



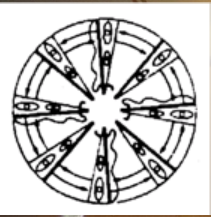
# ISEM EAST CHAPTER 2014

*(The 2nd Meeting, 18 June 2014, Tokyo)*

Competency of Utility for Magnifying Glass  
'Shall we try to suture the artificial vassals !'



**Eiji Kobayashi, MD,PhD**  
Department of Organ Fabrication,  
Keio University School of Medicine,  
Japan



# *Introduction of International Society for Experimental Microsurgery (ISEM)*

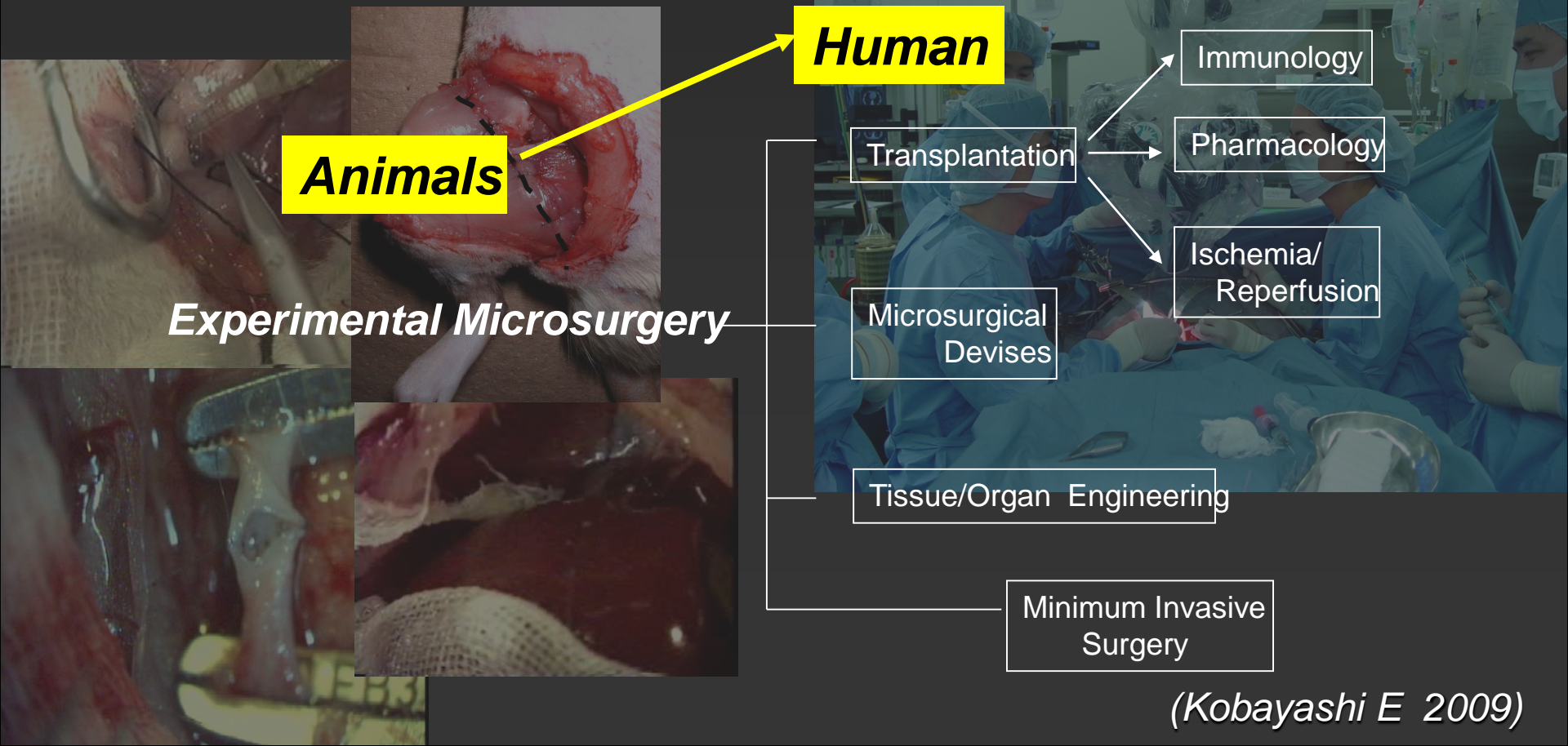


**See you in Tianjin, China 2016**



# A Proposal Concept of 'Translational' Microsurgery

**Experimental Microsurgery covered world-wide area  
as a powerful tool for Translational Research**



(Kobayashi E 2009)

# *Can you justify the experiment using living animals ?*



*(Claude Bernard; 1813-1878)*

# A Proposal Concept of Two Way Approach

Human Trail



Veterinary Medicine



Classical Way

A Proposal Way

*(Kobayashi E 2009)*

# ***Japanese Chapter of ISEM (The East Branch)***

## **•Monthly One Day Training**

We will use dry lab models in basic skills. Ten meeting will be opened while we help to progress the skills of competent participants.

•By more than 80% of attendance in every year, the young veterinary surgeons will receive ***the certificate for a year.***

•Recommendation to be a ***member for ISEM***

We encourage that young veterinary surgeons will present their works in ISEM 2016 in China.

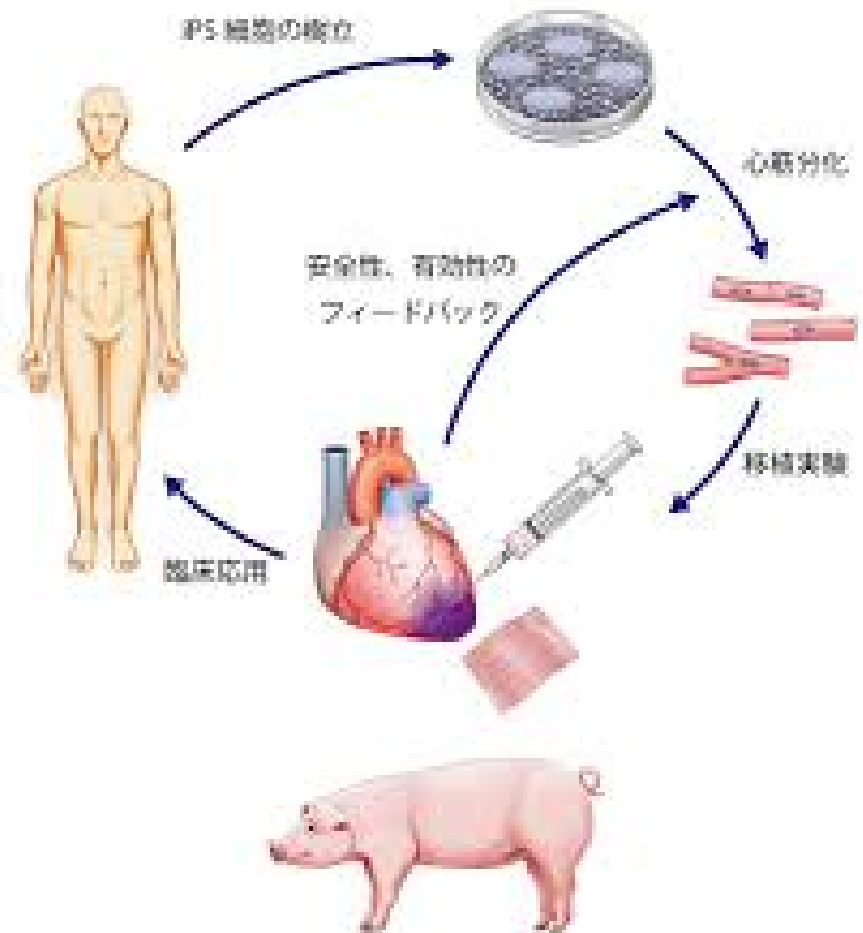
•This is ***volunteer work.*** We would like to donate some money for ***Shelter Animals.***

*(Ishii & Kobayashi 2014)*

# *Introduction of the top translational researcher using human iPS cells for regenerative medicine*



*Prof Keiichi Fukuda  
Keio University School of Medicine*





***Kaoru Endo***  
*Endo Dog & Cat Hospital*



***Yuuta Abe***  
*Keio University School of Medicine*



***Hidekazu Sekine***  
*Tokyo Women's Medical University*



***Akinori Hirano***  
*Keio University School of Medicine*



# 3 C Approach

教育を科学する

# 3 C Approach

- **Curriculum:**

Teaching is driven by a written curriculum which is given to the students to guide their learning

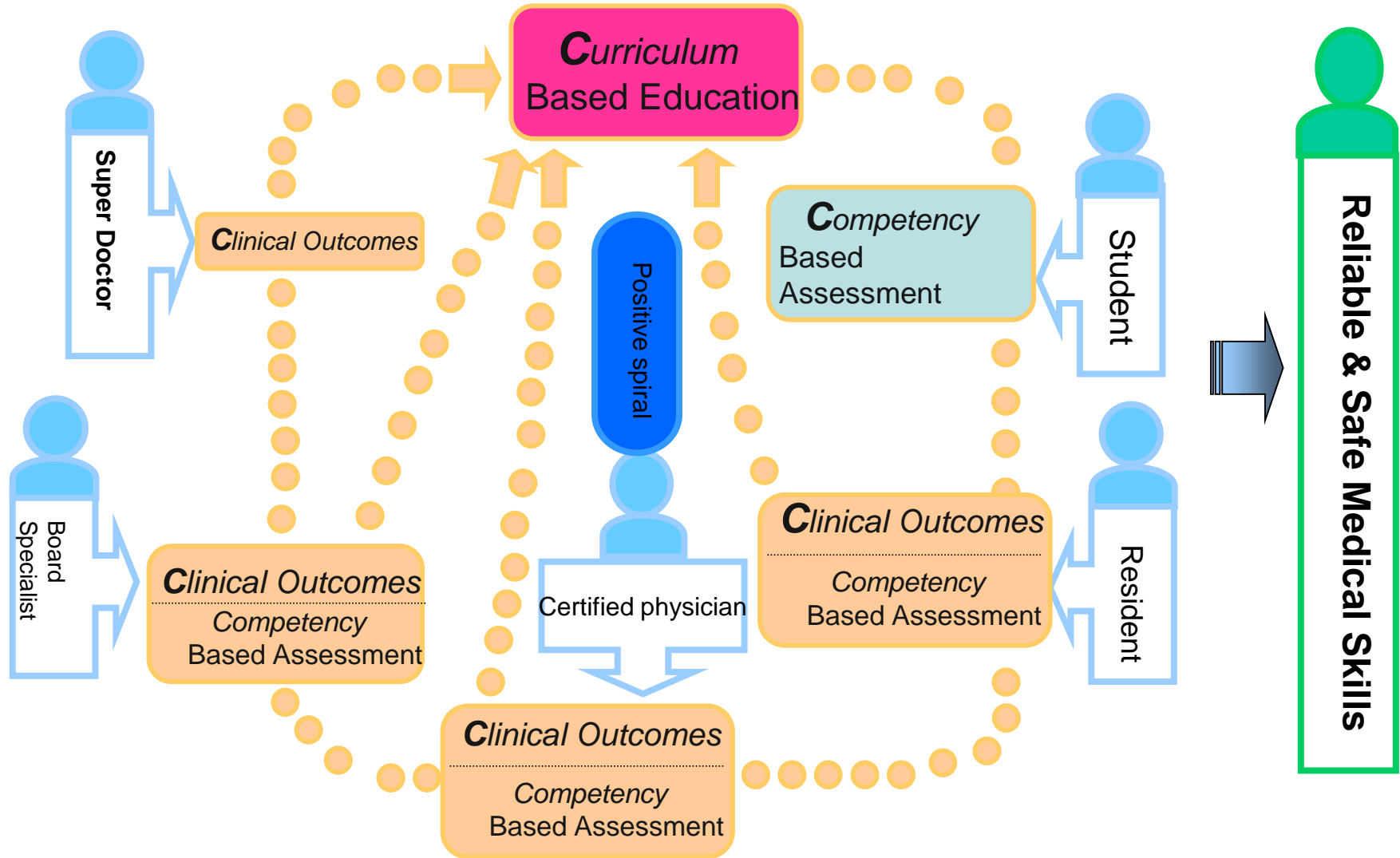
- **Competency:**

After the teaching, learners are evaluated to see if they have acquired the desired competency

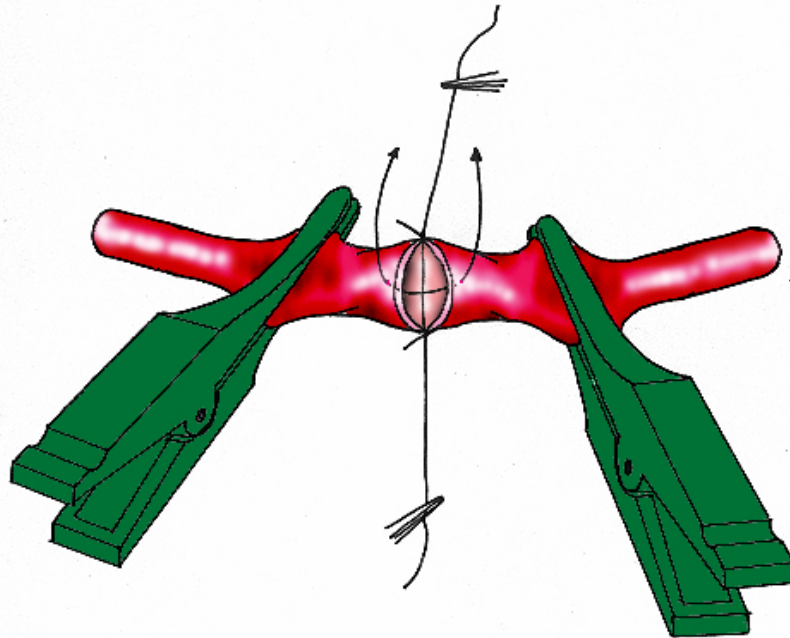
- **Clinical outcomes:**

Learners report their clinical experiences over the long term, to evaluate the value of the training in the clinical practice of medicine

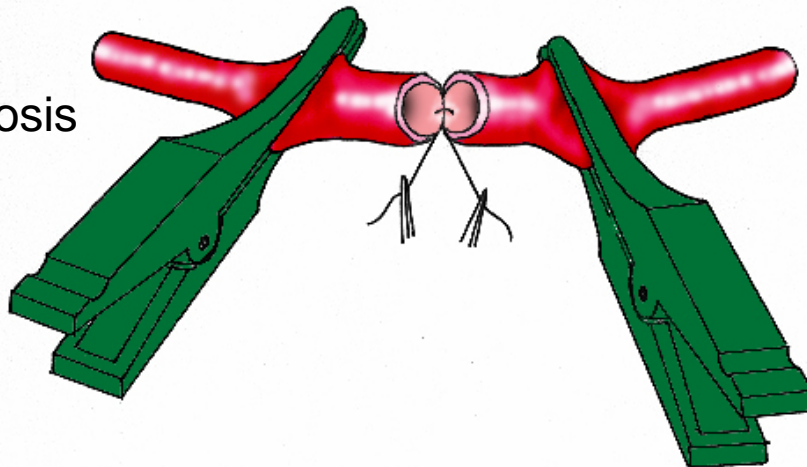
# Proposal Educational System; 3 C



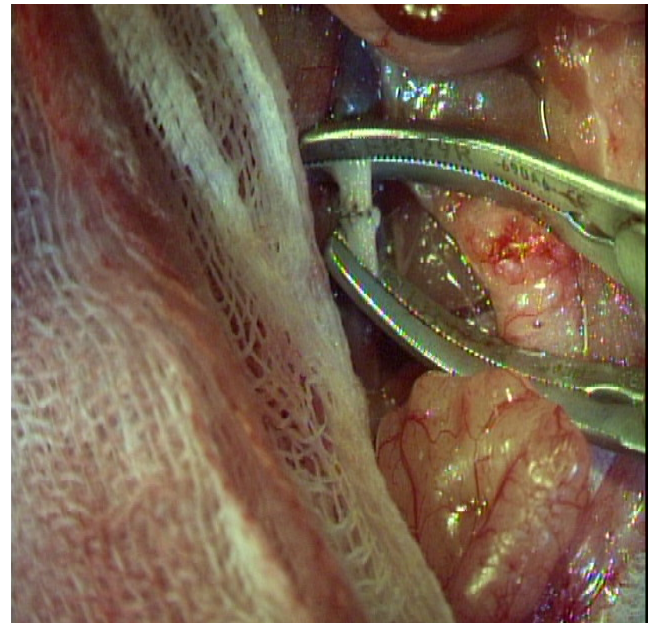
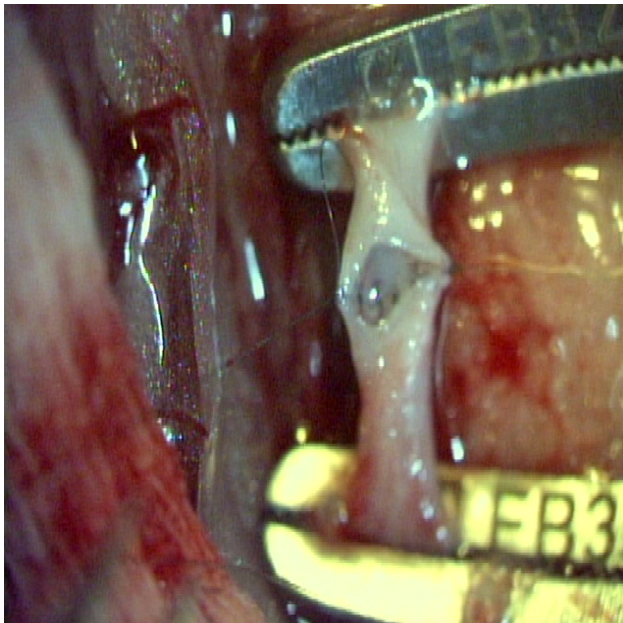
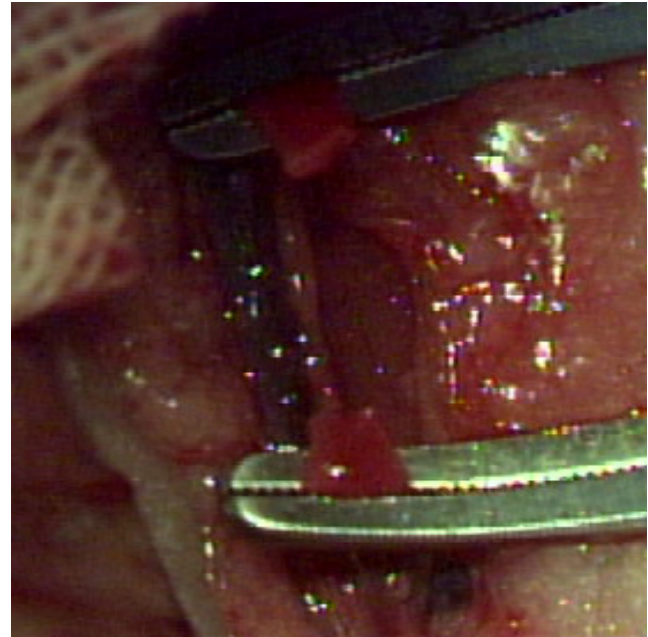
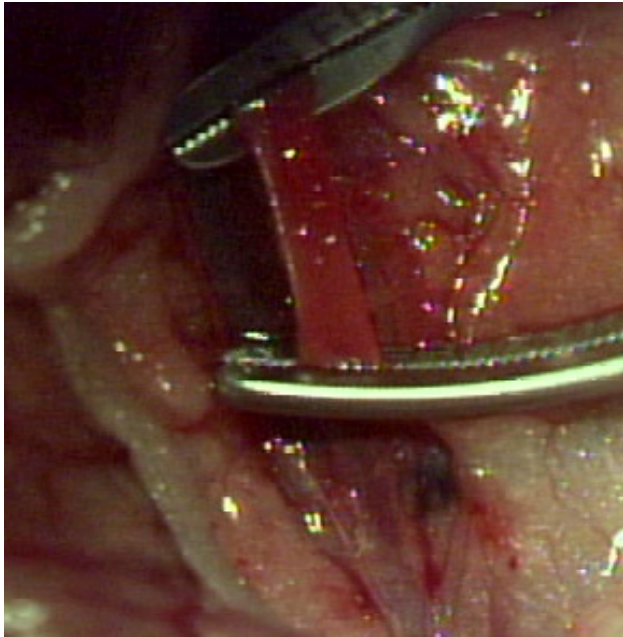
A : Twist type anastomosis



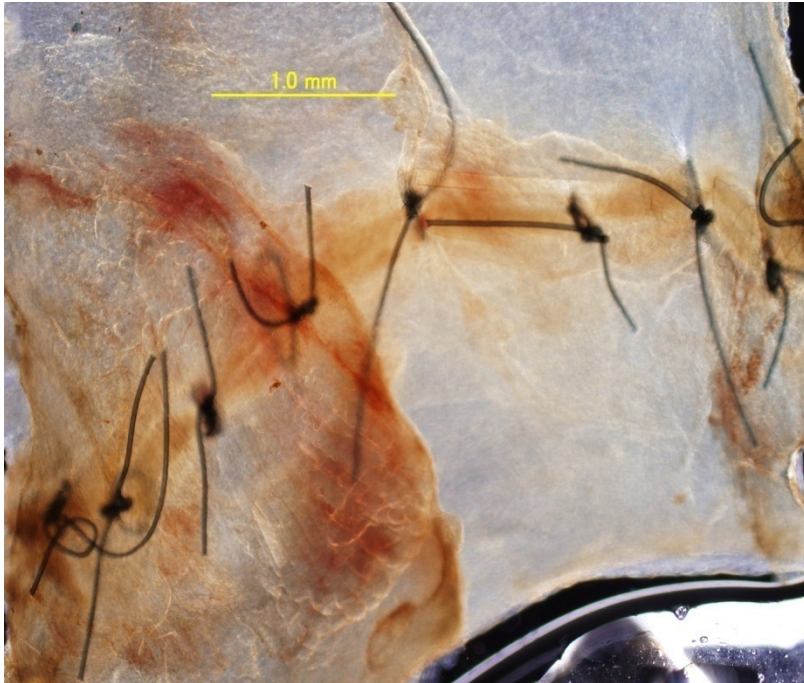
B : Non-twist type anastomosis





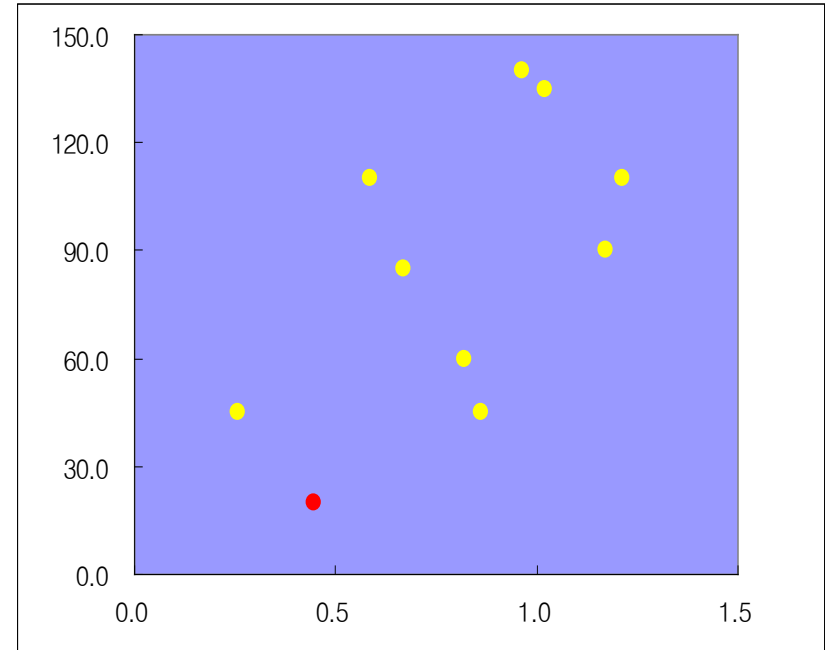


# Scientific Evaluation of the Interloped Suture in Rats

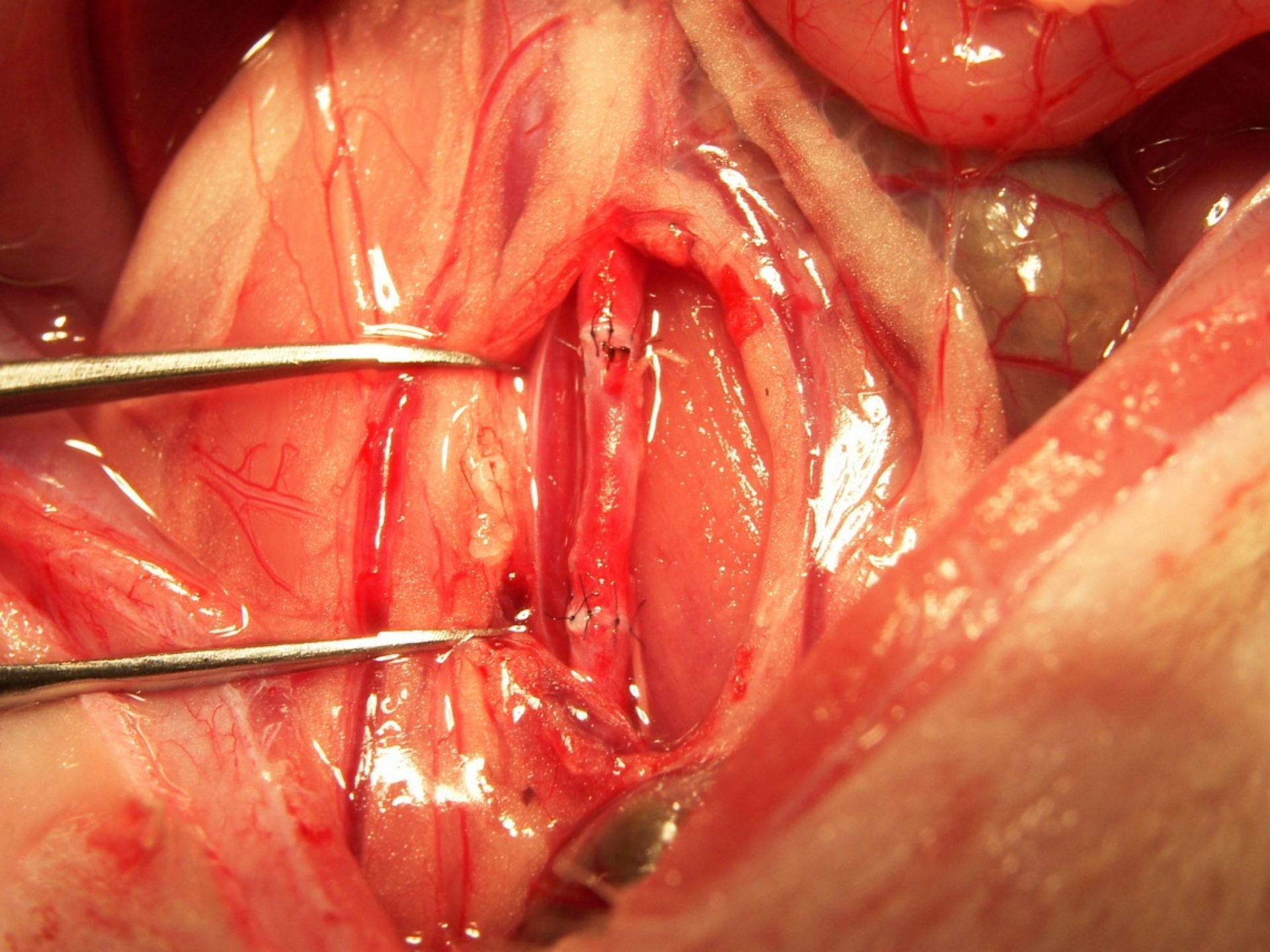


*Dissected Abdominal Aorta  
at the site of anatomists*

*Time required for complete Anast (min)*

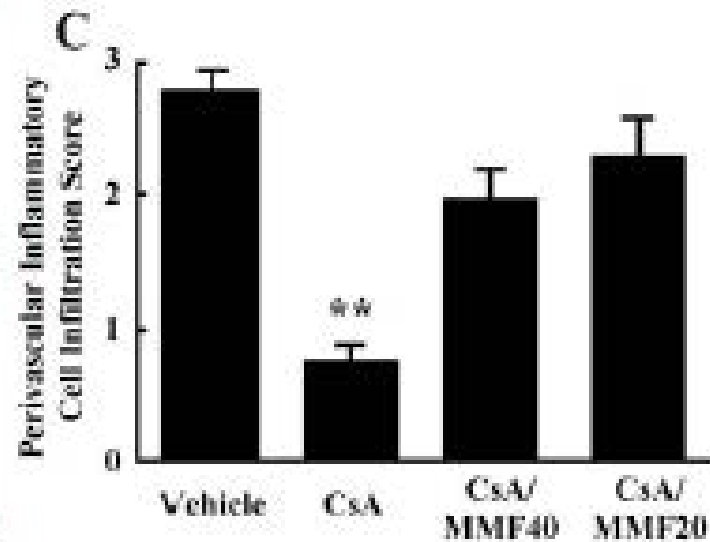
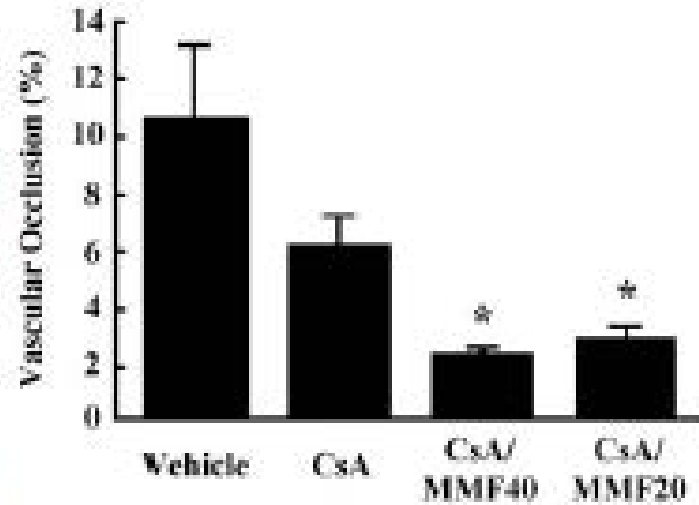
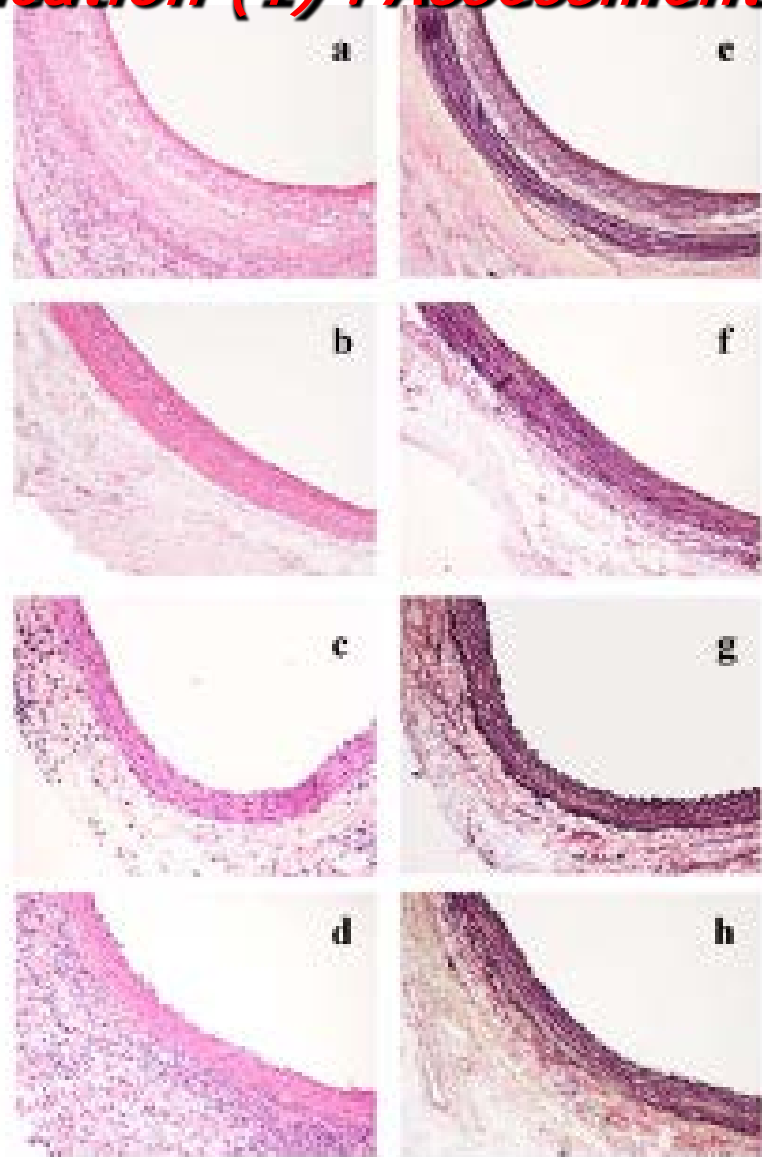


*Standard Deviation (SD) of the length  
between interloped points*





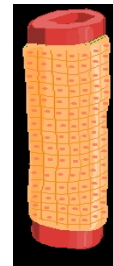
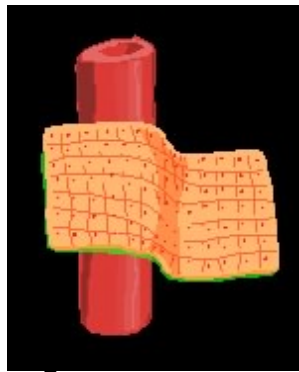
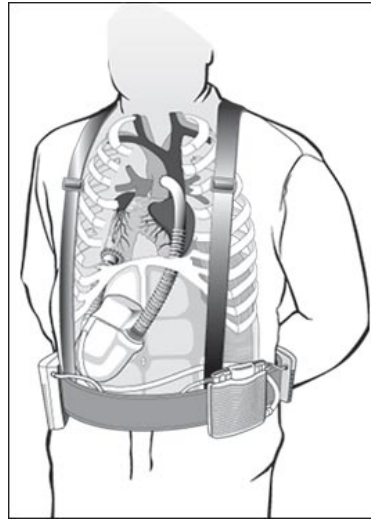
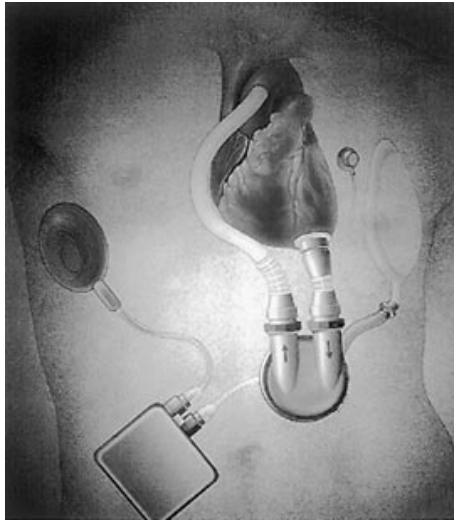
# Application (1) : Assessment of Immunosuppressive Drugs



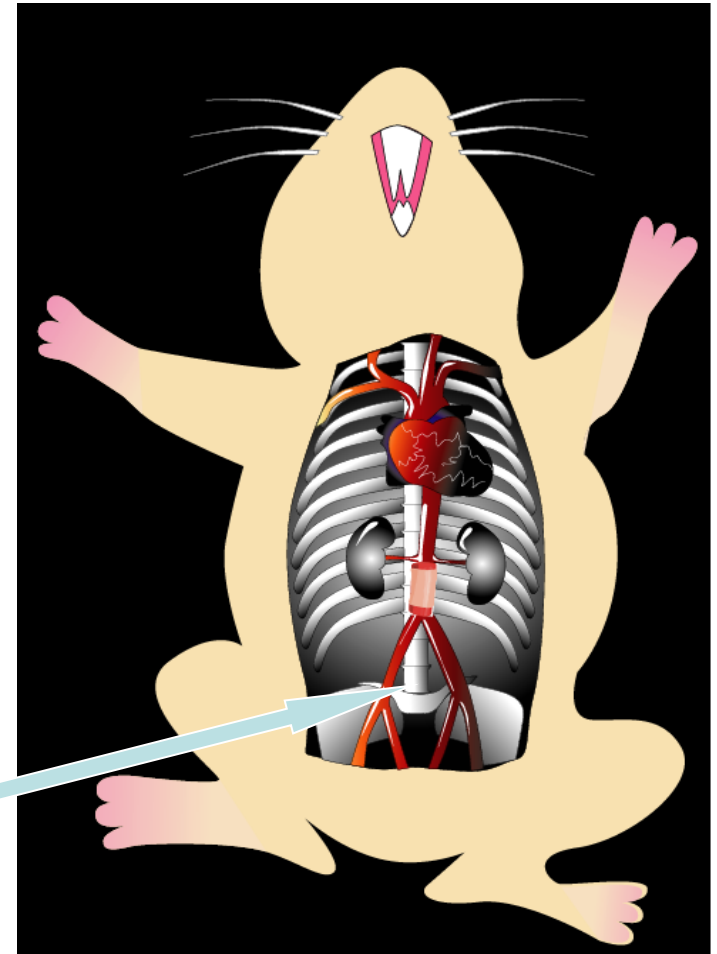
( Shimizu H, et al. *Transplant Immun* 13(3):219-227, 2004)

# ***Application (2) :Beating tubes for circulatory support***

## **Ventricular Assist Device**



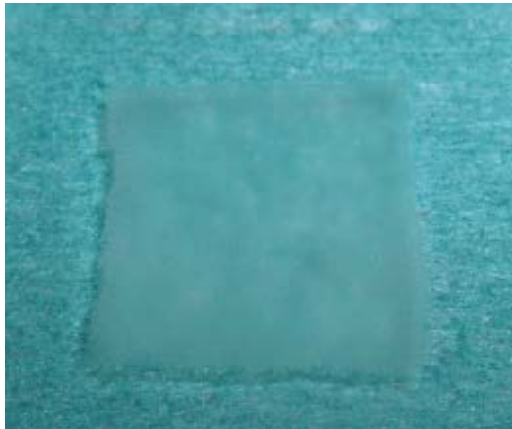
wrapping around aorta



resected aorta

( Sekine H, et al. *Circulation* 2006)

# Fabrication and transplantation of cardiac tube



cardiomyocyte sheet



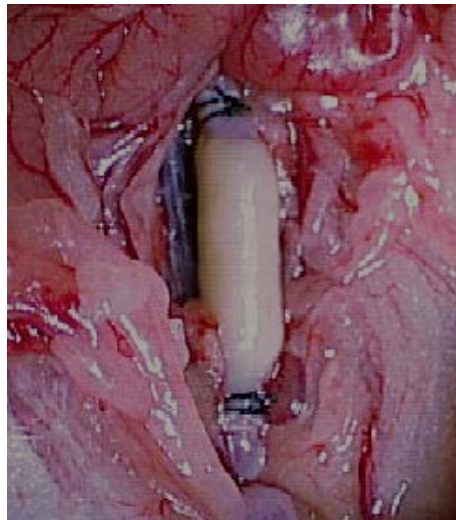
wrapped and layered



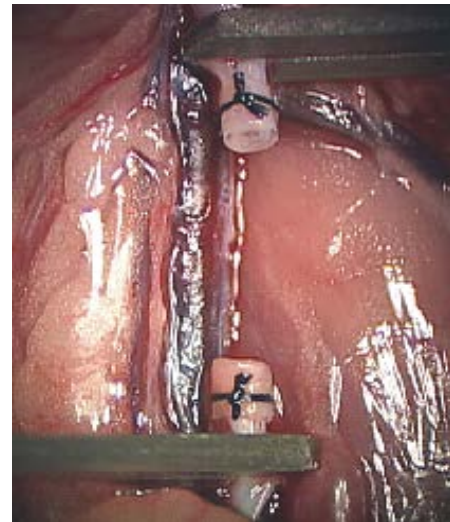
*in vitro*



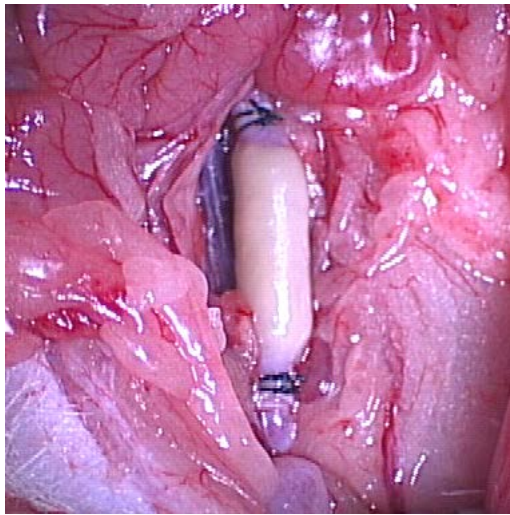
6 layered



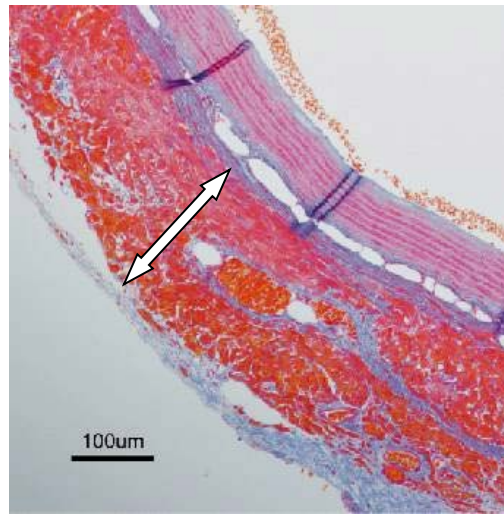
replacement of abdominal aorta



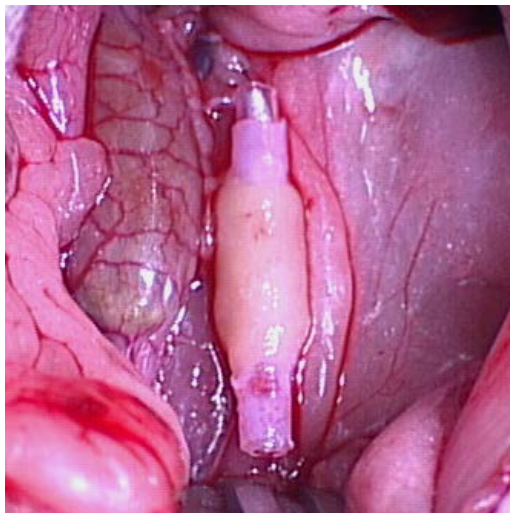
# Histological comparison between cardiac tubes in the replacement and in the cavity



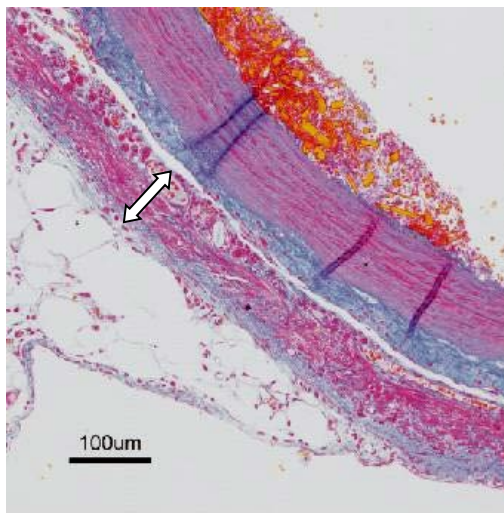
Aortic replacement



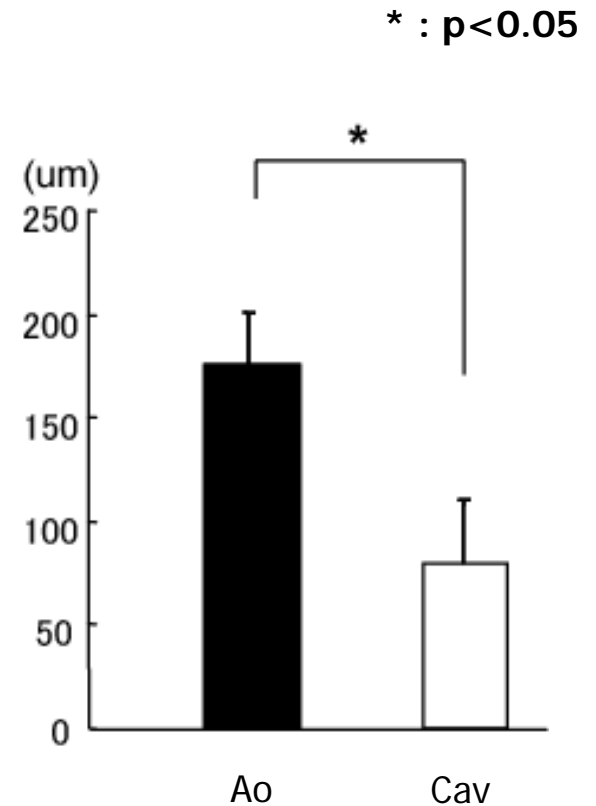
$175 \pm 26 \mu\text{m}$



Abdominal cavity



$80 \pm 30 \mu\text{m}$



Ao : aortic replacemant  
Cav : abdominal cavity

# Today's Training

64  
Types of Microsurgical Anastomoses  
S. Timm et al.

Vascular anastomoses can either be performed by continuous or by interrupted suture. Interrupted suture is easier to perform, but the vessel must be turned around to be able to suture the posterior wall, which is not always possible in microvascular surgery. Continuous suture saves time and suture material, and hemostasis can be achieved almost immediately. However, care must be taken not to produce stenosis by pulling the knot too tight. In our laboratory we prefer the continuous suturing technique.

### End-to-End Arterial Anastomosis

The end-to-end anastomosis is probably the simplest, most reliable, and most often used anastomosis in rat organ transplantation. It is started by placing the angle sutures. These are positioned in an angle of 140°-160° to each other in relation to the circumference of the vessel (eccentric biangulation). This allows the anterior wall to fall away and show the posterior wall (Fig. 1). Sufficient length of thread is left at their end to allow clamping. The clamps can now be used for stabilization of the vessel. Thus sutures can easily be placed without the need to grasp the vessel with forceps and the tension of the anastomosis can be controlled. The armed end of the thread is used for the suture. We usually start on the right side of the anastomosis as close to the angle suture as possible. The first stitch is placed from the outside to the inside. We usually start inside the vessel lumen. The next stitch is placed on the opposite lumen from the inside to the outside, as close to the angle suture as possible. This is important because leakage often occurs at the angle.



### Microsurgical Techniques for Vascular Anastomoses: Suture and Clamping

The needle should now be on the outside again, until the anterior wall has been finished. Usually five stitches. Knotting is performed with the free hand. The vessel is now rotated 180° and the armed end of the thread is used to suture the posterior wall in the same way. Before the last stitch is done, the vessel is irrigated with a saline solution to remove clotted blood and debris.

The distal clamp is opened first to allow the proximal clamp is opened but not to compress the vessel in case of major bleeding. Minor bleeding can be stopped by compression with a cotton swab. In case of major bleeding, this must be placed over the vessel wall is not visible and can easily be checked.

To check for stenosis the aorta is clamped proximally and the distal part is evacuated from blood by suction. The distal aorta should occur immediately after the anastomosis. It can also be used as an indicator for stenosis.

### End-to-Side Arterial Anastomosis

This technique is very important for transplanted organs are usually anastomosed with the recipient's artery. The suture is performed with the recipient's artery and the donor's artery. The donor's artery is sutured to the recipient's artery.

Now it is possible to perform the anastomosis in a size is performed in a slightly larger than the donor's artery.

The donor's artery length of its vessel are placed using the to-end anastomosis. The donor's artery is sutured to the anterior wall (where the anterior wall is now sutured).

Competency of Utility for Magnifying Glass

*'Shall we try to suture the artificial vassals !'*



# Materials & Methods



Groups : With or Without Magnifying Glass

Non-living animal: *artificial vassals*