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## Zoom On: Alain Carpentier, Pioneering Heart Surgeon



### **Prof. Alain Carpentier, MD, Ph.D**

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A 2014 recipient of the European Society of Cardiology's prestigious Gold Medal award, Alain Carpentier, MD, PhD has been a pioneer in biological heart valves since the 1960s. His career was inspired by an implanted valve that failed, causing his patient to suffer a stroke when a clot formed on the device. Following the tragedy, Carpentier obtained his PhD in chemistry in 1975, and began research into the use of animal tissue for reducing immunogenicity.

By combining animal tissue with mechanical infrastructures, Carpentier's experimentation led to the development of a so-called 'bioprosthesis', composed of porcine tissue valves in Teflon-coated metallic frames. The first such device was implanted in March 1968. The Carpentier-Edwards heart valve was later sold by the Edwards laboratory.

With the release of his 'French Connection' paper on mitral valve repair, Carpentier advocated for the superiority of native valves over valve replacements. Valve reconstruction technology began with the innovation of the Carpentier-Edwards ring, which permitted the patient to keep his or her own valve with the addition of a stabilising ring which reshaped the structure which holds the valve.

In the current century, Carpentier has continued his innovative research, incorporating sensor technology in animal tissue for the development of a permanent heart implant. The CARMAT device (so-named from a blend of Carpentier's name and device manufacturer Matra) contains sensors adapted from missile technology which detect pressure and permit the internal control of blood flow. Late last year, the first bioprosthetic artificial heart implantation was performed on a 75-year-old patient afflicted with end-stage heart disease.

Carpentier is the Chairman of the Scientific Advisory Board and Chief Scientific Officer of CARMAT SAS. He is Emeritus Professor at the Pierre & Marie Curie University in Paris, as well as a visiting professor at New York's Mount Sinai School of Medicine. In addition to the recent ESC honours, he has received numerous awards such as the Foundation for Medical Research Prize (1998) and the Albert Lasker Award for Clinical Medical Research (2007). The latter award recognised his invention of the first valve bioprosthesis as well as his methods for reconstructive heart valve surgery. In 2001, the University of Pavia (Italy) awarded Carpentier with an Honorary Doctor of Medicine and Surgery degree.

Carpentier is a member of the French Academy of Sciences.

References: Business Week, European Society of Cardiology

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