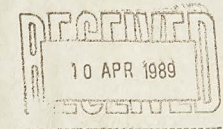




**INSIDER NOTES:** It's been 31 years since the TAH project was initiated in the US. Research what's the first carried out by Willem "Pim" Kolff and Abuts at the Cleveland clinic. These visionaries conceptualized and made a pneumatically driven heart consisting of two collapsible sacs and one plastic air chamber. Kolff, called "the father of artificial organs" left the Clinic to found the Division of Artificial Organs at University of Utah 1967. The TAH which evolved in Utah contributions early from the past work of Tetsuzo Akutsu and Yukihiko Nosé (from the Clinic days). Cliff KWAN-GETT who significantly Advanced design and finally Robert JARVIK.... A talented Sculptor, Jarvik won the support of Kolff through his efforts in the lab where he made important design multiplications in the pump which carries his name. In '76 the two formed Kolff Medical, a satellite of the University but differences in which way to take the company strained relationship. Jarvik hoping to diversify the business, raised new capital and initiated a "power-play" which removed his mentor from the Board of Directors. The company's name changed to SYMBION, and the Utah Heart became the "Jarvik Heart". The elder Kolff continues his work in Utah and his group has received NIH research funding for an electro-mechanical TAH. His son Jack is involved in the development of the "Philadelphia Heart" being perfected by CARDIAC SYSTEMS and Temple University. Jarvik is no longer with Symbion.

THE UNIVERSITY OF UTAH

March 29, 1989



Frank L. Tamru  
Executive Director  
Pacific Biomedical  
51A Science Park Drive  
Singapore Science Park  
Singapore 0511 China

Dear Mr. Tamru:

Thank you for having sent me a copy of your very interesting paper, APEX. I found it full of useful information and well written. Your "Insider Notes" are correct.

Our soft heart has been a joint development with my son Dr. Jack Kolff, in Philadelphia, Pennsylvania, who comes to Salt Lake City regularly for the implantations.

The University of Utah has given a license to Cardiac Systems, Inc. (Jack's company) to make and market these artificial hearts. These are Philadelphia-type hearts because they have no quick connects (less thrombosis, we hope), and are easy to implant.

Thank you for speaking to Prof. Chu of the Taiwan National University concerning our hearts.

My warm regards to Jackie and you.

Sincerely yours,

*W. J. Kolff*  
WILLEM J. KOLFF, M.D., Ph.D.

WJK:eh

cc: Cardiac Systems, Inc.

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