



kairuki\_ivf



**KHGIVF**

# **TRAINING ON INFERTILITY AND ASSISTED REPRODUCTION**

## **AT KAIRUKI GREEN IVF**

**BUNJU 'A' MIANZINI**

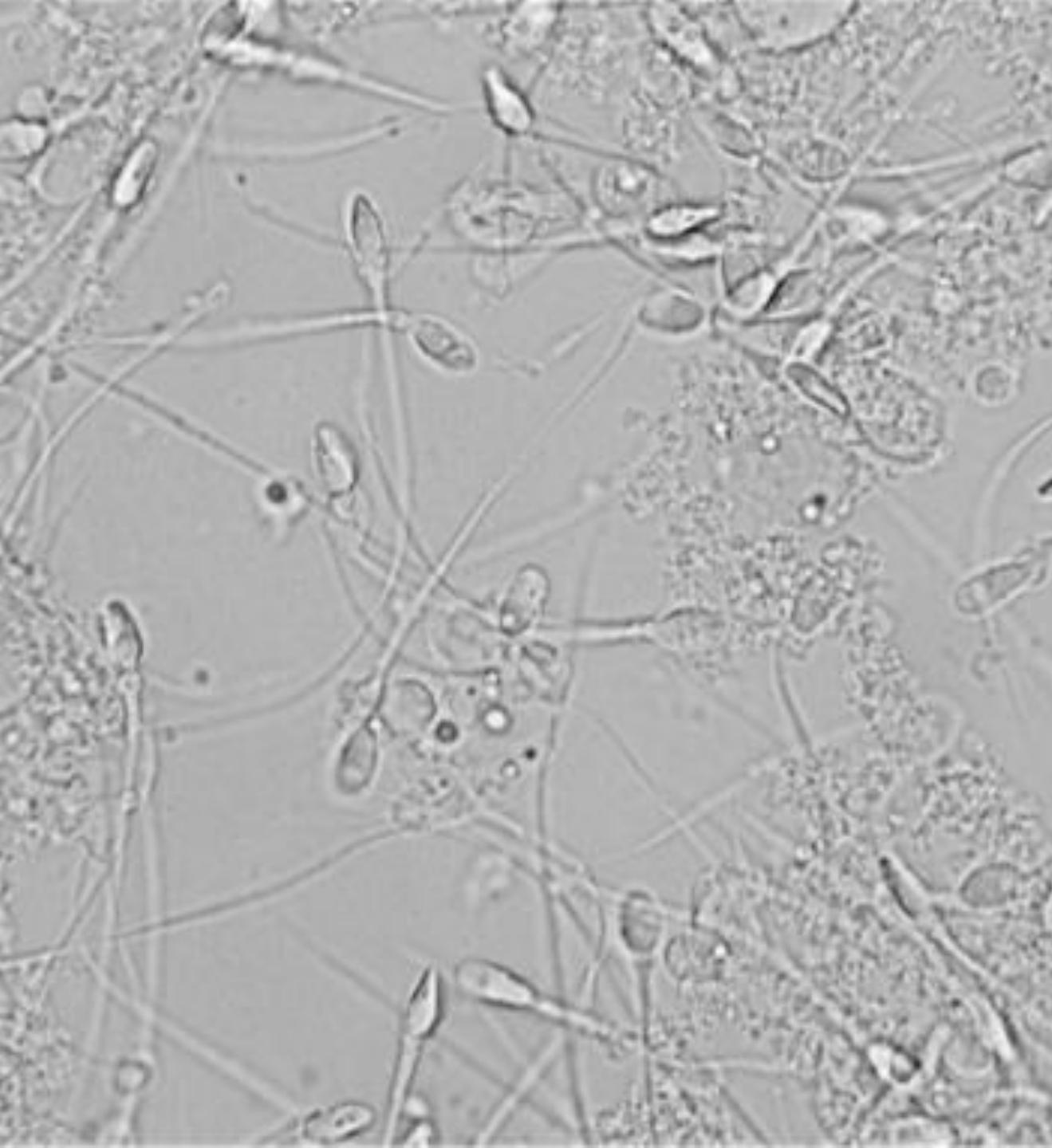
**DAR ES SALAAM, TANZANIA**

**16 & 17<sup>th</sup> SEPTEMBER**

# **Basic semen analysis and interpretation**

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(BSc. MLT, MSc. Biotechnology & Human assisted reproduction  
in Progress)



## OBJECTIVES:

- Evaluation of the infertility  
Man
- Interpretation of Semen  
report and additional tests
- Microbiological Culture
- Karyotype and Sperm  
FISH
- Special Protocol

# Evaluation of the infertile man: Spermogram

The definition of a **fertile/infertile** male presents an extreme complexity, since the situation can be variable in short periods of time, and even with different partners.

The only commonly accepted tool for studying the fertile potential of men is semen analysis according to the criteria of the World Health Organization (WHO, 2010), based on concentration, mobility and morphology. (2021 new revision)



# Evaluation of the infertile man: Spermogram

## Introduction

Evaluation of the classic parameters for the correct diagnosis of fertility. WHO

normality criteria (WHO, 1999/2010)



**World Health  
Organization**

# Evaluation of the infertile man: Spermogram

1. Collection of the sample and transport to the laboratory
2. Macroscopic examination
3. Microscopic examination
4. Normality criteria and nomenclature

# Evaluation of the infertile man: Spermogram

## Collection of sample by masturbation and transport to the laboratory

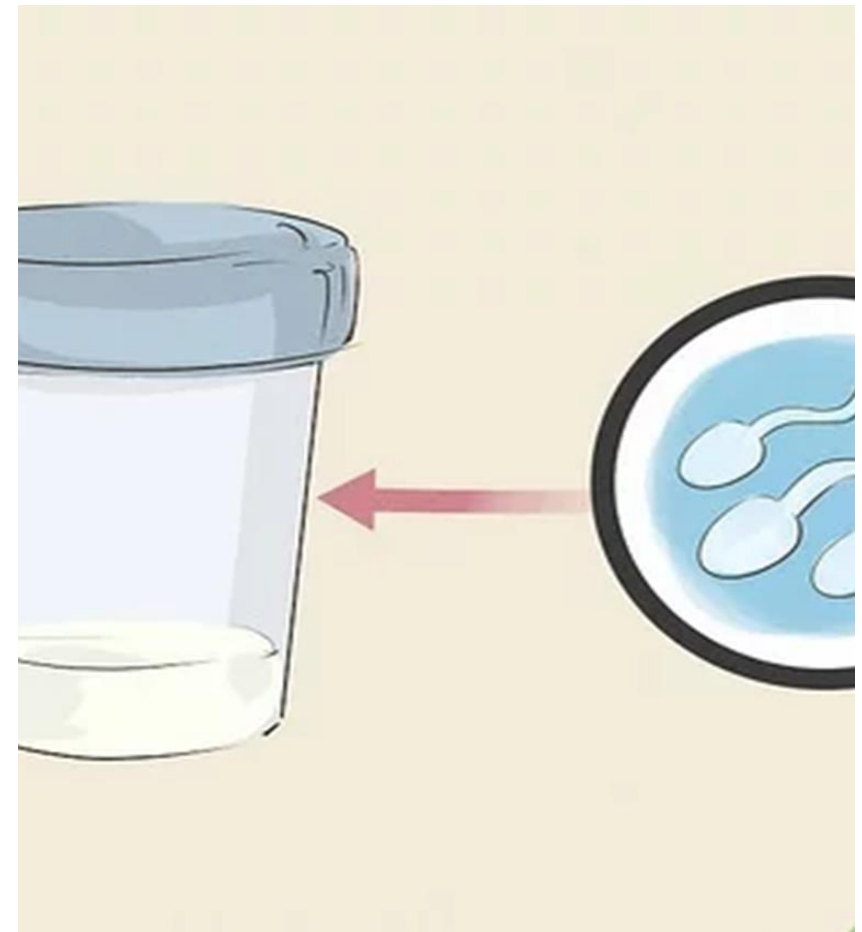
Sexual abstinence of 3-7 days.

Sterile and non-toxic plastic container. Never use normal condoms.

Clear labelling. Special cases:

- Collection in split.
- collected in urine.

Keep T near 37°C until the laboratory



# Evaluation of the infertile man: Spermogram

## Macroscopic Examination

- Liquefaction
- Viscosity Appearance Odor
- Volume
- pH



# Evaluation of the infertile man: Spermogram

## Microscopic Examination

1. Concentration
2. Motility
3. Agglutination
4. Morphology
5. Vitality
6. Other semen cells
7. Antisperm antibodies



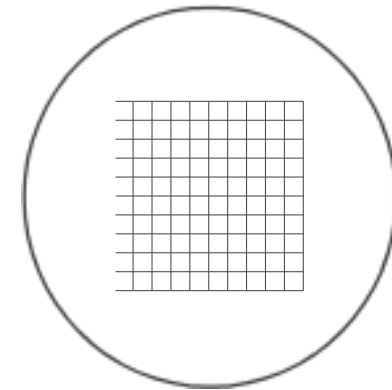


# Evaluation of the infertile man: Spermogram

## Microscopic Examination. Concentration: (20x

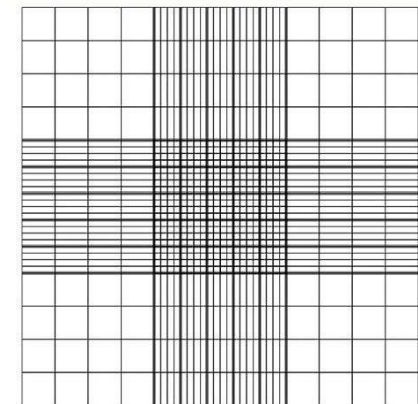
### Makler's chamber:

- Indicated for discharges, such as fresh semen under Phase contrast



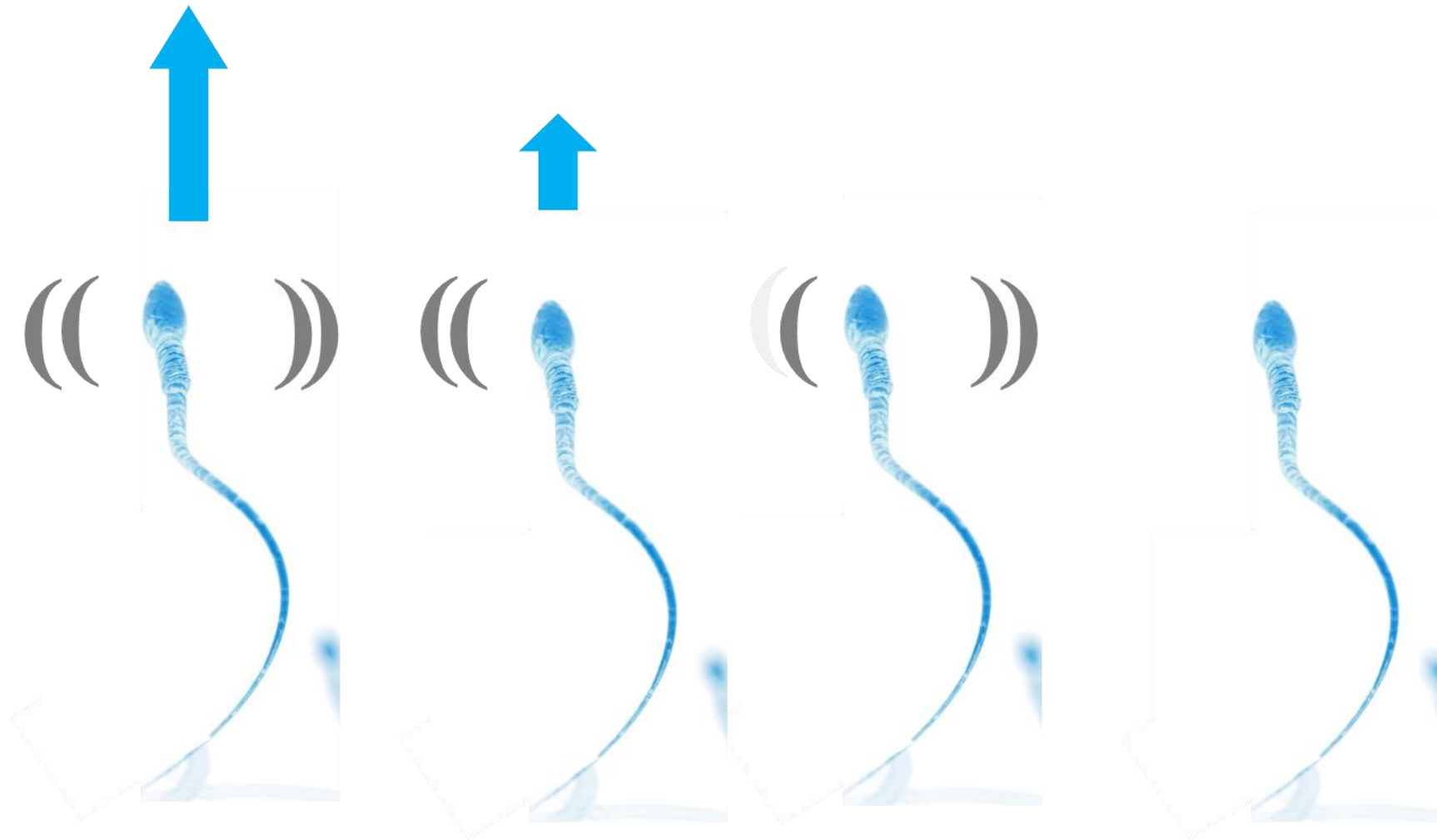
### Improved Neubauer Chamber:

- Indicated to adjust concentrations in insemination drops where minor number are seen



# Evaluation of the infertile man: Spermogram

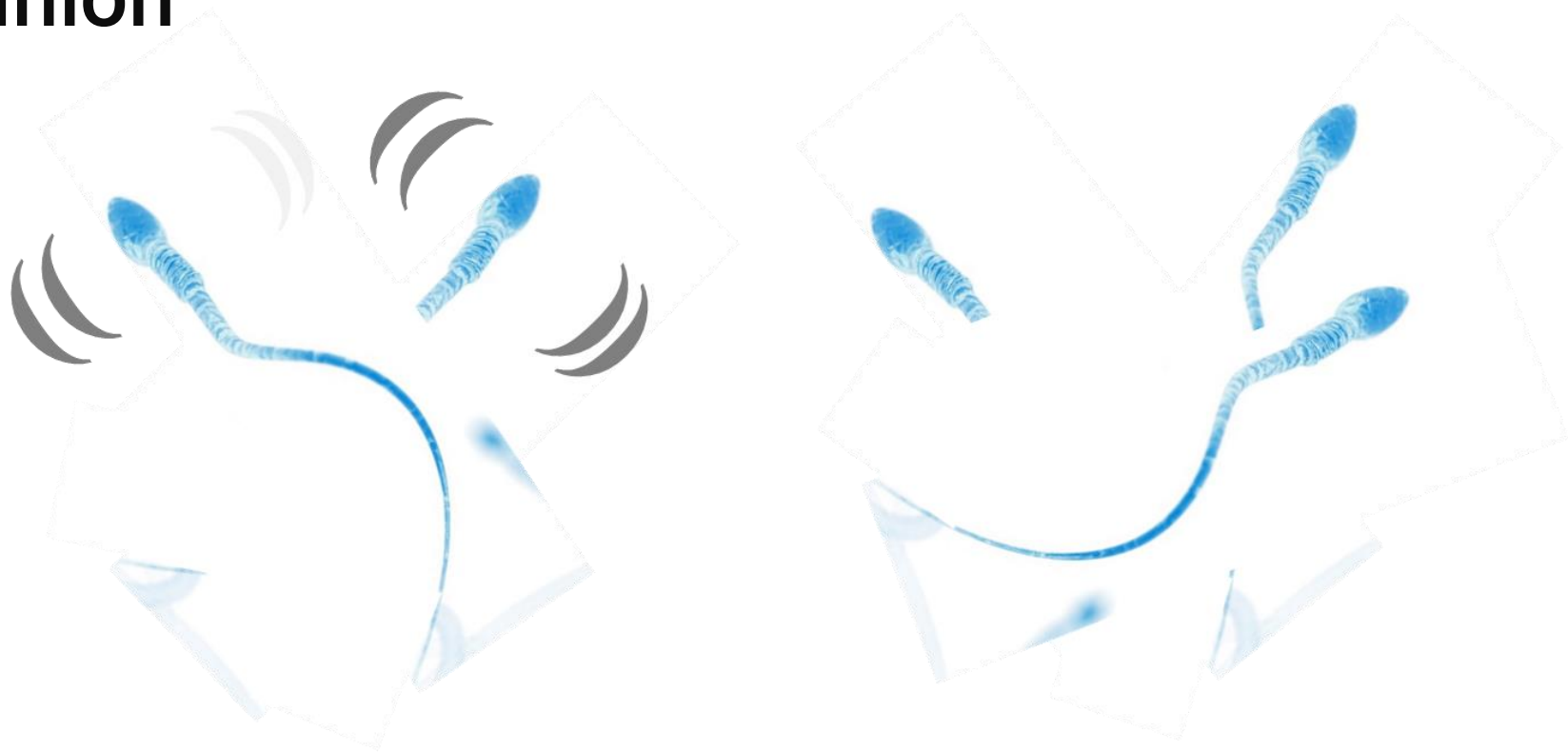
## Microscopic Examination. Concentration: (20x



# Evaluation of the infertile man: Spermogram

**Microscopic Examination. Concentration: (20x**

**Apoptosis-union**



# Evaluation of the infertile man: Spermogram

## Microscopic Examination. Concentration: (20x

Dyes:

Diff Quick Quick  
panoptic Papanicolau  
Shorr

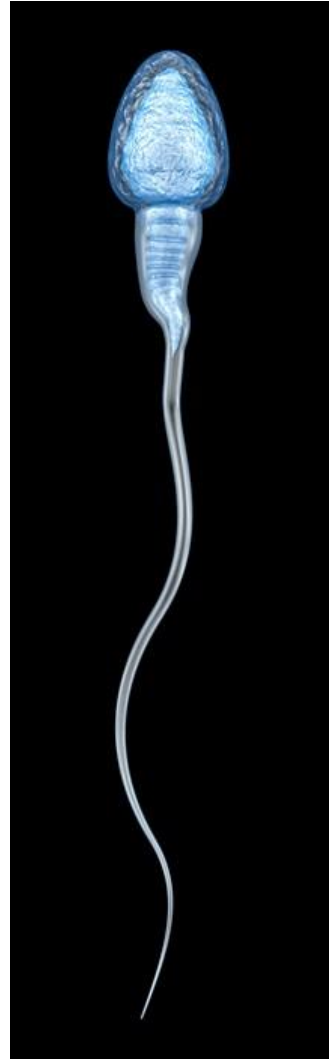
Normal Characteristics:

Oval head Acrosome 40-  
70%

Without >50% vacuoles

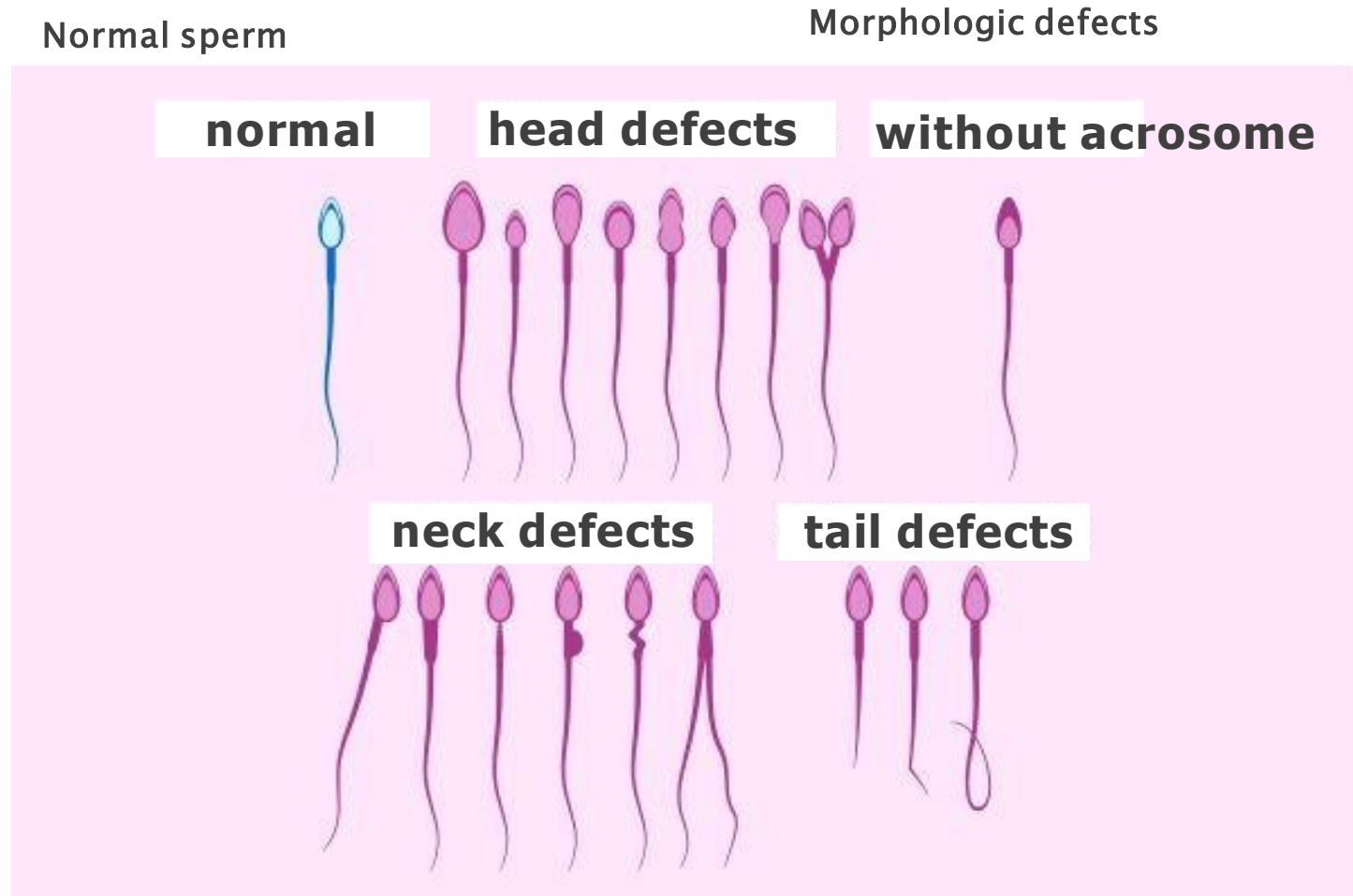
Axial midpiece without breakage or thickening

Extended tail, approx. 7-8 times the head



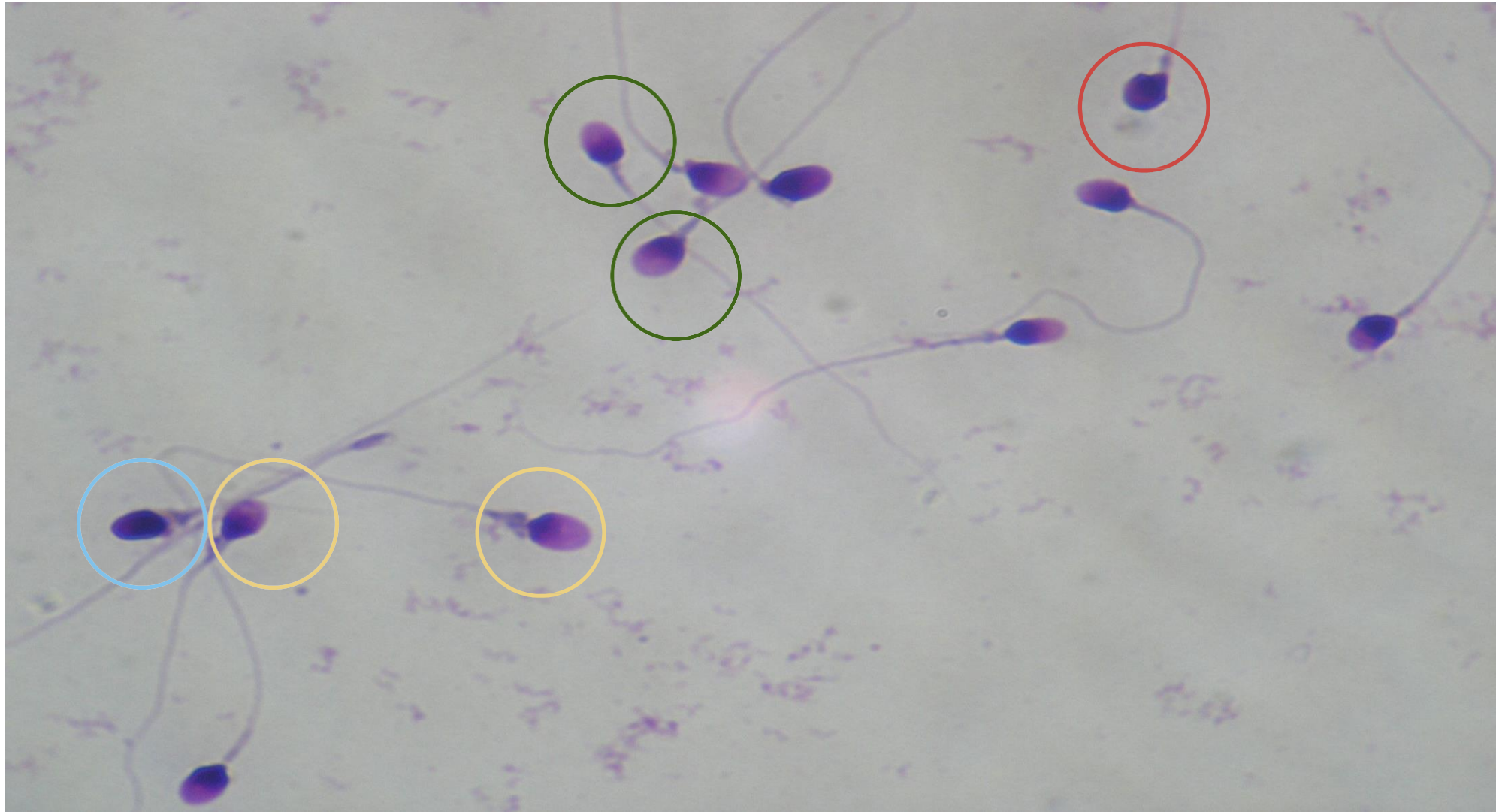
# Evaluation of the infertile man: Spermogram

## Microscopic Examination. Concentration: (20x)



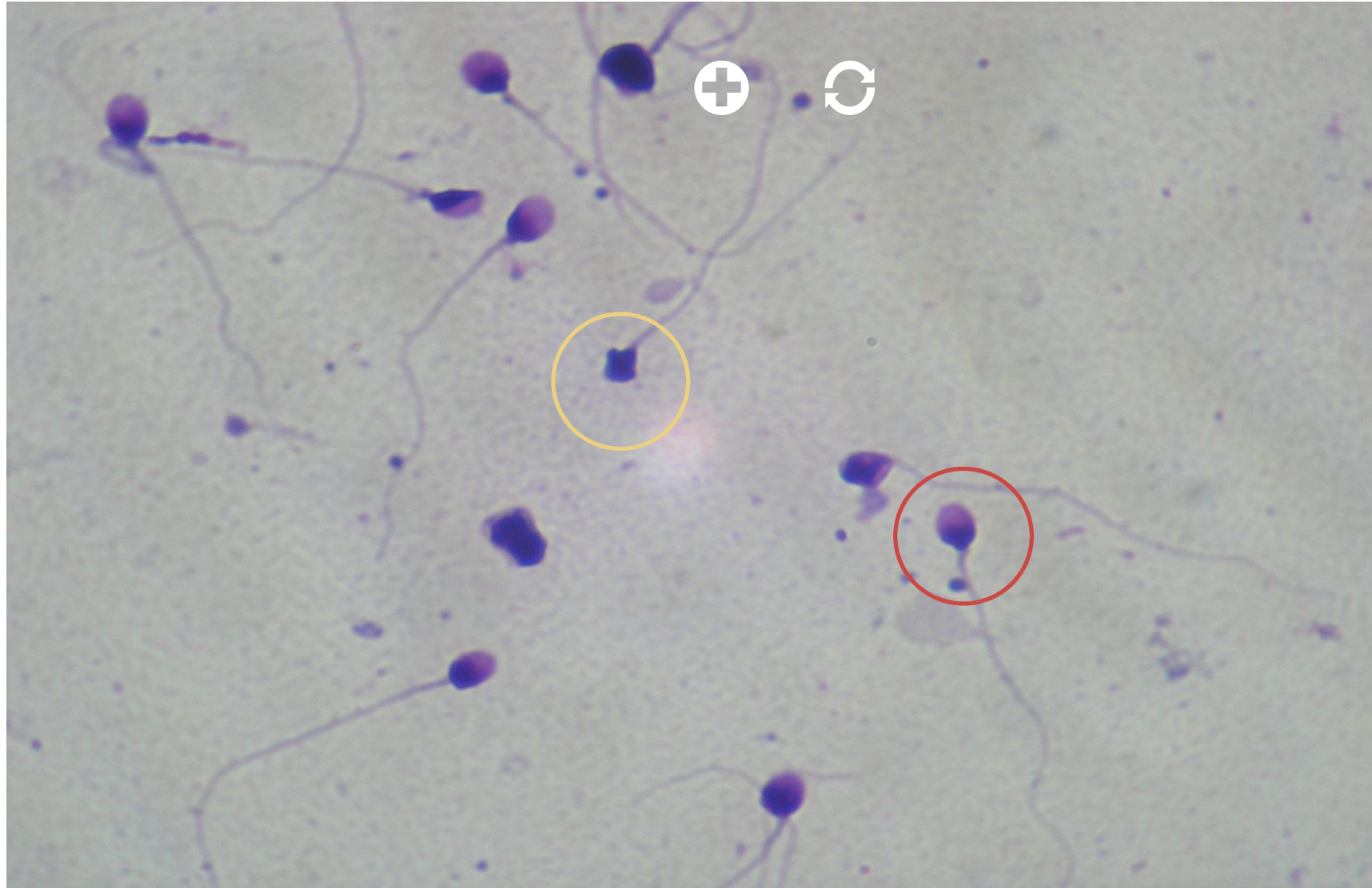
# Evaluation of the infertile man: Spermogram

**Microscopic Examination. Concentration: (20x**



# Evaluation of the infertile man: Spermogram

**Microscopic Examination. Concentration: (20x**



# Evaluation of the infertile man: Spermogram

## **Microscopic Examination. Concentration: (20x**

### Microscopic Examination. Morphology: (100x)

Results:

Normal

Abnormal

- Head defects
- Mid-piece defects
- Tail defects

$$\text{Teratospermia Index} = \frac{\textit{Sum of defects}}{\textit{Abnormal}}$$



# Evaluation of the infertile man: Spermogram

## Microscopic Examination. Concentration: (20x)

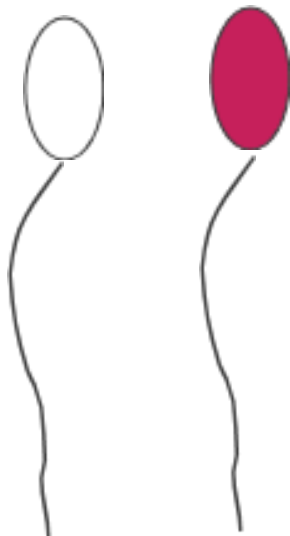
### Microscopic Examination. Vitality: (20x)

Methods:

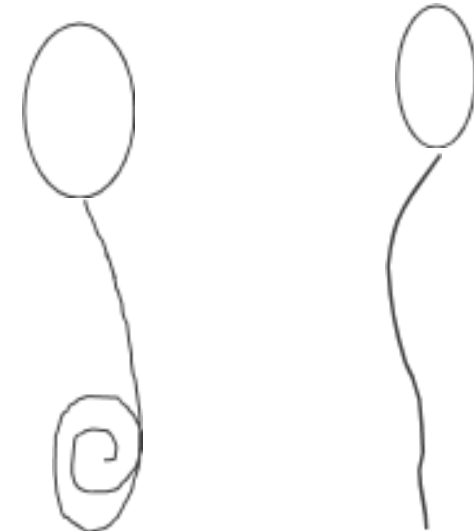
A. Vital stain (eosin, trypan blue)

B. Hypoosmotic Test

A. Live Dead

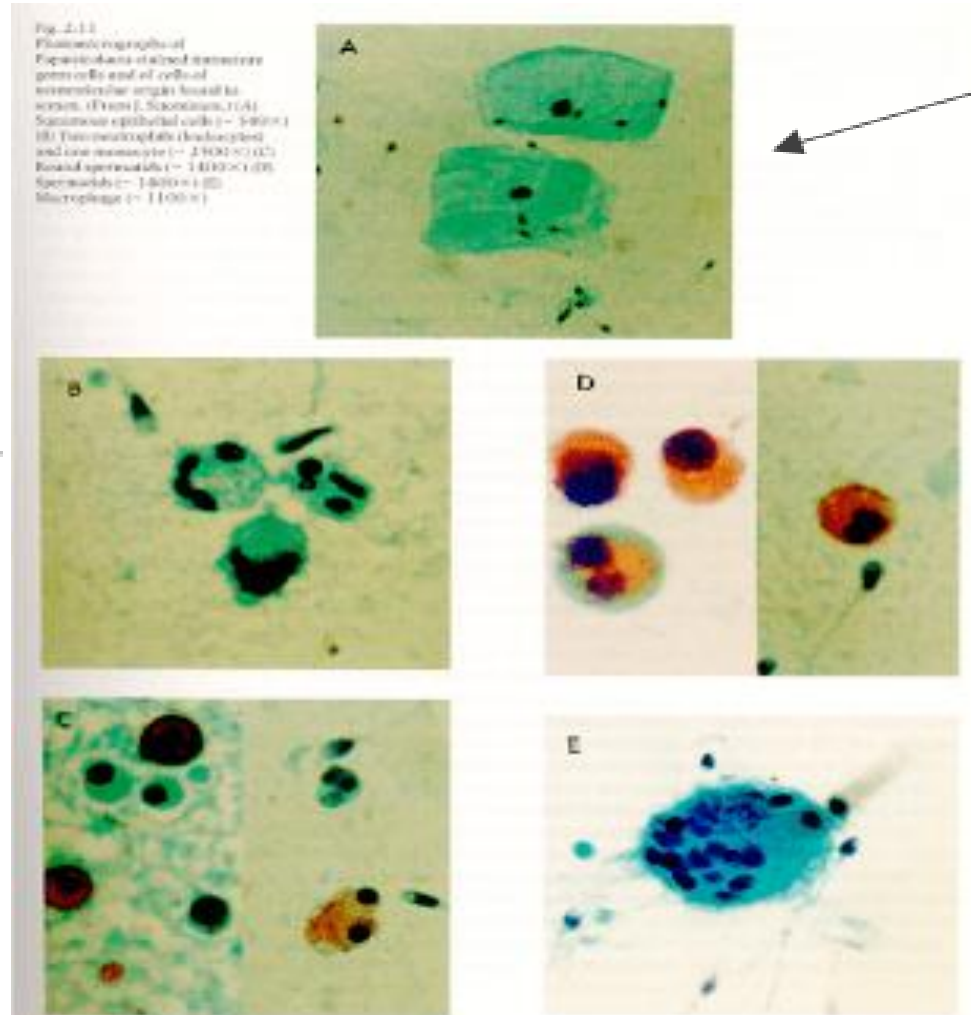


B. Live Dead



# Evaluation of the infertile man: Spermogram

## Microscopic Examination. Other cells present in semen.(100x)



Epithelial cells

Neutrophils

Spermatids

Macrophages

Rounded spermatids

# Evaluation of the infertile man: Spermogram

## Normality criteria and nomenclature (1999)

Volume:	2 ml
Concentration:	> 20 mill/ml
Motility:	> 50% forms A+B or 25% A
Morphology:	> 14% (Kruger's strict criterion )
Normozoospermia:	normal values
Oligozoospermia:	<20mill/ml concentration
Asthenozoospermia:	<50% grade (PR+NP) or < 25 PR%
Teratozoospermia:	<14% morphology
Cryptozoospermia:	less than 100000 sp/sample
Leucospermia:	more than 1 mill/ml
Necrospermia:	all spermatozoa dead
Azoospermia:	no spermatozoa in the ejaculate

# Evaluation of the infertile man: Spermogram

## Normality criteria and nomenclature (2010)

Volume:	1.5 ml
Concentration:	> 15 mill/ml or 39 mill total
Motility:	> 32% forms A+B or 25% A
Morphology:	>4% (Kruger's strict criterion )
Normozoospermia:	normal values
Oligozoospermia:	<15 mill/ml or 39 mill total
Asthenozoospermia:	<40% grade (PR+NP) or < 32 PR%
Teratozoospermia:	morphology
Cryptozoospermia:	less than 100,000 sp/sample
Leucospermia:	more than 1 mill/ml
Necrospermia:	>58% vitality or >70 % D
Azoospermia:	no spermatozoa in the ejaculate

# Evaluation of the infertile man: Spermogram

## Normality criteria and nomenclature (2021)

Volume:	1.4 ml	Progressive Motility	>30% of all sperm
Concentration/ml:	> 16 mill/ml or 39 mil/ejaculate		
Total Motility:	> 42% forms A+B or 27% A		
Morphology:	>4% (Kruger's strict criterion )		
Normozoospermia:	normal values		
Oligozoospermia:	<16mill/ml concentration		
Asthenozoospermia:	<42% grade (PR+NP) or < 30 PR%		
Teratozoospermia:	<4% nol morphology		
Cryptozoospermia:	less than 100,000 sp/sample		
Leucospermia:	more than 1 mill/ml		
Necrospermia:	>54% (vitality)		
Azoospermia:	no spermatozoa in the ejaculate		

# Evaluation of the infertile man: Spermogram

## Summary of normality criteria and nomenclature

Semen parameter	WHO 1980	WHO 1987	WHO 1992	WHO 1999	WHO 2010 <sup>1</sup>	WHO 2021
Volume (mL)	ND	≥2	≥2	≥2	1.5	1.4
Sperm concentration (x10 <sup>6</sup> /mL)	20-200	≥20	≥20	≥20	15	16
Total sperm number (x10 <sup>6</sup> )	ND	≥40	≥40	≥40	39	39
Total motility (%)	≥60	≥50	≥50	≥50	40	42
Progressive motility (%) <sup>2</sup>	≥2 <sup>3</sup>	≥25	≥25 (grade a)	≥25 (grade a)	32 (a+b)	30
Vitality (%)	ND	≥50	≥75	≥75	58	54
Normal morphology (%)	80.5	≥50	≥30	(14)	4	4

# Interpretation of spermogram

**Severe concentration alterations: severe oligozoospermia (<3 million/ml)**

## **Additional diagnostic tests:**

Hormone levels such:

- FSH, LH, Testosterone, Prolactin, and TSH etc.

Karyotype

- FISH studies on sperm
- Cystic brosis gene mutation studies Microdeletion studies

# Interpretation of spermogram

**Very severe alterations in concentration (cryptozoospermia and azoospermia):**

**Diagnostic tests:**

Semen pH analysis, fructose test, Inhibin B

Hormone levels

**Karyotype**

FISH studies of sperm

Cystic brosis gene mutation studies

Microdeletion studies

Testicular biopsy

**Therapeutic action:**

Freeze semen in which motile spermatozoa are found

Testicular biopsy/ICSI

Epididymis aspiration/ICSI



# Interpretation of spermogram

## **Severe motility alterations (asthenozoospermia):**

### Diagnostic tests

Perform microbiological culture

Rule out ciliary immotility syndrome (Kartagener)

Rule out the presence of urine in the sample (pH)

Vitality test (total immotility)

### Therapeutic actions

Hypoosmotic test and ICSI

Pentoxifylline and ICSI

# Interpretation of spermogram

There are different occasions in which tests are required to complement it and provide more information about the etiology of the disease, as well as the necessary treatments, and this occurs mainly when the quality of the semen is extremely low.

In these cases, physical examination is necessary in case of finding very pathological spermogram results.

