



For Immediate Release

## **The New Sutureless Corneal Transplantation Technique Descemet's Membrane Endothelial Keratoplasty (DMEK) Firstly Performed in Hong Kong Sanatorium & Hospital**

**Small Wound ♦ No Suture ♦ Lower Rejection Rate ♦ Faster Visual Recovery**

(6 March, 2013 – Hong Kong) Hong Kong Sanatorium & Hospital (HKSH) is pleased to announce that a new corneal transplantation procedure – Descemet's Membrane Endothelial Keratoplasty (DMEK), a minimally invasive sutureless corneal transplantation technique, was firstly performed in Hong Kong last October 2012. The new technique involves transplanting an ultra thin layer of donated corneal cells (or the graft) of 0.01mm in thickness, which is 55 times thinner than the graft used in Penetrating Keratoplasty (PKP) technique and 15-20 times thinner than that used in the existing generation of lamellar transplantation technique – Descemet's Stripping Automated Endothelial Keratoplasty (DSEK/DSAEK), resulting in lower rejection rate and faster visual recovery.

PKP is a surgical procedure where the patient's diseased or damaged cornea is replaced by the donated full-thickness cornea. DMEK is a new type of lamellar keratoplasty, where only the innermost corneal layers are replaced. It replaces only the Descemet's membrane and endothelium of 0.01mm in thickness, which accounts for less than 2% of the cornea. The patient's corneal structure can be largely retained after DMEK as compared with other transplant techniques. Since only the inner cell membrane is transplanted, most of normal structure of the cornea can be restored and the stroma can be adhered with a nearly perfect interface. Patients undergoing DMEK may result in better vision and faster recovery than those with DSEK/DSAEK.

Dr. Walton Li, Medical Superintendent of HKSH and Head of Department of Ophthalmology said, "DMEK offers better optical quality, fast and often complete visual rehabilitation, fast stabilization of refraction, small refractive shift and lower rejection rate, which can ultimately benefit our patients."





### **Retaining Normal Corneal Structure and Tissues**

Dr. Arthur Cheng, Specialist in Ophthalmology of HKSH, explained, “In DMEK, only the diseased cells are replaced and most of the normal corneal tissues are retained. Therefore the rejection rate is lower than that in DSEK/DSAEK. Furthermore, a much thinner and larger donor graft can be transplanted with less chance of Peripheral Anterior Synechiae (PAS) after the surgery, as compared with DSEK/DSAEK.

Besides, DMEK can restore the original structure of the cornea. Dr. Cheng added, “The transparency of the cornea plays an extremely important role in the optical clarity of the visual system, so any irregularity within the corneal structure has major impacts on visual performance. In DSEK/DSAEK, doctors use a surgical blade to cut into the stroma of the cornea creating an uneven and artificial surface. When the graft is transplanted, this artificial surface will become the irregular interface within the cornea, limiting the visual potential. Whereas in DMEK, since the membrane transplanted is ultra thin, and it only exchanges the inner cell layers that naturally exist within the cornea, doctors can take the inner cell layers without using surgical blade. As there is no cutting into the corneal stroma, it has no effect on its structural integrity. It means that the speed and the quality of the visual recovery are generally much better than other lamellar transplantation techniques like DSEK/DSAEK where an artificial interface is created by the surgeon’s blade.”

### **New Sutureless Technique ♦ Lower Rejection Rate and Less Astigmatism**

This new, sutureless technique was invented in Europe and first performed successfully in Hong Kong about six months ago. The procedure of DMEK is briefed as follows:

1. Removing the Descemet’s membrane and endothelium layer from the donor (around 0.01 mm thick), and put into the inserter
2. Injecting the graft through a micro wound (2- 2.75mm)
3. Using air bubble to place the graft in a proper position

In fact, the ultra-thin membrane containing the corneal cells to be transplanted is highly delicate. Holding or touching the membrane, which naturally wrinkles and scrolls up into a tight roll, would damage the corneal cells. Surgeons need to pay special attention to unscroll and unwrinkle the membrane and attach it into the inner surface of the patient’s own cornea without damaging the delicate cells.



Dr. Cheng said, “It is an extremely difficult form of surgery with particularly high level skill and experience. As the membrane transplanted is ultra thin and delicate, it tends to wrinkle into a tight roll when touched, potentially damaging the corneal cells when doctor tries to uncoil it. With the new insertion device and technology, the membrane or the graft can be unscrolled and injected into the patient’s eye and floated it up onto the back of the cornea by a gas bubble. Moreover, the wound of the DMEK is only around 2-2.75mm, so no suture is required and the postoperative astigmatism will be less than DSEK/DSAEK.”

### **Patient Case**

DMEK is suitable for patients with common corneal diseases, including various types of corneal edema. Major causes of corneal diseases are: 1) Corneal Infection – Endothelitis (角膜感染); 2) Corneal Decompensating after Acute Glaucoma (急性青光眼後角膜代償失調); 3) Corneal Degenerative Diseases – Fuch’s Dystrophy (角膜退化性疾病); 4) ICE Syndrome (先天性角膜疾病); 5) Toxic Anterior Segment Syndrome (眼前節毒性綜合症).

Hong Kong’s first patient with DMEK, Mr. Shi, in his late 40s, has strong Fuch’s Dystrophy in his family history. Fuch’s Dystrophy is one of the progressive eye diseases in which cells lining the inner surface of the cornea slowly die off. His parent and three cousins were affected by Fuch’s Dystrophy and two of the cousins were blinded for 20 years. His vision began to deteriorate about three years ago and the visual acuity of both of his eyes was 20/150 before surgery. Mr. Shi’s left eye and right eye had been undergone DSAEK and DMEK respectively.

Below are the results of the two kinds of lamellar keratoplasty on Mr. Shi.

|         | Right eye | Left eye |
|---------|-----------|----------|
|         | DMEK      | DSAEK    |
| Day 1   | 20/70     | 20/150   |
| Day 3   | 20/20     | 20/40    |
| Month 1 | 20/20     | 20/30    |

*Note: 20/20 is normal vision, the smaller the number, the better the results.*





Mr. Shi shared that “the right eye after DMEK had a faster recovery that 90% of visual acuity is reached in three days, and there is less astigmatism. At any rate, I am very happy to have my eyesight back!”

< End >

### **About the Department of Ophthalmology**

The Department of Ophthalmology was established in 1980 and is fully equipped with the most advanced technology, aiming to offer comprehensive and first-rate services to our patients. Our services include general eye checkups as well as expert eye care for patients suffering from eye diseases including cataracts, glaucoma, corneal diseases, eyelid diseases, orbital diseases, vitreo-retinal diseases, paediatric eye diseases and others.

### **About Eye Surgery Centre**

Established in 2003, the Eye Surgery Centre is equipped with the most advanced facilities and technologies. Wide-ranging eye-related surgeries including cataract surgery are performed by the Ophthalmologists of Department of Ophthalmology.

### **About Hong Kong Sanatorium & Hospital**

Hong Kong Sanatorium & Hospital is one of the leading private hospitals in Hong Kong. With the motto “Quality in Service Excellence in Care”, the Hospital is committed to serving the public as well as promoting medical education and research.

For media enquiry, please contact:

Department of Corporate Affairs, Hong Kong Sanatorium & Hospital

Ms. Carol Kwok

Tel : 2835 7082 / 9262 4455

Email : carolkwok@hksh.com

Ms. Mandy So

Tel : 2835 7092 / 9328 2627

Email : mandyso@hksh.com

### Photo

1. Dr. Arthur Cheng, Specialist in Ophthalmology of HKSH said, ‘only a 0.01 mm thick graft is replaced in Descemet’s Membrane Endothelial Keratoplasty (DMEK), the wound is so small that no suture is required.’



2. Mr Shi, a patient with severe Fuch’s Dystrophy had a speedy recovery after receiving DMEK in his right eye in October 2012, 90% of visual acuity is reached in 3 days.





3. (From right) Dr. Arthur Cheng and Mr. Shi, the first patient underwent DMEK in Hong Kong.





Additional Information:

**Comparison of the Corneal Transplantation Technology**

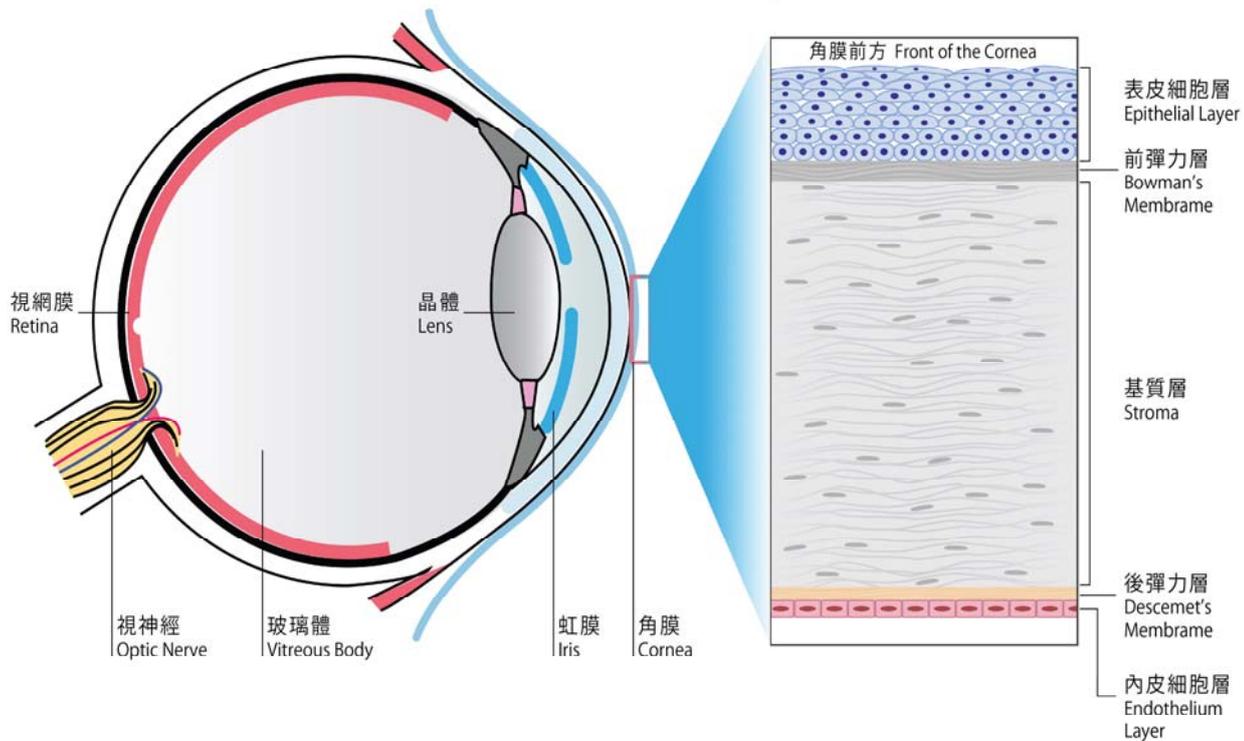
|                               | <b>PKP</b><br>Penetrating Keratoplasty                                  | <b>DSEK/DSAEK</b><br>Descemet's Stripping<br>Automated Endothelial<br>Keratoplasty | <b>DMEK</b><br>Descemet's Membrane<br>Endothelial Keratoplasty |
|-------------------------------|---|--|--|
| 1. Thickness                  | Full thickness  | Partial thickness  | Partial thickness  |
| 2. Tissue Cells to be removed | Even normal layers are removed  | Part of the normal tissue is removed   | Only diseased cells with membrane is removed                   |
| 3. Structure of the Cornea    | Normal structure of the cornea cannot be restored                       | Normal structure of the cornea cannot be restored                                  | Normal structure of the cornea can be restored                 |
| 4. Suture                     | At least 16 sutures   | 2-3 sutures  | No suture  |
| 5. Size of the Wound          | 360 deg full thickness wound  | 5mm wound  | 2-2.75mm wound   |
| 6. Astigmatism                | High astigmatism<br>300-600   | 100-200  | 50   |
| 7. Rejection Rate             | higher chance of rejection  | Lower chance of rejection  | Lowest chance of rejection -<br>No stromal graft rejection     |
| 8. Demand on Doctor Skills    | Lower demand on skills  | Higher demand on skills  | Highest demand on skills                                       |
| 9. Visual Acuity              | Visual acuity can reach 20/20 but with high astigmatism and aberrations | 80% > 20/40  | 85% > 20/40<br>46% > 20/20                                     |
| 10. Recovery Time             | Around 6-12 months  | Around 3 months  | Less than 1 month  |
| 11. Graft Size                | 7-7.5mm graft size  | 8.0mm  | 9-9.5mm - about 40% more transplanted cells than DSEK/DSAEK    |



**Photos:**

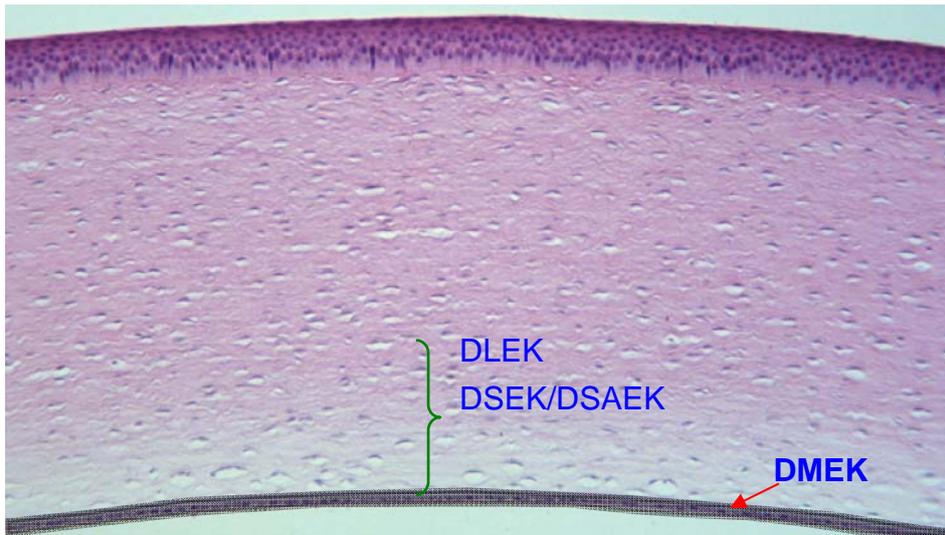
**1. Structure of the Eye**

眼睛結構  
Structure of the Eye



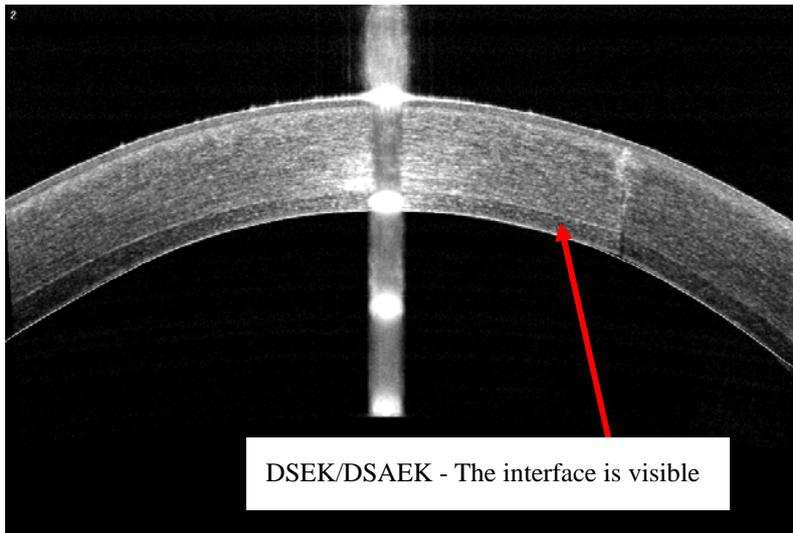


## 2. Lamellar Endothelial Keratoplasty



### 3. DSEK/DSAEK vs DMEK

#### DSEK/DSAEK



#### DMEK

