a possible future for these grafts in both the arterial and venous systems.

In summary, no commercially available synthetic or biologic graft is adequate for venous replacement. We remain cautiously optimistic, however, that with significant improvements, collagen tube grafts may be of value in the future.

Yasuko Tomizawa, MD, PhD

Marc R. Moon, MD

*Department of Cardiothoracic Surgery
Stanford University School of Medicine
Stanford, CA 94305*

Yasuharu Noishiki, MD, PhD

*First Department of Surgery
Yokohama City University School of Medicine
Yokohama City, Japan*

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Reply to the Editor:

In their letter, Drs. Tomizawa, Moon, and Noishiki raised some criticisms regarding the results we have obtained with glutaraldehyde-treated ovine collagen grafts implanted in the inferior vena cava of pigs (*J THORAC CARDIOVASC SURG* 1991;102:440-7).

They noted that only two grafts were removed 28 days after operation and there were no explantations between 14 and 28 days. They concluded that our findings may not precisely depict the phenomenon of graft endothelialization. However, the exact definition of the period during which ovine collagen grafts were completely endothelialized in growing pigs has little clinical concern. Great differences exist between human beings and experimental species with regard to the healing of vascular grafts. In particular, it has been suggested that 1-month results with the prosthesis in pigs may be considered to correspond to 3-month prosthesis results in the dog and 21-month results in human beings. Further, human beings have limited capacity for development of a complete endothelial lining. Data in the growing pig may thus be useful only as preliminary and general indicators of the prosthesis' potential. Because results cannot be extrapolated to human beings, chronologic elucidation of the endothelialization phenomenon did not seem essential.

Similar considerations could be applied to the interesting suggestion of using a staining method specific to endothelial

cells. In our article, we always called the cells covering the inner graft surface "endothelium-like cells," never "endothelial cells".

Tomizawa, Moon, and Noishiki also discussed our early findings after implantation. One hour after blood contact, multiple areas of thrombus deposition have been observed on the exposed Dacron polyester fibers of the ovine collagen prostheses. Three possible explanations of this phenomenon have been proposed by Tomizawa, Moon, and Noishiki: (1) The graft was not strong enough to withstand injuries during preparation. (2) The graft could not tolerate blood pressure. (3) The graft was extremely thrombogenic. Because fibrin deposition was limited to defects in the inner collagen layer (exposing the underlying Dacron polyester fibers), graft surface thrombogenicity cannot explain inner thrombus formation. We assumed that the intimal graft defects were caused by the thinness and inadequate mechanical strength of the inner collagen cover, making it easily damaged by handling and manipulation during implantation. Accordingly, a new ovine collagen prosthesis with improved structural characteristics was developed. A thicker inner tissue layer was obtained without changing the graft's biophysical properties. We tested the new biosynthetic graft in the inferior vena cava of growing pigs, according to the same experimental protocol described in our previous article. One hour after implantation, neither disruptions of the inner graft components nor fibrin deposits were found. These findings confirmed the following statements: (1) The intact intimal graft surface was not thrombogenic. (2) The inner layer defects were traumatic in nature. (3) The defects were due to a structural deficiency. Despite such improvements, however, long-term patency of the newer grafts was not superior to that of the older ones. The reason for these late failures remained unclear.

Because Tomizawa, Moon, and Noishiki pressed us to discuss this subject, we state that, under microscopic examination of both types of failed grafts, the most remarkable finding was uniform mononuclear cell infiltration of the prosthetic wall. The widely known procoagulant activity exerted by white blood cells may support the immunologic hypothesis for long-term thrombosis of either the older or the newer ovine collagen grafts. Variable degrees of intimal hyperplasia were also observed in the failed grafts. Whether intimal hyperplasia depends on the immunologic response intensity remains to be investigated. Our results further emphasize the importance of Tomizawa, Moon, and Noishiki's suggestion to use alcohol instead of glutaraldehyde for ovine collagen tube treatment. A greater reduction of the graft antigenicity (with maintenance of hydrophilic properties) could make ovine collagen tubes a more reliable venous substitute.

*Giovanni B. Ratto, MD
University of Genoa
Viale Benedetto XV
16132 Genoa, Italy*

The New York Society for Thoracic Surgery: Seventy-five years, 1917-1992

To the Editor:

On February 20, 1917, in prescient recognition of thoracic surgery as a newly emerging specialty area of surgical endeavor, Dr. Willy Meyer (Fig. 1) of New York City convened a meeting in his office for the dual purpose of founding a New York Society for Thoracic Surgery and creating a national