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## Structure, function and clinical relevance of the cardiac conduction system, including the atrioventricular ring and outflow tract tissues

**Halina Dobrzynski**  
University of Manchester, UK

It is now over 100 years since the discovery of the cardiac conduction system, consisting of three main parts, the sinus node, the atrio-ventricular node and the His-Purkinje system. The system is vital for the initiation and co-ordination of the heartbeat. Over the last decade, immense strides have been made in our understanding of the cardiac conduction system. It has been shown that the system has a unique embryological origin, distinct from that of the working myocardium, and is more extensive than originally thought with additional structures: atrio-ventricular rings, a third node (retro-aortic node) and pulmonary and aortic sleeves. It has been shown that the expression of ion channels, intracellular calcium-handling proteins and gap junction channels in the system is specialized (different from that in the ordinary working myocardium), but appropriate to explain the functioning of the system, although there is continued debate concerning the ionic basis of pacemaking. We are beginning to understand the mechanisms (fibrosis and remodeling of ion channels and related proteins) responsible for dysfunction of the system (bradycardia, heart block and bundle branch block) associated with atrial fibrillation and heart failure and even athletic training. Equally, we are beginning to appreciate how naturally occurring mutations in ion channels cause congenital cardiac conduction system dysfunction. Finally, current therapies, the status of a new therapeutic strategy (use of a specific heart rate lowering drug) and a potential new therapeutic strategy (bio-pacemaking) are of great interests globally.

### Biography

Halina Dobrzynski has completed his Ph.D. in 2000 from University of Leeds, UK and Postdoctoral studies from Universities of Leeds and Manchester, UK. She is an Associate Professor/Senior Lecturer at the Institute of Cardiovascular Sciences, University of Manchester, UK. On PubMed she has around 70 publications in reputed journals. Her expertise in the anatomy, immunohistochemistry and histology of the cardiac conduction system has been sought by many scientists worldwide.

[halina.dobrzynski@manchester.ac.uk](mailto:halina.dobrzynski@manchester.ac.uk)