0.0000*	1.84 (1.5–2.27)	<0.0001*
Sperm DNA damage assays					
SCSA	23	1.18 (0.96–1.44)	0.1115	1.22 (0.93–1.61)	0.1522
TUNEL	18	2.18 (1.75–2.72)	0.0000*	2.22 (1.61–3.05)	<0.0001*
Comet	7	3.34 (2.32–4.82)	0.0000*	3.56 (1.78–7.09)	0.0003*
SCD	8	1.51 (1.18–1.92)	0.0011*	1.98 (1.19–3.3)	0.0086*
Types of assisted treatment					
IVF	16	1.65 (1.34–2.04)	0.0000*	1.92 (1.33–2.77)	0.0005*
ICSI	24	1.31 (1.08–1.59)	0.0068*	1.49 (1.11–2.01)	0.0075*
Mixed	16	2.37 (1.89–2.97)	0.0000*	2.32 (1.54–3.5)	0.0001*

FERTILITY

MSOME ***Motile Sperm Organellar Morphology Examination***

IMSI ***Intracytoplasmic Morphologically Select Sperm Injection***





FERTILITY

Infertility UROLOGY 78 (4), 2011

Sperm Organelle Morphologic Abnormalities: Contributing Factors and Effects on Intracytoplasmic Sperm Injection Cycles Outcomes

Daniela Paes de Almeida Ferreira Braga, Amanda S. Setti, Rita C. S. Figueira, Marcilio Nichi, Ciro D. Martinhago, Assumpto Iaconelli, Jr., and Edson Borges, Jr.

Table 1. Multivariate regression analysis of factors contributing to motile sperm organelle morphology defects incidence with variables including sperm DNA fragmentation percentage, patient's age, and sperm aneuploidy frequency

Predictor Variables	Response Variable MSOME	Slope	R^2	*P*
Percentage of sperm DNA fragmentation	Normal cells	−0.016	0.030	.145
	Abnormal shape	0.010	0.009	.411
	Abnormal size	0.004	0.189	<.001
	Large vacuoles	0.004	0.067	.029
	Small vacuoles	0.006	0.063	.034
Patient's age	Normal cells	−0.012	0.002	.715
	Abnormal shape	−0.001	0.030	.148
	Abnormal size	0.053	0.156	.135
	Large vacuoles	0.065	0.118	<.001
	Small vacuoles	0.198	0.104	<.001
Sperm aneuploidy	Normal cells	0.00291	0.009	.805
	Abnormal shape	0.00115	0.001	.960
	Abnormal size	0.08637	0.006	.528
	Large vacuoles	0.00291	0.009	.805
	Small vacuoles	0.00115	0.001	.960

FERTILITY AND STERILITY

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Title: Sperm DNA fragmentation is correlated with poor embryo development, lower implantation rate and higher miscarriage rate in reproductive cycles of non-male factor infertility

Article Type: Cohort Study

Keywords: Sperm chromatin dispersion; Sperm DNA fragmentation; ICSI; semen analysis; non-male factor infertility

Corresponding Author: Dr. Edson Borges Jr., MD, PhD

Corresponding Author's Institution: Fertility Medical Group

First Author: Edson Borges Jr., MD, PhD

Table 4- Descriptive analysis of seminal parameters according to SDF groups

	<30% SDF (n= 433)	*≥30% SDF (n= 42)*	*p*
Paternal age (years)	*38.68 ± 5.65*	*41.19 ± 6.35*	***0.009***
Ejaculatory abstinence (days)	*3.92 ± 2.42*	*5.51 ± 5.46*	***0.002***
Seminal volume (mL)	*2.94 ± 0.50*	*3.79 ± 1.09*	***0.001***
Seminal Concentration (x 10^6/ml)	*77.70 ± 29.83*	*81.09 ± 33.23*	*0.677*
Total sperm count (x 10^6)	*214.58 ± 72.95*	*303.71 ± 78.80*	***0.003***
Total sperm motility (%)	*63.45 ± 12.75*	*55.52 ± 17.55*	***<0.001***
Progressive sperm motility (%)	*54.90 ± 14.27*	*46.50 ± 16.77*	***<0.001***
TMSC	*121.11 ± 98.24*	*146.89 ± 139.09*	*0.120*
SDF (%)	*17.48 ± 8.70*	*37.67 ± 6.39*	***<0.001***

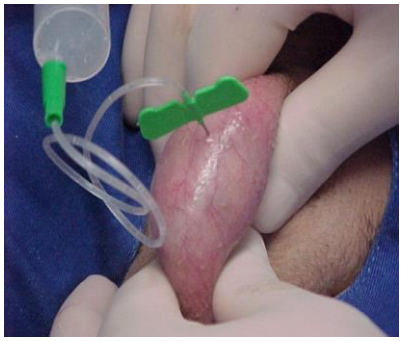
Table 7- Effect of Sperm DNA fragmentation on laboratorial and clinical outcomes

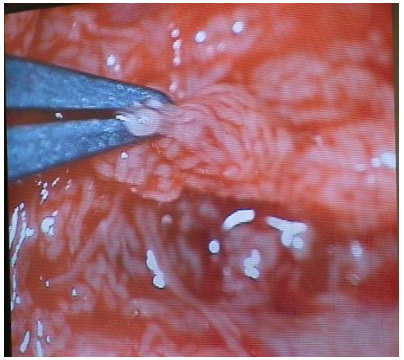
	<30% SDF (n= 433)	≥30% SDF (n= 42)	*p*
Laboratorial outcomes*			
Fertilization rate	90.10 ± 3.50	85.67 ± 1.03	0.226
Normal cleavage speed rate	72.16 ± 1.30	61.56 ± 4.40	**0.021**
High quality embryos at day three rate	36.47 ± 1.51	23.89 ± 5.51	**0.028**
Blastocyst rate	56.25 ± 2.01	39.01 ± 1.40	**0.006**
Blastocyst quality rate	30.54 ± 2.27	11.32 ± 7.72	**<0.001**
Clinical outcomes			
Implantation rate	46.09± 0.55	33.21 ± 1.96	**<0.001**
Chemical Pregnancy rate	34.99	33.11	0.940
Clinical Pregnancy rate	32.42	30.33	0.774
Miscarriage rate	17.8	39.9	**0.021**

Use of testicular sperm in nonazoospermic males

Akanksha Mehta, M.D.,[a] Sandro C. Esteves, M.D.,[b,c,d] Peter N. Schlegel, M.D.,[e] Craig I. Niederberger, M.D.,[f] Mark Sigman, M.D.,[g] Armand Zini, M.D.,[h] and Robert E. Brannigan, M.D.[i]

VOL. 109 NO. 6 / JUNE 2018





PRO: Emerging body of evidence supports use of testicular sperm for nonazoospermic males in several clinical settings

Pro 1. Akanksha Mehta, M.D., Fertile Battle Team Leader

Pro 2. Peter N. Schlegel, M.D.

Elevated Levels of Ejaculated Sperm DNA Damage: The Case for Use of Testicular Sperm

Pro 3. Sandro C. Esteves, M.D.

Recurrent IVF Failure and Recurrent Pregnancy Loss: The Case for Use of Testicular Sperm

CON: First do no harm—more data is needed before adapting use of testicular sperm in nonazoospermic male

Con 1. Craig I. Niederberger, M.D., Fertile Battle Team Leader

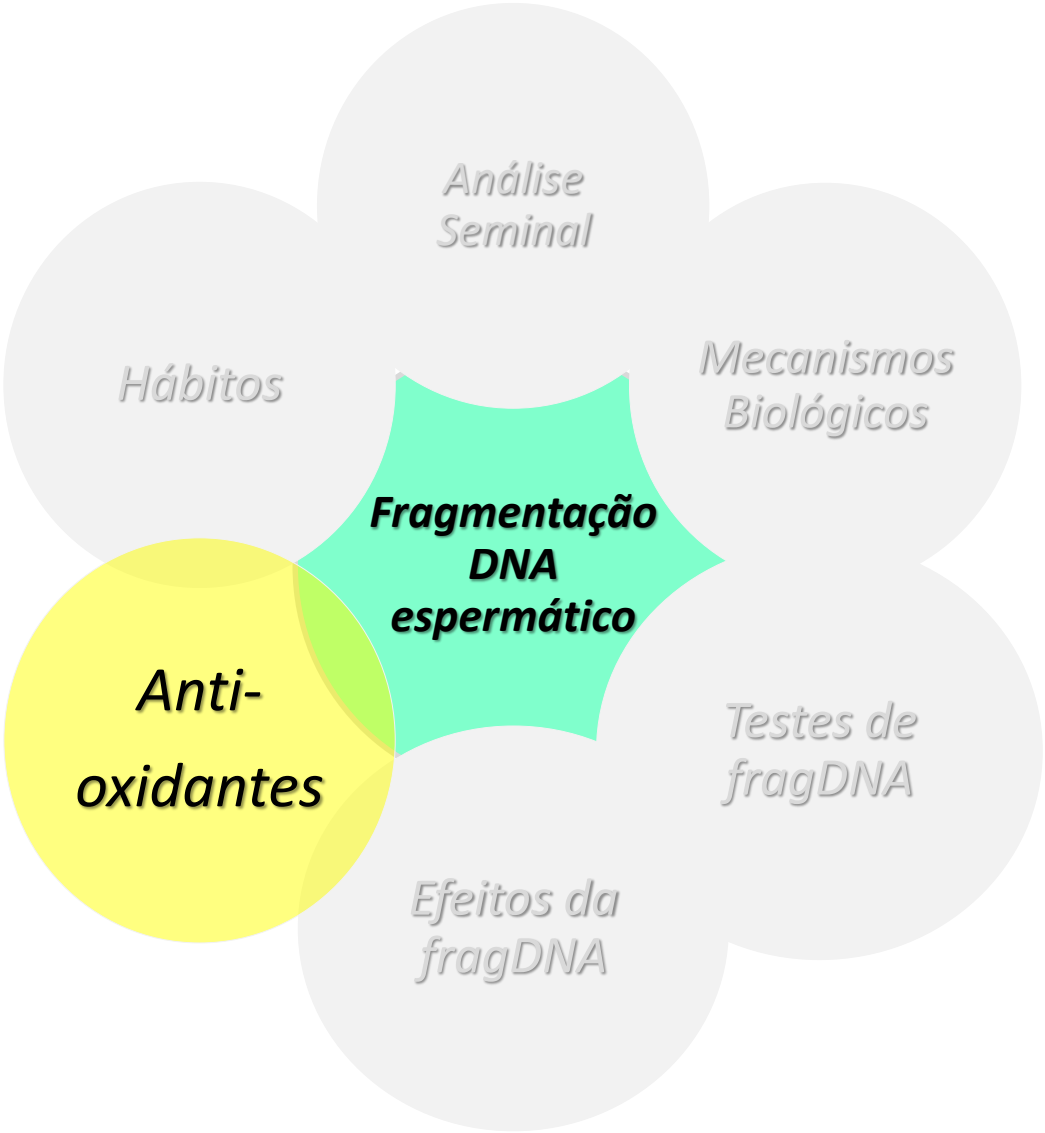
Con 2. Mark Sigman, M.D.

Elevated Levels of Ejaculated Sperm DNA Damage: The Case Against Use of Testicular Sperm

Con 3. Armand Zini, M.D.

Recurrent IVF Failure and Recurrent Pregnancy Loss: The Case Against Use of Testicular Sperm

FERTILITY


Análise Seminal
Hábitos
Mecanismos Biológicos
Fragmentação DNA espermático
Anti-oxidantes
Testes de fragDNA
Efeitos da fragDNA

FERTILITY

COCHRANE SUMMARIES
Independent high-quality evidence for health care decision making

Antioxidants for male subfertility

Showell MG, Brown J, Yazdani A, Stankiewicz MT, Hart RJ

Published Online: March 14, 2012

Oxidative stress may cause sperm cell damage. This damage can be reduced by the body's own natural antioxidant defences. Antioxidants can be part of our diet and taken as a supplement. It is believed that in many cases of unexplained subfertility, and also in instances where there may be a sperm-related problem, taking an oral antioxidant supplement may increase a couple's chance of conceiving when undergoing fertility treatment. This review identified 34 randomised controlled trials involving 2876 couples. Pooled findings from three small trials suggest an increase in live birth rates for the partners of subfertile men taking an antioxidant supplement as part of an assisted reproductive program. However, further well-designed large randomised placebo-controlled trials are needed to confirm these findings.

- 34 estudos randomizados – 2.876 casais
- Aumento da taxa gestação (OR=4,18)
- Aumento na taxa de nascidos vivos (OR=4,85)

FERTILITY

Cochrane Library

Cochrane Database of Systematic Reviews

Cochrane Database of Systematic Reviews 2019, Issue 3. Art. No.: CD007411.

Antioxidants for male subfertility (Review)

Smits RM, Mackenzie-Proctor R, Yazdani A, Stankiewicz MT, Jordan V, Showell MG

- 61 studies with a total population of 6264 subfertile men, aged between 18 and 65 combined 18 different oral antioxidants.

- **Live birth:** ***OR 1.79***, 95% CI 1.20 to 2.67, P = 0.005, 7 RCTs, 750 men.

- **Clinical pregnancy rate:** ***OR 2.97***, 95% CI 1.91 to 4.63, P < 0.0001, 11 RCTs, 786 men.

FERTILITY

Human Reproduction, Vol.27, No.10 pp. 2908–2917, 2012
Advanced Access publication on July 12, 2012 doi:10.1093/humrep/des261

human reproduction

META-ANALYSIS *Andrology*

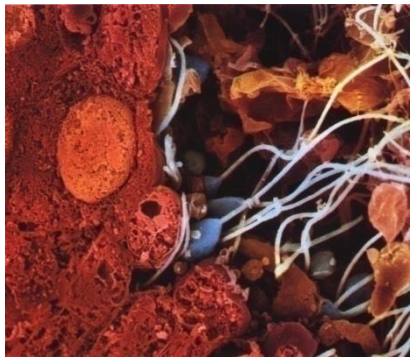
The effect of sperm DNA fragmentation on miscarriage rates: a systematic review and meta-analysis

Lynne Robinson[1,*], Ioannis D. Gallos[1,2], Sarah J. Conner[1,2], Madhurima Rajkhowa[1], David Miller[3], Sheena Lewis[4], Jackson Kirkman-Brown[1,2], and Arri Coomarasamy[1,2]

- ***16 estudos – 2.969 casais***
- Aumento significativo de ***abortamento*** em homens com aumento da *fragDNA espermática*: RR =2,16 (1,54 – 3,03)
- TUNEL: RR = 3,94 (2,45 – 6,32)

Antioxidantes orais – como prescrever

- Vitamina C: 500 mg/dia
- Vitamina E: 400 mg/dia
- Ácido fólico (folato): 2-5 mg/dia
- Zinco: 25 mg/dia
- Selênio: 26 mg/dia
- L-carnitina: 3g/dia



65 dias – tempo da espermatogênese

FERTILITY

ANDROLOGY

ISSN: 2047-2919

ANDROLOGY

ORIGINAL ARTICLE

Correspondence:
Edson Borges Jr., Fertility Medical Group, Av. Brigadeiro Luis Antonio, 4545, Sao Paulo, Brazil.
E-mail: science@sapientiae.org.br

Keywords:
Ejaculatory abstinence, ICSI, semen quality, sperm DNA fragmentation

Received: 13-Jul-2018
Revised: 4-Oct-2018
Accepted: 7-Nov-2018

doi: 10.1111/andr.12572

Revisiting the impact of ejaculatory abstinence on semen quality and intracytoplasmic sperm injection outcomes

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[1]Fertility Medical Group, Sao Paulo, Brazil, and [2]Sapientiae Institute, Sao Paulo, Brazil

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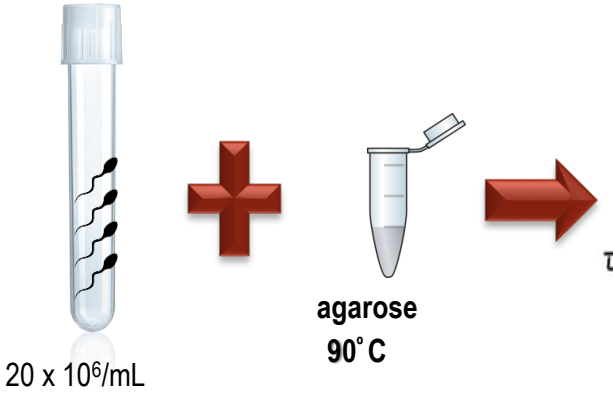
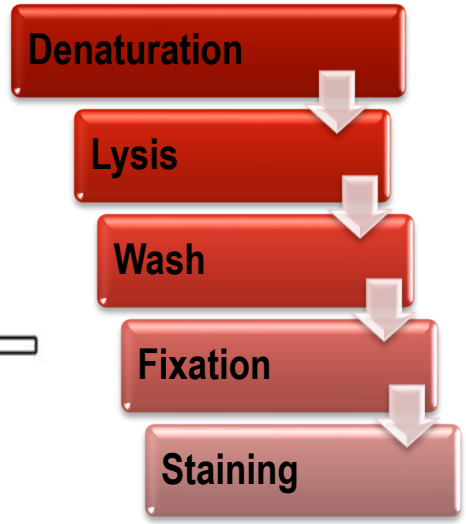
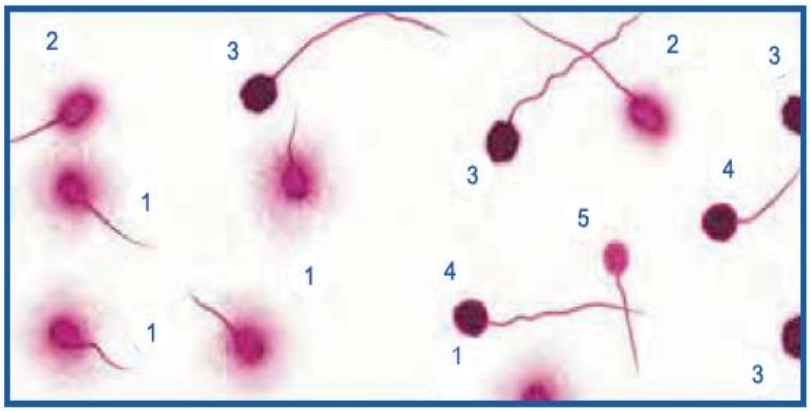
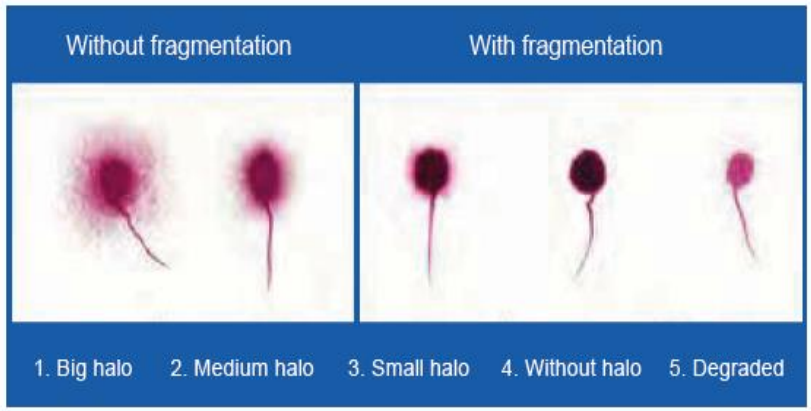
Sperm Chromatin Dispersion Test









FERTILITY

Linear model analysis of the association between sperm parameters and EA length (n = 818)

SEMEN PARAMETER	R	SLOPE	R^2 (%)	P-VALUE
Semen volume (mL)	0.1405	1.62102	5.28	<0.001
Sperm count ($x10^6$/mL)	3.1261	52.2206	2.59	<0.001
Total sperm count ($x10^6$)	18.941	170.650	8.37	<0.001
Total sperm motility (%)	-0.3355	19.0885	0.23	0.212
Progressive sperm motility (%)	-0.1895	19.1802	0.07	0.483
TMSC ($x10^6$)	9.6396	102.629	6.14	<0.001
Morphology (%)	0.0227	1.29926	0.23	0.215
SDF (%)	0.5355	9.34201	2.57	<0.001

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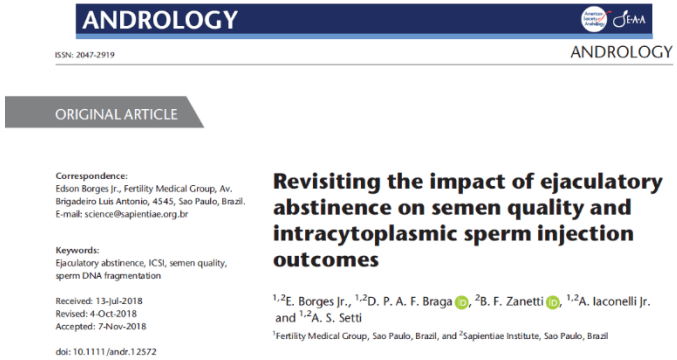
Table 5 GzLM results for the association between ICSI outcomes and EA length ($n = 483$)

Continuous ICSI outcomes	B	95% CI	*p*-value
Fertilization rate[a]	−0.983	−1.954 to −0.011	0.047
High-quality embryos rate on day 3[a]	−0.090	−0.207 to 2.284	0.131
Blastocyst formation rate on day 5[a]	−2.384	−4.552 to −0.216	0.031
Implantation rate[ab]	−3.299	−5.388 to −1.260	0.002

Continuous ICSI outcomes	Exp(B)	95% CI	*p*-value
Pregnancy rate[ab]	0.506	0.290–0.882	0.016
Miscarriage rate[ab]	0.736	0.458–1.185	0.207

GzLM: generalized linear model; ICSI: intracytoplasmic sperm injection; EA: ejaculatory abstinence; B: unstandardized regression coefficient; CI: confidence intervals; Exp(B): exponentiation of the B coefficient. [a]Adjusted for maternal and paternal ages, smoking habits and body mass index, seminal parameters, total dose of FSH administered, estradiol levels on the day of hCG administration, number of oocytes and mature oocytes; [b]Adjusted for number of transferred embryos.



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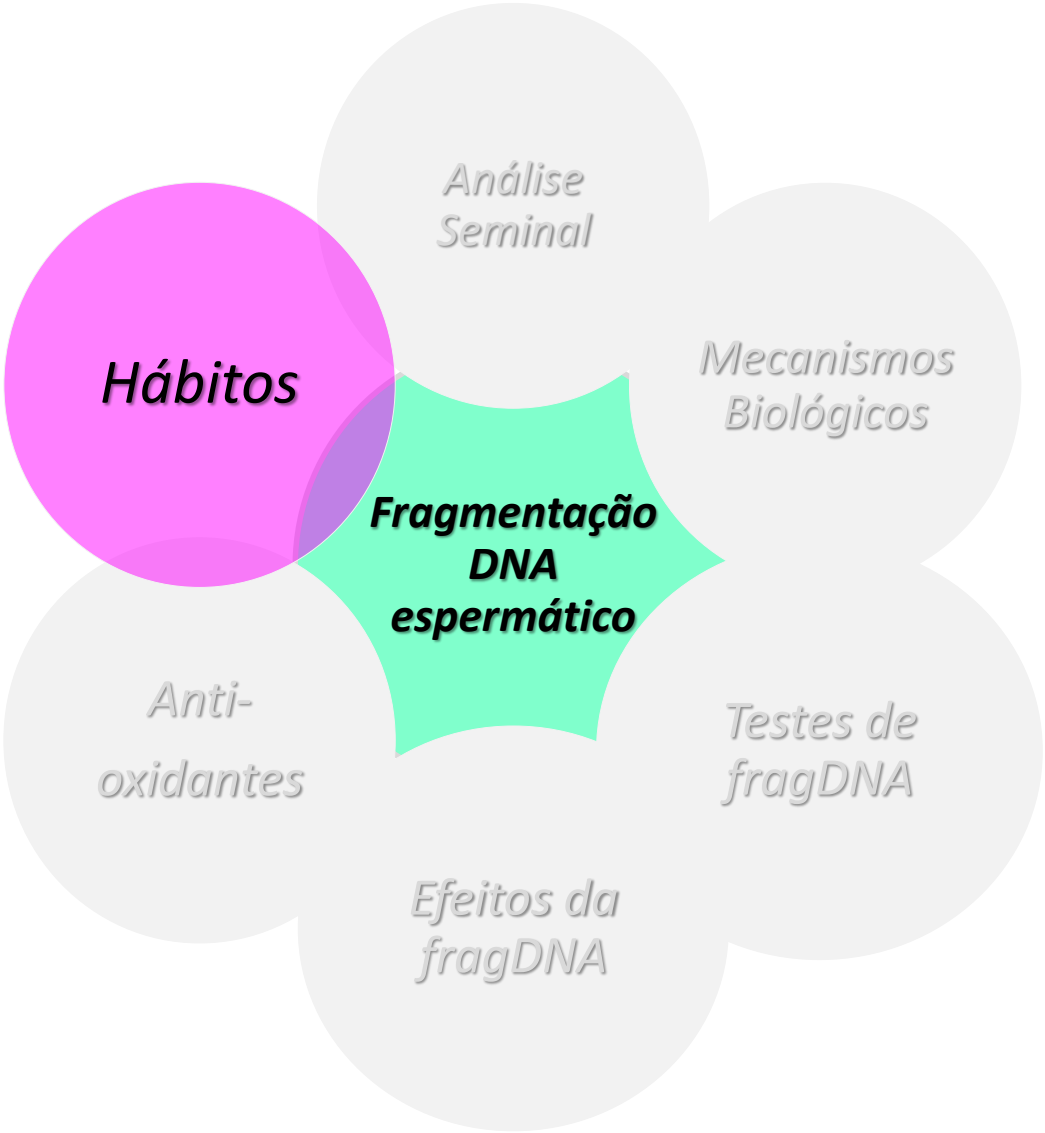
[1]Fertility Medical Group, Sao Paulo, Brazil, and [2]Sapientiae Institute, Sao Paulo, Brazil

The ejaculatory abstinence ≤ 4 days:

- Significant lower sperm DNA fragmentation index, and higher rates of fertilization, high-quality embryos on day 3, blastocyst development, implantation and pregnancy compared to ejaculatory abstinence > 4 days group.

- The implantation rate was significantly higher and the pregnancy rate tended to be higher with one day of ejaculatory abstinence, compared to 2–4 days of ejaculatory abstinence.

FERTILITY


Análise Seminal
Hábitos
Mecanismos Biológicos
Fragmentação DNA espermático
Anti-oxidantes
Testes de fragDNA
Efeitos da fragDNA

FERTILITY

Received: 7 March 2018 | Revised: 4 June 2018 | Accepted: 12 June 2018

DOI: 10.1111/and.13090

Check for updates

ORIGINAL ARTICLE

WILEY ANDROLOGIA

Paternal lifestyle factors in relation to semen quality and in vitro reproductive outcomes

Edson Borges Jr[1,2] | Daniela Paes de Almeida Ferreira Braga[1,2] | Rodrigo R. Provenza[1] | Rita de Cassia Savio Figueira[1] | Assumpto Iaconelli Jr[1,2] | Amanda Souza Setti[1,2]

- ❖ Fator masculino isolado
- ❖ 1º. ciclo de tratamento
- ❖ Idade mulher < 36 anos
- ❖ 233 ciclos ICSI

1. Quantos cigarros/dia?
2. Consumo semanal de álcool?
3. Frequência de exercícios ?
4. Medicações nos últimos 3 meses? Qual?
5. Exposição a agentes tóxicos, pesticidas, radiação etc..

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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

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SDF	0.014	**0.033**	5.833	**0.002**

Principais indicações para investigação da fragDNA espermático

1. Varicocele palpável e sêmen normal ou limítrofe (espermograma convencional)

2. Infertilidade inexplicada

3. Falha RA (Inseminação intra-uterina, FIV clássica ou ICSI)

4. Aborto de repetição

5. Fatores risco infertilidade (obesidade, tabagismo, álcool, idade, uso gonadotoxinas, infecção, etc..)

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Agarwal et al. *Transl Androl Urol* 2016 ;5(6):935-950

Considerações (1)

- *fragDNA* espermático como nova ferramenta diagnóstica;
- Teste da dispersão da cromatina – mais adequado e de menor custo;
- Antioxidantes como forma de tratamento;
- Modificação do estilo de vida (cigarro, peso);

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Considerações (2)

- Diminuição do tempo de abstinência ejaculatória
- Identificação e tratamento de fatores causais (infecção, varicocele)
- Utilização MSOME / IMSI
- Utilização de espermatozoide testicular???

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https://fertility.com.br/producao-cientifica-2019/

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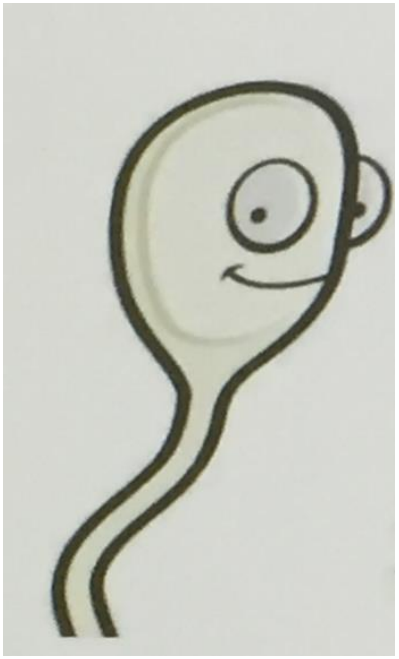
Obrigado !



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