



MEMPHASYS
REPRODUCTIVE BIOTECHNOLOGY

The Felix™ System for Sperm Separation: Operating Procedure

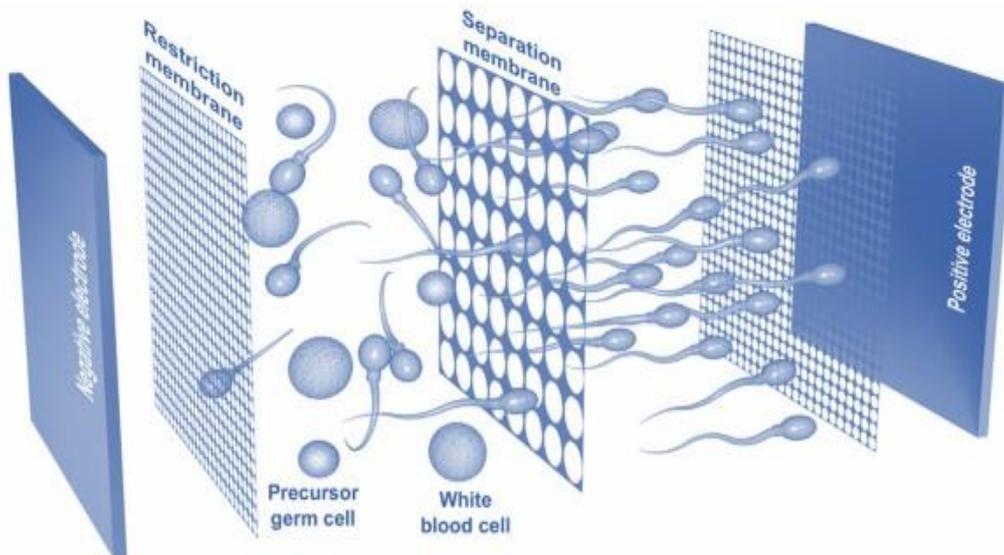


The Felix™ system separates high quality ^(1, 2) sperm from raw semen by a process combining electrophoresis and size exclusion membranes.

How does the Felix™ system work?

The Felix™ system separates sperm from semen based on two principles: charge and size of sperm ⁽³⁻⁵⁾.

1. The quality of sperm DNA is strongly linked with the magnitude of negative charge on the sperm cell surface ⁽³⁻⁶⁾. This negative charge develops very late in the sperm maturation process, when a negatively-charged sialic acid layer forms on the sperm's outer membrane. When an electric field is applied, these more mature negatively-charged sperm are drawn towards the positive electrode (the anode).



2. The sperm can also be separated from other seminal fluid cells based on their size ⁽³⁾. Two sets of size-exclusion membranes are utilised in the Felix™ sperm processing cartridge. A membrane with pores sizes just large enough to enable sperm to pass through is used to separate the sperm from other larger undesirable cells in the semen, such as lymphocytes. Other membranes with finer pores keep the separated sperm isolated from the electrodes.

What is the sperm separation process for the Felix™ System?



- The Felix™ system comprises a small desktop console and a sterile, single-use cartridge.
- The Felix™ system’s cartridge uses restriction membranes that allow ion transfer and isolation of the sperm from the electrodes.

- A separation membrane with fixed pore size within the cartridge is used as a “size-exclusion” barrier that allows the sperm to be separated from other larger seminal plasma cells, including white blood cells.
- The operating process is as follows:
 1. Commercially approved media is pipetted into the two buffer chambers between the electrodes and the restriction membranes to stabilise pH and temperature and to enable current to flow utilising the ions in the media.
 2. Liquified raw semen is pipetted into the sample chamber.
 3. After the power is turned on, the Felix system’s console applies a voltage across the cartridge to create the electrophoretic force to move the negative-charged sperm through the separation membrane and into the harvest chamber. ^(3, 6).
 4. After the 6-minute Felix processing time, 0.3ml to 0.8ml of the separated sperm is ready to be extracted from the harvest chamber. 0.3ml provides the highest quality sperm extract but a larger extraction volume may be used if more sperm are required ⁽⁷⁾.
- The sperm volume harvested will be determined by the clinic embryologist. The required volume of sperm will depend on the quality of the raw semen sample and which egg fertilisation procedure (ICSI or IVF) is to be used.

References

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