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Edward Carmeliet (1930–2021)—channelling scientific curiosity: a tribute from the ESC Working Group on Cardiac Cellular Electrophysiology

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In April 2021, very sad news spread like wildfire through our electrophysiological community—we had lost a great scientist, mentor, and dear friend, when Edward ‘Ward’ Carmeliet, MD, PhD, Professor Emeritus of the University of Leuven died after a long, productive life in science.

From the start of his studies in medicine at the University of Leuven, he engaged in a life-long pursuit to unravel the mechanisms underlying the normal electrical activity of the heart and to understand what goes wrong in arrhythmias. Edward Carmeliet’s approach to experimental physiology was driven by scientific curiosity and critically scrutinizing all observations. He has provided in-depth insights into the various ion channels and transporters that determine the time course of the action potential. He studied Na⁺ transport (Na⁺ current, Na/K pump; late Na⁺ current and Long-QT syndrome type 3), Ca²⁺ homeostasis (T-type Ca²⁺ current; Ca²⁺ regulation, Na/Ca exchange), Ca²⁺-activated Cl current, and various K⁺ channels (delayed rectifier current, ATP-sensitive K⁺ current, ACh-sensitive K⁺ current). His work was translational as well, studying ischaemia and cardioprotection, and the mechanisms of antiarrhythmic drugs.

The work of Edward Carmeliet is characterized by a continuous drive to pursue his ideas with the latest innovative methods. His pioneering research led to several prizes and honorary invitations worldwide. Of Edward Carmeliet’s numerous publications we wish to highlight his insight into cardiac ion channels in the well-received book: ‘Cardiac Cellular Electrophysiology’ (Carmeliet E and Vereecke J; Springer 2002); the proceedings of the 1990 Corsendonk meeting ‘Ionic currents and

Ischemia’ and the summary of the symposium honouring his retirement in 1995 ‘Potassium Channels in Normal and Pathological Conditions’.

He remained scientifically active well beyond his retirement. In 2019, he published three reviews on the basics of cardiac electrophysiology in *Physiological Reports*.^{1–3} In 2020, a few weeks before his 90th birthday, he also gave the first webinar of the European Working Group on Cardiac Cellular Electrophysiology (EWGCCE) on ‘Cardiac cellular electrophysiology: back to basics’, which was viewed by more than 700 scientists from around the world.

Retirement has indeed been a remarkable period in Edward Carmeliet’s exceptional career: he started collaborating with his son Peter Carmeliet, a renowned geneticist and molecular biologist. Father and son became co-authors of five publications on ion channel dysfunction and Long-QT syndrome, including a *Nature Medicine* paper.⁴

Edward Carmeliet had a wide network of collaborations and scientific exchange, key to his exceptional impact on cardiac electrophysiology (*Figure 1A,B*). Beyond advancing the field, he also took great pains to pass on his knowledge to younger scientists. Together with his friend Edouard Coraboeuf, he reached out in 1977 to invite PhD trainees and postdoctoral fellows to come to Leuven for an informal meeting to share novel information about all aspects of the cardiac action potential and its underlying ion currents in a stimulating and friendly atmosphere. No abstracts were required. The meeting date had been chosen shortly before Christmas when no other conferences were taking place and universities were about to close down for the festive season. One of the authors of this reflection vividly remembers the thrill she felt when she

[†]The extended version of this tribute can be found at the homepage of the Working Group Cardiac Cellular Electrophysiology (<https://www.escardio.org/Working-groups/Working-Group-on-Cardiac-Cellular-Electrophysiology>).

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Figure 1 (A) Early years in Bern, studying Cl^- currents (courtesy Ernst Niggli, University of Bern, CH). (B) The Laboratory of Physiology in 1982. (C) Edward Carmeliet presenting Andras Varro with the award for the Carmeliet–Coraboeuf–Weidmann lecture annual WG meeting, with Paul Volders and David Eisner to the right and left. (D) Edward Carmeliet in his garden in 2019.

opened her personal invitation by the two highly admired and—in contrast to her—firmly established electrophysiologists. How did she ‘deserve’ to join? This first meeting took place on the Gasthuisberg. A group of almost one hundred electrophysiologists enjoyed the warm hospitality of the old monastery (including the rather Spartan sleeping cabinets of the guesthouse). The science was amazing: there were no parallel sessions, everybody listened to each presentation about cardiac action potentials and the underlying ionic currents, the discussions were tough but friendly and inspiring. Thus 1977 can be considered the founding year of the Working Group on Cardiac Cellular Electrophysiology that, once associated with the European Society of Cardiology (after fierce discussions whether or not to remain independent) became the EWGCCE as we know it today. For many of our peers, the annual meeting of the EWGCCE became a favourite because it continued in the spirit in which it was initiated. We commemorate the pioneers in the field, founders of the EWGCCE, with the Carmeliet–Coraboeuf–Weidmann lecture presented at our annual meeting (Figure 1C).

Edward Carmeliet continued to attend the meetings himself until very recently, sharing his insights and gentle teachings with the younger generation. We all have fond memories of him. At the 2016 WG meeting in

Glasgow, he co-chaired a platform session with Otto Hutter, another giant in physiology of the generation of Edward Carmeliet (<https://www.physoc.org/magazine-articles/obituary-otto-f-hutter-1924-2020/>). They greatly impressed all of us, and the younger scientists responded to the passion and interest that Edward and Otto clearly retained for electrophysiology. There could be no better advert for the subject than its ability to sustain the interest of these lively and curious minds for many decades. Between them, Otto and Edward remarked how good it was to meet up, particularly as ‘one never knows whether there will be another meeting’. It may indeed have been the last time they met.

Those of us who worked with Edward in the laboratory, will always remember him as a mentor who stood aside and above. His fatherly guidance in challenging scientific issues, his balanced approach to scientific debate, and his experience based on historic contributions to our field, made us realize that he led in greatness by example.

But, Edward Carmeliet was not blinded by research. He had many interests outside the realms of science, too. Central to his private life was his family. The remainder of his free time was devoted to reading books, listening to music, and caring for his beautiful garden (Figure 1D). Physically he kept fit by cycling, mentally by nurturing his scientific

curiosity. We will miss his astute remarks and impish questions, his kind sense of humour, and his unassuming and generous support of other scientists.

Conflict of interest: none declared.

References

1. Carmeliet E. Conduction in cardiac tissue. Historical reflections. *Physiol Rep* 2019;**7**: e13860.

2. Carmeliet E. From Bernstein's rheotome to Neher-Sakmann's patch electrode. The action potential. *Physiol Rep* 2019;**7**:e13861.

3. Carmeliet E. Pacemaking in cardiac tissue. From IK2 to a coupled-clock system. *Physiol Rep* 2019;**7**:e13862.

4. Nuyens D, Stengl M, Dugarmaa S, Rossenbacker T, Compennolle V, Rudy Y, Smits JF, Flameng W, Clancy CE, Moons L, Vos MA, Dewerchin M, Benndorf K, Collen D, Carmeliet E, Carmeliet P. Abrupt rate accelerations or premature beats cause life-threatening arrhythmias in mice with long-QT3 syndrome. *Nat Med* 2001;**7**: 1021–1027.