

was necessary for the development of such devices.

The first biomedical engineering program at the Pennsylvania State University began in 1970 with a team (made up of a surgeon, an engineer, and a veterinarian) that has worked without interruption for 21 years. Its goal was to create an electrical-powered heart that could be recharged as needed through the unbroken skin without wires. Extensive basic research on cardiovascular and circulatory pathophysiology was required as new artificial materials were developed and tried.

In 1971 the first left ventricular assist device was implanted in a calf, and in 1976 an improved device was implanted in a human patient. Since then the Penn State device has been used in more than 225 patients worldwide and has saved more than 100 lives. In 1990 the assist device was declared a mechanical engineering breakthrough and an international historic landmark by the American Society of Mechanical Engineers.

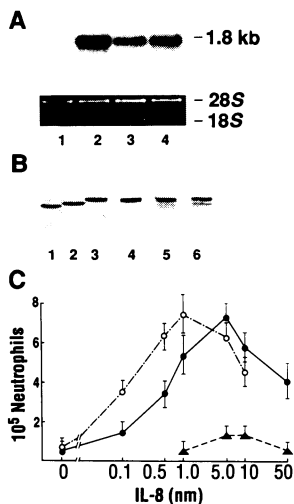
It took 12 years to develop the pneumatic-powered artificial heart and implant it successfully in a human patient. The Penn State heart still is the only one approved for human use by the Food and Drug Administration.

It may be ten more years before the team feels it is safe to apply for human use of the electric-powered heart. To be sure and safe takes more time than might be gathered from Marshall's article.

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Erratum: Figure 2, part B (p. 100) in the report "Regulation of transendothelial neutrophil migration by endogenous interleukin-8" by A. R. Huber *et al.* (4 Oct., p. 99) was printed incorrectly. The correct figure (parts A, B, and C) appears below.



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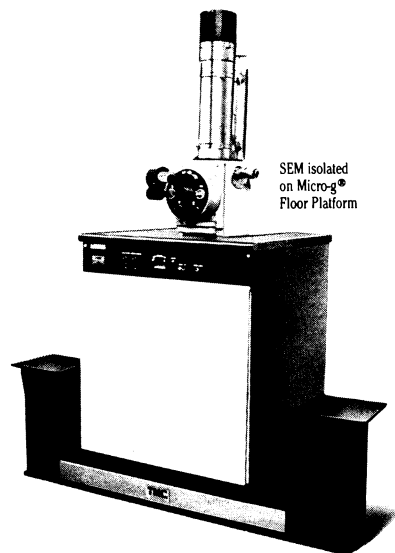
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