

**510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY
ASSAY ONLY TEMPLATE**

A. 510(k) Number:

K071737

B. Purpose for Submission:

Traditional 510(k) for modification of a previously cleared device

C. Measurand:

Sperm head morphology parameter

D. Type of Test:

Quantitative immunohistochemical assay using flow cytometry

E. Applicant:

Dyn-BioShaf Ltd., Israel

F. Proprietary and Established Names:

General Semen Analysis (GSA) Kit

G. Regulatory Information:

1. Regulation section:

- a. There is no regulation for semen analysis devices
- b. 21 CFR 864.5220, Automated differential cell counter

2. Classification:

Class II

3. Product code:

MNA, GKZ

4. Panel:

Hematology (81), OB-GYN (85)

H. Intended Use:

1. Intended use(s):

The GSA Kit is for the evaluation of human semen and provides a set of reagents to evaluate semen quality by measuring five parameters, recommended by the World Health Organization (WHO), that are used to determine whether infertility is caused by abnormalities of one or more of them. The parameters include: sperm count, sperm motility, sperm viability, white blood cell count, sperm head morphology.

2. Indication(s) for use:

N/A

3. Special conditions for use statement(s):

N/A

4. Special instrument requirements:

Assay has been validated on three commercial flow cytometers: Becton Dickinson FACScan, Beckman Coulter Epics XL, and Partec PAS III (German)

I. Device Description:

The GSA Kit consists of a set of reagents which when used with an appropriate flow cytometer [(Three have been validated with this kit: Becton Dickinson FACScan, Beckman Coulter Epics XL, and Partec PAS III (German))], enables the laboratory technician to perform a set of tests to evaluate five semen parameters: sperm count, sperm motility, sperm vitality, white blood cell count, and sperm head morphology (DNA condensation).

J. Substantial Equivalence Information:

1. Predicate device name(s):

Dyn-BioShaf Ltd., General Semen Analysis Kit (GSA)

2. Predicate K number(s):

K024337

3. Comparison with predicate:

Similarities		
Item	Device	Predicate
Principle	Specific reagents that label cell surface molecules with a fluorescent dye (monoclonal antibodies tagged with fluorescent dye) or a fluorophore reagent whose fluorescent intensity depends on the physiological activity of the cell The fluorescent signal is measured by a flow cytometer with software to calculate results.	Same
Intended Use	The GSA Kit is for the evaluation of human semen and provides a set of reagents to evaluate semen quality by measuring parameters, recommended by the World Health Organization (WHO), that are used to determine whether infertility is caused by abnormalities of one or more of them.	Same

Differences		
Item	Device	Predicate
Measured Parameters	Sperm count, sperm motility, sperm vitality, white blood cell count.	Sperm count, sperm motility, sperm viability, white blood cell count, sperm head morphology.

K. Standard/Guidance Document Referenced (if applicable):

N/A

L. Test Principle:

Fluorescence intensity of a specific reagent is used to measure physiological function of the

sperm cells. For example, the vitality reagent passively diffuses into the cells and if the cell is vitality has enzymatic activity that cleaves the reagent. As a result of this cleavage the reagent becomes fluorescent and this fluorescence is detected by the flow cytometer, thus allowing counting of vital cells. For other parameters not related to physiological function such as WBC count—specific monoclonal antibodies labeled with FITC are used.

M. Performance Characteristics (if/when applicable):

1. Analytical performance:

- a. *Precision/Reproducibility:* N/A
- b. *Linearity/assay reportable range:* N/A
- c. *Traceability, Stability, Expected values (controls, calibrators, or methods):* N/A
- d. *Detection limit:* N/A
- e. *Analytical specificity:* N/A
- f. *Assay cut-off:* N/A

2. Comparison studies:

a. *Method comparison with predicate device:*

In a prospective study clinical trial carried out in four USA clinics and one Israeli clinic, the morphology of 485 semen samples were evaluated by the Routine Method (WHO manual method) and by the GSA Kit.

Table 1. Agreement Between Sperm Morphology by the Routine Method and the GSA kit.

Routine Analysis	GSA Kit		
	Normal	Abnormal	Total
Normal	180 87.8%	25 12.2%	205
Abnormal	45 16.1%	235 83.9%	280
Total	225	260	485

In the above table the agreement of the GSA Kit with the Routine Analysis for abnormal sperm morphology was 83.9% (exact 95% CI, 79.1---88.0). The agreement of the GSA kit with the Routine Analysis for normal sperm morphology was 87.8% (exact CI, 82.6--92.0). The overall agreement rate was 85.6% (exact CI, 82.1%--88.6%)

Table 2. Comparison of GSA Kit for Sperm Head Morphology With Three Flow Cytometers

	(Y) Partec-PAS vs. (X) BD-FACScan	(Y) BC-Epix vs. (X) BD-FACScan	(Y) BC-Epix vs. (X) Partec-PAS
Slope	0.952	0.970	0.992
Intercept	3.762	1.966	0.128
R ²	0.964	0.975	0.960
Correlation (r)	0.982	0.987	0.980
Residual Std Dev	3.352	2.847	3.565
Bias @ 40(% bias)	1.85 (4.6%)	0.76 (1.9%)	-0.18 (-0.05%)
Bias @ 65 (% bias)	0.66 (1.0%)	0.00 (<0.01%)	-0.38 (-0.01%)
Bias @ 90 (% bias)	-0.53 (-0.6%)	-0.75 (-0.01%)	-0.57 (-0.01%)
Mean Difference	0.126	-0.338	-0.465
SD of Difference	3.409	2.855	3.513

b. Matrix comparison: N/A

3. Clinical studies:

a. Clinical Sensitivity: N/A

b. *Clinical specificity*: N/A

c. Other clinical supportive data (when a. and b. are not applicable): N/A

4. Clinical cut-off: N/A

5. Expected values/Reference range:

For sperm head morphology, $\geq 65\%$ of fluorescence staining in gate R2 defines a sample with normal DNA condensation.

N. Proposed Labeling:

The labeling is sufficient and it satisfies the requirements of 21 CFR Part 809.10.

O. Conclusion:

1. A substantial equivalence decision.