Fornax

witness an **evolution**

Centri

finally turns **better**


fuge

to form the all
new

Sperm

that improves the IVF world by

five folds

fuge

Introduction

Spermfuge is an improvise centrifuge, dedicated totally for elevating the total motile sperm recovery from the parent semen sample, by regulating the main parameter of “Temperature thus aimed at enhancing the ART results. The instrument has been designed to regulate and subsequently maintain the “Critical” inner chamber temperature before, after and during centrifugation.


Reach

the temperature you

desire

Temperature and Centrifugation

By regulating the temperature throughout the centrifugation, Spermfuge improves sperm motility and longevity when compared to a non temperature regulated centrifuge, thus increasing the effectiveness of the sperm wash procedures. Also Spermfuge may improve semen samples from infertile men with high seminal ROS. Spermfuge eliminated the existing dependency on RPM by providing the exact indication of G-Force.

The heating range of Spermfuge's chamber is from 26^{0}C to 42^{0}C. The intelligent control system does not allow the centrifugation to commence till the set temperature is attained. However, one does have the option to commence the centrifugation without chamber heating and to commence the chamber heating without centrifugation.

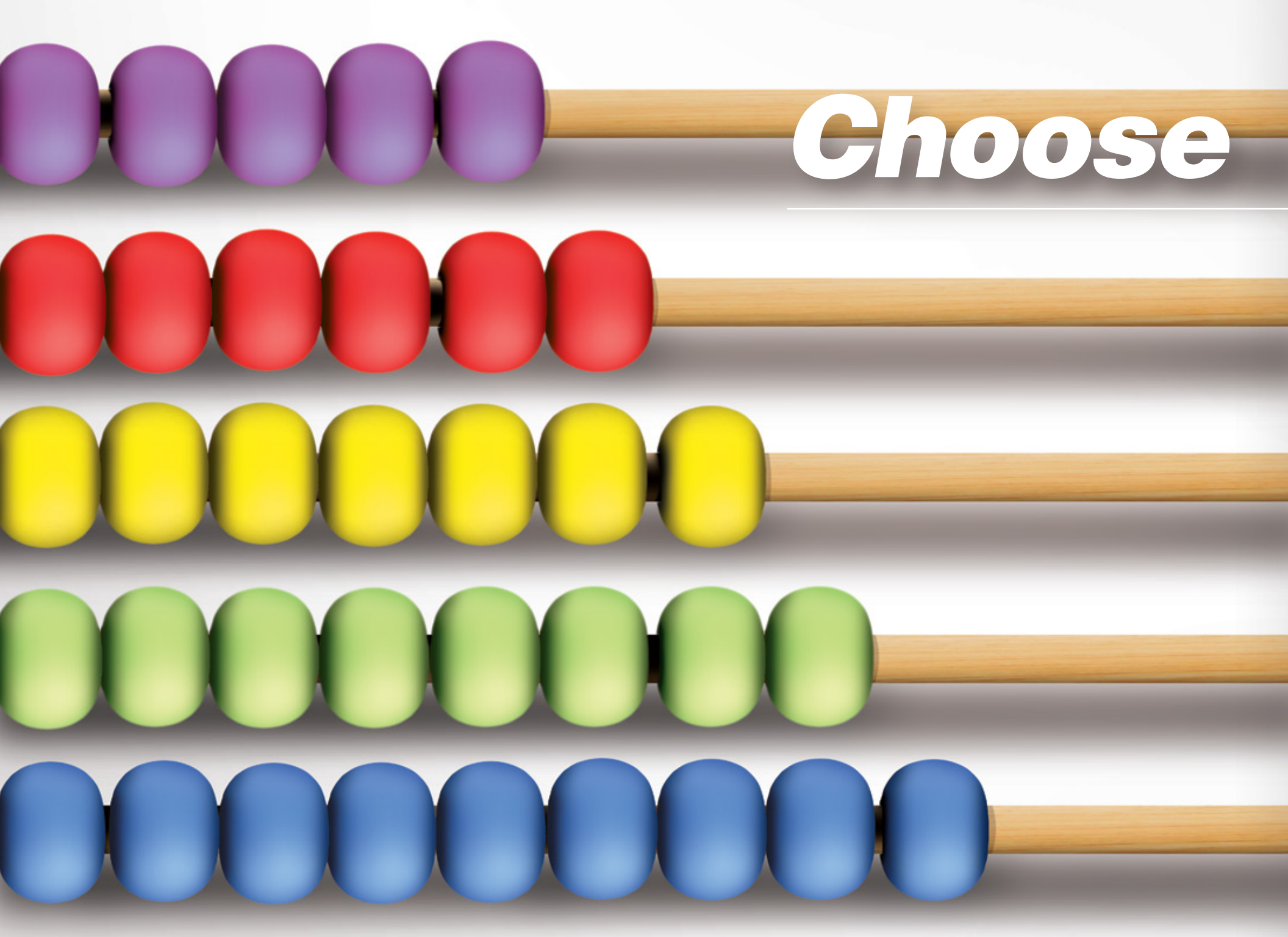
Get

the g-force upfront

G Force

The exact indication of G-Force helps the ideal sperm pellet formation by subjecting the sperm to and exact and precise amount of G-Force unlike other centrifuges where G-Force is subject to RPM and the tube size. Nowadays centrifugation speed is never reported in RPM as it is not reproducible. (As RPM is dependent on rotor radius.)

G-Force is a type of acceleration. It is force per unit mass. Any G-Force is described as a “Weight per Unit mass”, One G is the acceleration due to gravity at the earth surface and is the standard gravity, it is defined as 9.80655 meteres per second square.


Choose

from nine different options

Multiple Programs

The Spermfuge facilitates user selectable 9 programs. This 9 programs can be used for different applications/purpose such as 3 programs for swim up, 40% gradient, 90% gradient and or also for 3 different media brands and may be for 3 different embryologist in the IVF Laboratory. The desired protocols as recommended by the Culture Media Companies or as standardized by various Clinics can be easily programmed by the users with the parameters such as G-Force, RPM, tube size, temperature, time, braking (normal and slow) by the digital encoder. The Spermfuge also can be used only as incubator or only as centrifuge or incubator and centrifuge together.


Stop

the flow with smooth **braking**

Acceleration and Braking

One of the very important criteria in Andrology and ART is to get compact pellet at the bottom of the tube after the centrifugation. This is very well achieved by giving 3 levels of braking in Spermfuge. Centrifuge comes to halt with the smooth and accurate precision without jerky or anti-clockwise movement. The three levels of braking are normal, slow and very slow. Once the centrifugation time is over, Spermfuge facilitates a complete stoppage which takes place till a minute. This gentle stoppage or braking ensures that the pellet does not get disturbed and ensures smooth compaction. The undisturbed pellet could be easily overlaid with the sperm media as no mechanical mixing of sperm is possible nor there is any premature release of the sperm from the pellet.

Prevent

the cross-contamination with ***sealed*** *buckets*

Sealed Buckets

Spermfuge has been designed to give the highest safety to the operator as well as the semen sample. Centrifugation may present serious hazards, mechanical failure and dispersion of aerosol. Spermfuge has been designed to arrest and to secure both these hazards of mechanical failure is averted by limiting speed to 2200 RPM or 800G and also by providing Sealed Buckets as per the requirement of laboratory health and safety standard to prevent dispersion of aerosols. The sperm DNA is also protected by restricting the type of speed of Spermfuge at 2200 RPM or 800G.

Advantage Spermfuge

Fornax

Temperature Regulated Centrifuge

SF 800

The ever increasing need for **Assisted Reproductive Techniques** has witnessed a phenomenal advancement in the innovative gadgets for gamete processing. Ideally processed gametes do result in the subsequent formation of ideal embryos thereby optimising implantation. **Spermfuge** is one such gadget - a centrifuge with incubation and memory which eliminates any probable suboptimal conditions thereby nearly negating TRAUMA. **The 37^{0}C temperature essential for optimising activation, auto 'g' force selection depending upon the centrifuge tube size and capacity, smooth extended braking etc all ensure ideal pellet compaction with minimal trauma thus preserving sperm integrity.** A number of pre-fixed set programmes gives us the range of instant selection thus eliminating daily settings and an OPEN SET programme variable gives us the option of programme setting to our convenience. Every step is checked before the task progresses. Research studies have albeit proved the advantage of this temperature controlled Spermfuge thus making it a necessary tool for Andrology labs.

Spermfuge is Next Generation Clinically proven version of centrifuge. Spermfuge has been designed and produced as per needs of preparation procedures for Human Spermatozoa. It also complies various International guidelines such as WHO and EUTCD. **Spermfuge has been CE certified and produced under ISO 13485 quality system**

The instrument has been designed to regulate and subsequently maintain the “Critical” inner chamber temperature before, after and during centrifugation. **By regulating the temperature throughout the centrifugation, Spermfuge improves sperm motility and longevity when compare to a non-temperature regulated centrifuge, thus increasing the effectiveness of the sperm wash procedures.** Also Spermgure may improve semen samples from infertile men with high seminal ROS. Spermgfuge eliminates the existing dependency on RPM by providing the exact indication of G-Force.

Scientific results supporting the Spermfuge

Sperm preparation and processing techniques have changed dramatically since the onset of ART techniques. The role and contribution of sperm parameters have been thoroughly evaluated. Many predictive parameters have been emphasized and studied and continuously improved upon. Numerous reports have shown a significant positive correlation between percentage progressive motility, velocity and morphology parameters on both fertilization and pregnancy rates. Other motion variables are also reliable prognostic indicators for fertilization potential of sperm.

The routinely used sperm processing techniques namely the swim-up and density gradient have yielded capacitated motile sperm for use in various procedures in ART. Fluctuating temperature conditions during the entire process of sperm preparation make the sperm very vulnerable, with the result that suboptimal conditions during processing severely compromise the results.

The advantages which Spermfuge has over conventional centrifuges in improvisation have been supported by scientific results listed as under.

Table 1 : Sperm retrieved following double-wash swim-up process

	Sperm concentration x10^6 sperm ml)$^{-1}$	% Motile
Baseline semen	108.3 ± 63	54.9 ± 16
Sample prepared with Spermfuge and incubated at 34^{0}C	48.1 ± 23.7a	64.0 ± 19.9f
Sample prepared with Spermfuge and incubated at RT	30.9 ± 33.3b	54.7 ± 17.0g
Sample prepared with Sigma and incubated at 34^{0}C	32.7 ± 21.5c	44.2 ± 24.2h
Sample prepared with Sigma and incubated at RT	30.6 ± 17.2d	46.5 ± 14.3i

Students paired *t*-test using ARCSIN values: a vs. b, $P = 0.01$, a vs. c, $P = 0.03$; a vs. d, $P = 0.01$, b vs. c, P = NS; b vs. d, P = NS; c vs. d, P = NS; f vs. g, $P = 0.04$, f vs. h, $P = 0.02$; f vs. i, $P = 0.03$, g vs. h, $P = 0.03$; g vs. i, $P = 0.04$, h vs. i, P = NS.

Table 2 : Comparison between baseline and experimental values presented as average values and standard deviations for percentage rapid, medium, slow and static moving cells after double swim-up

	Rapid (%)		Medium (%)		Slow (%)		Static (%)	
	AVE	SD	AVE	SD	AVE	SD	AVE	SD
Baseline	43.9	18.4	7.7	6.4	11.3	7.8	37.4	17.0
Spermfuge 34 ^{0}C	40.4	22.8	24.2^a	11.6	13.2	11.0	22.2^b	16.4
Spermfuge RT	28.3^c	28.2	17.4^d	16.1	16.2	16.4	38.0	39.3
Sigma 34^0 C	36.1^e	23.8	21.5^f	14.0	14.5	8.6	27.9	18.8
SigmaRT	26.3^g	22.6	20.4^h	13.3	17.0^i	12.0	35.9	22.2

Significant *P*-values, $P < 0.001$ (a, f, g, h); b: 0.006; c: 0.003; d: 0.009; e: 0.032; i: 0.033

Studies by Franken et al., (Andrologia, 2011, 43, pg 217) have revealed that temperature controlled preparation procedures, significantly increased the retrieved sperm concentration and percentage motile sperm with improved motion characteristics which might have a positive effect on the improvement of prepared sperm parameters *(Table 1 and 2).*

Figure 1

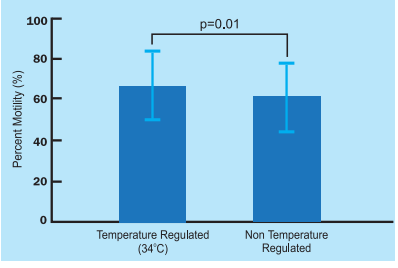


Figure 2

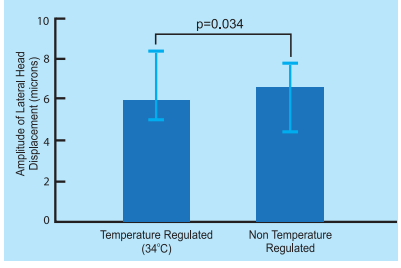
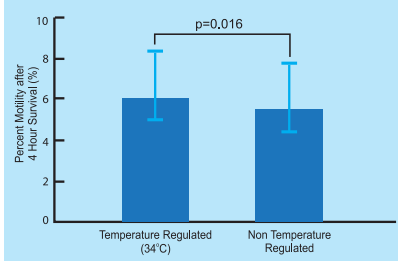


Figure 3



Studies by Agarwal et al.,(J of Clinical Embryology, vol. 13, issue 4, 43) have shown improved sperm motility after temperature regulated centrifugation at 34°C as compared to non-temperature regulated centrifugation *(Figure1).*

Further motion variables as studied by Agarwal et al., have also registered improvement in sperm incubated at 37°C as compared to 20°C *(Figure2).*

An improvement in sperm longevity after incubated centrifugation at 34°C was also reported *(Figure3)* long with reduced ROS values (Agarwal et al.) *(Figure3).*

Spreading Spermfuge across the globe

Shivani SCIENTIFIC

Enabling life through technology

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