

# Alain Carpentier, M.D., Ph.D

## CURRICULUM VITAE

### BACKGROUND AND FUNCTIONS

- Doctor of Medicine, University of Paris (1966).
- Doctor of Sciences (Ph.D.), University of Paris (1975).
- Founder and director of the "Laboratoire d'Etude des Greffes et Prothèses Cardiaques", University of Paris (since 1967).
- Professor of Cardiovascular Surgery, University of Paris (1978), Emeritus since 2004.
- Membre de l'Académie des Sciences, Institut de France (2000).
- Adjunct Professor, Mount Sinai School of Medicine New York (2002).
- President, Académie des Sciences, Institut de France (since 2011).
- Chief Department of Cardiovascular Surgery and Organ Transplantation, Hôpital Broussais-Hôpital Européen Georges Pompidou (1982-2000).
- Consultant Hôpital Européen Georges Pompidou (since 2000).

### International

- "Visiting Professor" University of New-York (1983, 2001-2005), Portland (1986-1989), London (1989, 1996-2002), Harvard (1991, 1996, 2002, 2005), Montreal (1991, 2004, 2005, 2006), Baylor (2002), Washington (1994, 2000), Florida (1996, 1999), Padua (1996), Beirut(1996), Virginia (1997), North Carolina (1998), Tokyo (1998, 2000, 2003), Bangkok (2000, 2004), Pavia (2000), Buffalo (2001), Belgrade (2003), Philadelphia (2004), Mexico (2004), Minneapolis (2004), Delhi (2006), Morioka (2006), Jerusalem (2007).
- Scientific Advisor : Edwards LifeSciences Research and Development, Irvine, California (since 1975).

### ORIGINAL SCIENTIFIC WORKS

**The concept and development of valvular bioprosthesis** (Biological valve of animal origin chemically treated to avoid immunological rejection) :

- Discovery that Glutaraldehyde reduces xenograft tissue antigenicity and enhances tissue stability by crosslinkages.
- Development of the "concept of bioprosthesis" and application to the development and manufacturing process of valvular bioprostheses. First implantation in human (1968).
- Today, more than 50% of valve replacements are carried out using a bioprosthesis.

**The concept and development of dynamic cardiomyoplasty** (Physiological and biological transformation of a skeletal muscle by sequential electrical stimulation prior to its use as a myocardial substitute in the human) (1982-1985) :

- Original protocol of **progressive sequential stimulation of a skeletal muscle** for the transformation of fatigable glycolytic myosine into non fatigable oxydative isoform (personal contribution).
- Development of the technique of cardiomyoplasty (with Pierre Grandjean and Juan-Carlos Chachques). Over 1000 clinical applications in humans worldwide.

- This technique led to the recent development of "cellular cardiomyoplasty", a technique which uses muscular cells instead of muscular tissue.

### **Concept of annular remodeling. Mitral and tricuspid valves reconstructive techniques**

- Concept of annular remodelling using prosthetic rings in valve surgery (1969)
- Development of mitral and tricuspid valve reconstruction techniques.
- These techniques widely used today worldwide allow to repair rather than to replace 70% of the diseased mitral valves and 90% of the diseased tricuspid valves.

### **Functional classification of heart valve diseases**

- First description of the various types of cardiac valve dysfunction using the concepts of "Functional analysis" and "Segmental analysis". This approach of valve analysis is now widely used in echocardiography and cardiac surgery (1980).
- Recognition and first description of the clinical and pathological characteristics of a new entity of degenerative mitral valve disease, the "Fibroelastic deficiency".

### **Other original contributions**

- New techniques for the surgical treatment of complex cardiac malformations: atrioventricular canal (1977), Ebstein's disease (1989), hypertrophied obstructive cardiomyopathy.
- First total biventricular support by extracorporeal artificial ventricles (1986)
- First use of the radial artery as a conduit to bypass coronary artery lesions (1972)
- First world case of cardiomyoplasty (1985)
- First case of complex open heart surgery with video assistance (1996)
- First case of computer assisted open heart operation (1998)

### **Research in progress**

- Cardiac xenotransplantation.
- Induced tissue transformation.

### **TEACHING AND TRANSFER OF TECHNOLOGY PROGRAMS**

- Founder and chairman of the Institut du Coeur de Ho Chi Minh City (Vietnam) : 1300 open heart operations per year.
- Founder of the cardiac surgery services of Rabat, Algiers and Beirut (Hôtel Dieu de France).

### **SCIENTIFIC BOOKS AND PUBLICATIONS**

- Anatomie de la tête et du cou (Maloine, Paris 1962).
- Chirurgie Vasculaire, with Charles Dubost (Masson publisher, Paris 1982).
- Techniques de chirurgie vasculaire, with Charles Dubost (Masson publisher, Paris 1984).
- Chirurgie du coeur droit, with Charles Dubost (Masson publisher, Paris 1986).
- Chirurgie du coeur gauche, with Albert Starr (Masson publisher, Paris 1989).
- Cardiomyoplasty, with Juan-Carlos Chachques (Futura, New York, 1990).
- Transplantation d'organes, with Dominique Farge (Flammarion Médecine-Science, Paris 1992).
- Vasoreactivity of human vessels, with Jean-Noël Fabiani and Sir Magdi Yacoub (Arnette Blackwell, Paris) 1996.
- Cardiac Bio Assist, with Juan-Carlos Chachques (Futura, New York, 1997).

### **ESSAYS**

- Le Mal Universitaire (Robert Laffont, 1988) awarded by l'Académie Française.
- Socrate, in "Honneur aux Maîtres", livre collectif (Critériion, 1991).

### **SCIENTIFIC DISTINCTIONS AND AWARDS**

- Bronze medal of the Scientific Research National Council (1967).
- French National Academy of Medicine 1967 Award.
- Honorary member of the American Association for Thoracic Surgery (1983).
- Honorary member of the American Surgical Association (1985).
- Honorary member of the British Thoracic and Cardiovascular Surgical Society (1986).
- Grand Prix GPA 1986 of the Academy of Science.
- **Honorary member of the American College of Surgeon** (1988).
- Honorary member of the American College of Cardiology (1990).
- Honorary member of the Collège Royal des Médecins et Chirurgiens du Canada (1991).
- Honorary member of the Royal College of Surgeons of England (1992).
- Member of the European Association for Cardio-Thoracic Surgery (2004)
- **Grand Prix Mondial Cino del Duca** (1996).
- **Grand Prix de la Fondation pour la Recherche Médicale Française** (1998).
- Doctor Honoris Causa of the University of Bucarest, Rumania (2001).
- Doctor Honoris Causa of the University of Pavia, Italy (2001).
- **5<sup>th</sup> Scientific Achievement Award of American Association for Thoracic Surgery** (2005).
- **Albert Lasker Medical Research Award** (2007).
- Doctor Honoris Causa of the Mount Sinai Medical School, New York University (2008).

### **DECORATIONS**

- Commandeur de la Légion d'Honneur (France).
- Commandeur de l'Ordre National du Mérite (France).
- Grand Croix de l'Ordre de Léopold (Belgium).
- Commandeur du Mérite de l'Ordre de Malte.
- Commandeur de l'Ordre du Cèdre (Lebanon).
- Officier du Ouissam Alaouite (Morocco).