

# Advanced Assisted Reproductive Technologies



養和醫院  
Hong Kong Sanatorium & Hospital

體外受孕中心  
IVF Centre

## IVF CENTRE at Hong Kong Sanatorium & Hospital

The IVF Centre at Hong Kong Sanatorium & Hospital has been offering excellent patient care and in vitro fertilisation (**IVF**) services to infertile patients since 1986. Our dedicated team - gynaecologists/ reproductive specialists, urologists, endocrinologists, professional nurses and embryologists – is well experienced in the field of assisted reproductive technologies (**ART**), which have been successfully applied at our centre in treating male and female infertility. Our unique characteristic is patient-oriented services. We listen to you. We understand you. We help you to achieve your dream – having a family.

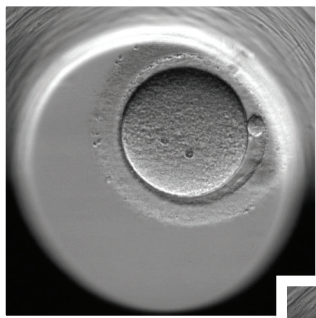
Over the years, we have improved our state-of-the-art facilities to maximise the quality of embryos transferred to patients. Our success on take-home-baby rate by IVF has been dramatically increasing. The cutting-edge technology of intracytoplasmic sperm injection (**ICSI**), i.e. injecting a single sperm into an oocyte, is also very successful in producing embryos for patients who suffer from male infertility. There is hope for patients who do not have sperm in their ejaculate. The sperm can be retrieved from the testis (testicular sperm extraction, **TESE**) or its appendages such as microsurgical epididymal sperm aspiration (**MESA**). Normal babies were born by using these technologies.



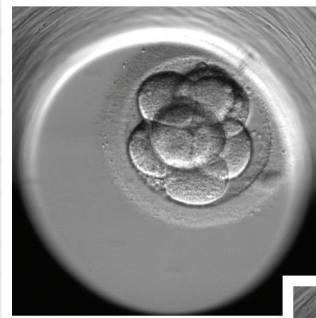
In addition, we offer natural cycle IVF using oocyte in vitro maturation (**IVM**) technology. Application of IVM also allows embryologists to freeze the oocytes for cancer patients prior to their radiation therapy or chemotherapy for the purpose of preserving fertility for the future use after recovery.

This brochure is designed for you to understand our services and procedures. For further details, please visit [www.hksh.com](http://www.hksh.com).



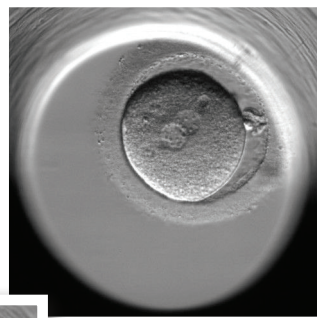


**Day 0**  
Mature Egg

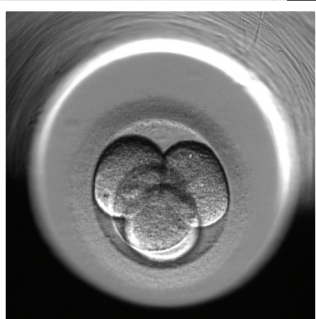
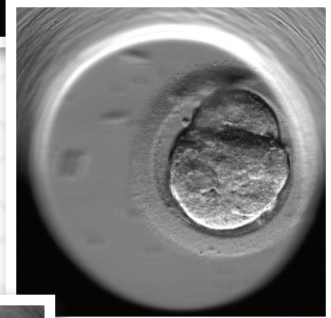


**Day 3**  
8 Cells Embryo

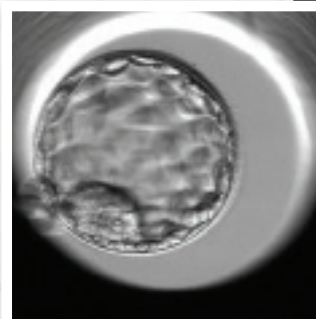
**Day 1**  
Fertilised Egg



**Day 4**  
Morula Stage  
Embryo



**Day 2**  
4 Cells Embryo



**Day 5**  
Blastocyst

## What is IVF?

Normally, the egg and sperm meet at the fallopian tube (oviduct) where the fertilisation occurs. Then the fertilised egg (embryo) travels down the fallopian tube to the uterus, implants into the uterine wall and grows to pregnancy, if uterine conditions are favourable. IVF procedure is to assist in this process for the patients, whose fallopian tubes are blocked or for any other reasons that the sperm and egg cannot physically meet each other naturally. In fact, IVF refers to conventional in vitro

fertilisation technique for patients with normal sperm parameters. The egg(s) are retrieved from the ovaries after controlled ovarian stimulation and ovulation induction. Eggs are cultured in a controlled environment (mimicking the human body temperature, humidity and oviductal fluid) in the IVF laboratory, the sperm will be added to the cultured dish containing eggs. The resulted embryos are transferred to the patient's uterus on or before Day 5, the longest may be up to Day 6.

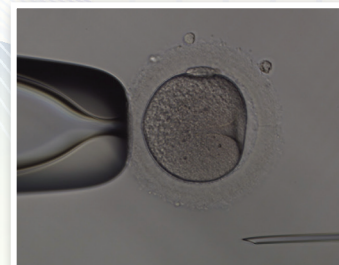
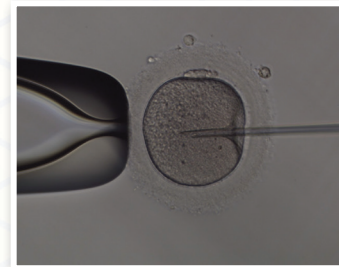
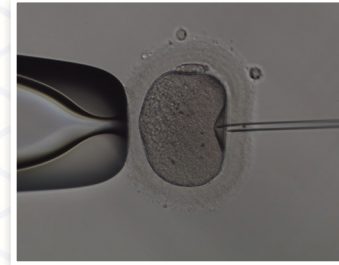




## Intracytoplasmic Sperm Injection (ICSI)

The conventional IVF requires a critical number of motile sperm to achieve fertilisation. When the normal sperm number required is not enough for IVF, our embryologists can inject a single sperm into an egg cytoplasm, i.e. intracytoplasmic sperm injection (ICSI).

Sperms can be extracted for ICSI procedure from the testis or its appendages (vas or epididymis) of male patients with few or no sperm in their ejaculate (azoospermia). The technical terms for these procedures are testicular sperm extraction (TESE) or microsurgical epididymal sperm aspiration (MESA). After achieving fertilisation the procedure of embryo transfer is the same as IVF.





## Who will Benefit from IVF and ICSI?

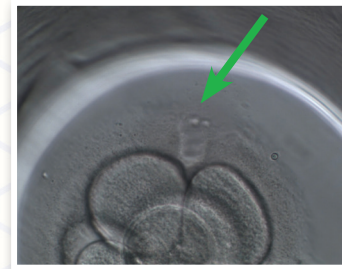
IVF is for women with blocked tubes while ICSI is for men with extremely low sperm counts and/or poor sperm motility, or prior IVF failure at the fertilisation stage. IVF and ICSI are also used under the following conditions:

1. Tubal factor, i.e. earlier investigations showing that the fallopian tubes are blocked or there is adhesion around the tubes.
2. Male factor, i.e. semen analysis showing abnormal result
3. Endometriosis, i.e. the presence of aberrant endometrium (lining of the womb) outside the uterus
4. Unexplained infertility, i.e. couples that cannot conceive even when no obvious pathology is found
5. Age – it is especially true for women. Fertility reduces with age. It falls sharply after the age of 38.

## Assisted Hatching (AH)

Assisted hatching is a laboratory procedure designed to increase the chance of implantation or embryo attachment to the wall of the womb. For a successful implantation, the embryo must “hatch” out of the zona pellucida (the outer shell of embryo). In some patients, the failure of getting pregnancy after embryo replacement may be related to the inability of embryos to “hatch” out of the zona pellucida. Assisted hatching uses laser to cut a tiny opening at a diameter of 10-15 microns on the zona pellucida without touching embryos.

Research has shown that in patients over 38 years of age and those with repeated failures, AH improves implantation and pregnancy rates.

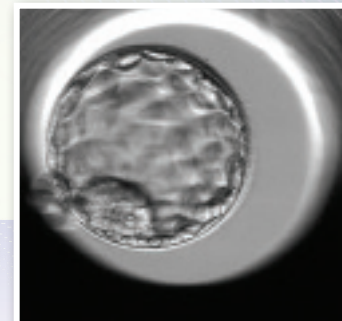


## Blastocyst Transfer

By allowing the embryos to be cultured to the stage of blastocysts in vitro, our embryologists are in a better position to select embryos of higher quality for transfer, so that it is more likely for healthy babies to be developed. Only the best embryos can proceed to the blastocyst stage.

Another advantage that blastocyst transfer has versus Day 3 transfer is the lower risk of potential multiple pregnancies since a smaller number of embryos of higher grade may be transferred for an equivalent pregnancy rate.

Supernumerary blastocysts after embryo transfer may also be stored for later use by means of a new technique called vitrification.





# Embryo Cryopreservation - Vitrification

Generally speaking, an average of 10-15 eggs can be retrieved from each IVF or ICSI cycle. Only 1-3 embryos will be replaced. Surplus embryos can be cryopreserved (frozen) and stored in the IVF laboratory for future use. Our IVF laboratory uses the most advanced technique called Vitrification, which has been proven successful worldwide. Our centre achieves a very high success rate by transferring frozen / thawed embryos.

## In Vitro Maturation of Oocytes (IVM)

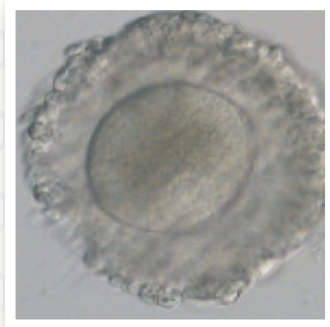
IVM is a revolutionary procedure, which is especially suitable for patients with polycystic ovaries (PCO). IVM also applies to patients with a natural cycle of IVF.

The difference between IVM and IVF is that, for IVM, immature eggs are retrieved and matured in vitro and then fertilised, while for IVF, already mature or almost mature eggs are retrieved for fertilisation. Apart from monitoring the follicular growth prior to retrieval, no or minimal stimulation drug is needed in IVM cycle.

As no / minimal stimulating drugs are involved, patients will not suffer from ovarian hyperstimulation syndrome (OHSS) and treatment costs will be lower as compared to conventional IVF treatment. Patients with polycystic ovaries have a high risk of OHSS development when being subjected to ovarian drug stimulation.

The way of extracting eggs and replacing embryos in IVM process is just the same as that in IVF.

### Stages of Egg Maturation

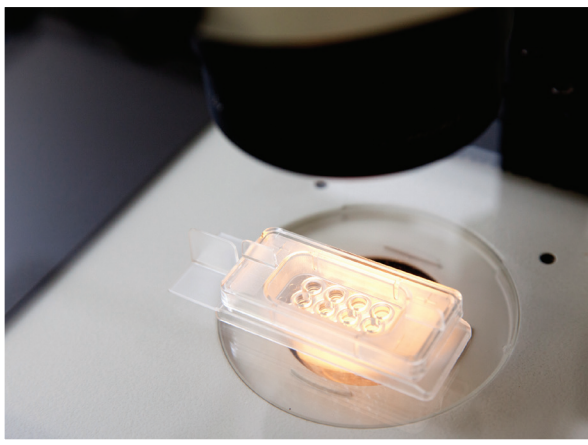


Immature Egg



Mature Egg





## EmbryoScope

An incubator with a built-in camera for automated time-lapse imaging of fertilised oocytes in a safe incubation environment from fertilisation until the time of transfer.

## Gamete Storage

We provide storage service of eggs and sperms for cancer patients, so that gametes are kept to be used after radiotherapy or chemotherapy treatment.

We also accept gamete donation to fulfill people's dreams of parenthood. Under the laws of Hong Kong, gamete donation cannot involve any financial transaction. Donor shall not receive any payment in money or money's worth. For details, please refer the Code of Practice on Reproductive Technology & Embryo Research. You can also contact **the Council on Human Reproductive Technology**.  
Website: [www.chrt.org.hk](http://www.chrt.org.hk)





## IVF Programme in Detail

### 1. Initial Consultation

Couples should bring along their records of infertility workup they possess, such as hysterosalpingogram (HSG) films, semen analysis reports, basal body temperature charts, previous operative records and laboratory test results. The gynaecologists/ reproductive specialists will advise them on the programme, and some further investigations may be ordered to establish the cause of their problems, if not clearly known, or to help decision-making on choosing the most appropriate technique.



### 2. Counselling

After preliminary examination and investigation, the patients, as a couple, need to receive counselling service offered by the attending doctor and nurses, in order to have an in-depth understanding of the meaning and procedures of reproductive technology. They will also learn about the complications that might be induced by the treatment and other options for the situation, such as adoption. Patients will be referred to other doctors, clinical psychologists or lawyers for counselling when they have the need or when it is required for certain reproductive technology. The patient couple must have sufficient time before making the decision.

Consent forms must be signed when the patient couple decides to take up treatment. Marriage certificate must be presented before the treatment begins.

*Under the laws of Hong Kong, doctors cannot start any assisted reproductive technology procedure without a valid marriage certificate and a consent form signed by both husband and wife. Sex selection is prohibited.*

Please consult our doctors if you have any questions.



### 3. Hormonal Stimulation

IVF treatment usually begins with the use of drug in the form of injections to stimulate the ovaries and produce more mature eggs. There are different protocols available and our doctor will choose the most appropriate stimulation protocol for you.

Natural cycle IVF or the in vitro maturation technology may sometimes be conducted for certain clinical situation. Please talk to our doctor for details.



### 4. Monitoring the Maturation of Eggs

Ultrasound scanning (USS) of the ovaries is done regularly to monitor the size of the follicles (pocket of fluid seen on USS examination in the ovaries that may contain an egg inside). Once the time of egg collection is decided, an additional injection (usually in the form of placental hormone (hCG)) is given to complete the final maturation step and to release the eggs timely. Egg collection will be scheduled 35-36 hours later after this injection.



### 5. Egg Collection

*Transvaginal Ultrasound-Guided Oocyte Retrieval (TUGOR)* – The doctor will pass a needle through the vagina to obtain the eggs under the guidance of ultrasound imaging. The eggs, thus obtained, will be handed to the embryologist-in-charge immediately for in vitro fertilisation and culture. The patient can leave the hospital in a few hours after the surgery.



## 6. Semen Collection

The husband will be asked to submit a sample of fresh semen on the day of egg collection. If you have problem with semen collection or need to freeze a sample before treatment cycle for backup, please contact our staff for arrangement.



## 7. Fertilisation and Cleavage

Fertilisation is the process of a sperm penetrating an egg. The egg thus fertilised is called an embryo. Embryos are cultured for 2 to 6 days to ensure that they are dividing (cleaving) normally into an embryo.

## 8. Embryo Transfer

Embryos are usually ready for transfer about 2-5 days following egg collection. They are placed into the uterus by means of a thin tube (catheter) through the neck of the womb (cervix). The procedure is similar to a routine gynaecological examination; it usually does not require anaesthesia. The patient may leave the hospital half an hour after embryo transfer.

## 9. Post-Embryo Transfer Blood Test

Blood tests are performed to monitor the progesterone level following embryo transfer and for evidence of pregnancy approximately 8-14 days later.

## The Chances of Success of IVF

Couples that join the IVF programme may commonly expect more than 90% chances of having at least one embryo replaced. However, beyond this final stage there is no technological control. This has limited the overall IVF success rate to 25-45% per cycle of treatment worldwide. Scientific studies have demonstrated that human fecundity, i.e. the probability of conceiving after natural unprotected intercourse, in any given month, is 20-25% for a normal fertile couple. Thus, the IVF success rate is comparable to that of natural conception.



## A Note on the Risk

### 1. Cycle Cancellation

Occasionally, the decision is made not to have the female partner undergo egg retrieval, especially when her response to the medication is less than satisfactory and the ultrasound and blood tests reveal limited follicular growth or when the husband cannot obtain viable mature sperms from the testicular biopsy.

### 2. Other Potential Problems

There are several factors that may affect the outcome of the couple's treatment cycle. Sometimes the recruited eggs are either over-mature or immature to be fertilised, or the eggs may fertilise but the embryo may not develop appropriately. Sometimes, apparently healthy embryos fail to implant on the uterine wall resulting in a negative pregnancy test or they implant outside of the uterus resulting in an ectopic (extra-uterine) pregnancy.

### 3. Ovarian Hyperstimulation Syndrome (OHSS)

In a small percentage of cases, the response to medicine may be exaggerated, resulting in too many eggs. This condition is known as Hyperstimulation, and may lead to withholding embryo transfer for this cycle. Embryos will be cryopreserved (frozen) for later transfer.

The reasons for these problems may never be known and it is important that you understand that your chances of success in any given cycle may vary.



Our commitment to service and research goes hand in hand. Whenever we can, all affordable time and effort are employed to keep us abreast of whatever technology developed around the world. We have carried out clinical studies and contribute to the advancement of reproductive science.



## Clinical Milestones

- 1986 1<sup>st</sup> Test Tube (IVF) Baby in Hong Kong
- 1988 1<sup>st</sup> GIFT Baby
- 1988 1<sup>st</sup> FREDI Baby
- 1990 1<sup>st</sup> ZIFT Baby
- 1993 1<sup>st</sup> Frozen-thawed-embryo Baby
- 1994 1<sup>st</sup> MESA & IVF Baby
- 1996 1<sup>st</sup> MIFT Baby
- 1996 1<sup>st</sup> ICSI Baby
- 1997 1<sup>st</sup> TESA & ICSI Baby
- 2001 1<sup>st</sup> Laser Assisted Hatching Baby
- 2005 1<sup>st</sup> IVM Baby
- 2013 1<sup>st</sup> Baby from EmbryoScope
- 2016 1<sup>st</sup> PGT-A Baby Using NGS

## Scientific Contributions

The physicians and IVF scientists have published over 30 papers internationally, which include:

Fertility and Sterility

Human Reproduction

Journal of Endocrinology

Cell and Tissue Research

Journal of the Hong Kong Medical Association

Also, the research results have been presented at international conferences. Our current research projects include studies of oocyte quality in improving pregnancy rates and dynamic embryo development analysed by the time-lapse EmbryoScopes.



For enquiries and appointments,  
please contact us at:

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**Service Hours** (By appointment only)  
Monday to Friday: 9:00 am to 5:00 pm  
Saturday: 9:00 am to 1:00 pm  
Closed on Sundays and Public Holidays

For complaints, please contact the Council on  
Human Reproductive Technology at 2961 8955

**[www.hksh-hospital.com](http://www.hksh-hospital.com)**