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## Antiarrhythmic drugs – an updated classification after 50 years

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In the late 1960s, Vaughan Williams introduced a novel classification of antiarrhythmic drugs. This scheme has been widely used around the world and has prompted the development of new drugs with major clinical impacts. Yet fifty years later, arrhythmic diseases still remain a major public health issue. Both scientific investigation and clinical practice directed at these fall behind advances in other cardiac and medical areas. These problems together have resulted in a lack of a comprehensive yet clear conceptual classification of identified targets and their relationship to each of the wide range of known arrhythmic mechanisms. Repeated attempts, including that by a working group of the European Society of Cardiology in 1991 at such a clarification met only limited success.

Our recent focus article published in Circulation (2018; 138:1879–1896) now bridges these conceptual gaps and culminates in a modernized drug classification collating findings made over the subsequent five decades. These compiled and organized studies of different molecular drug targets, their action mechanisms, and consequent clinical effects, areas in which the authors have themselves contributed, whether as experimentalists or clinicians. It augments Vaughan Williams's original framework covering the actions of sodium, potassium and calcium ions and autonomic nervous effects on these (Class I-IV). The novel categories introduced now bear on altered heart rates (Class 0), mechanical stretch (Class V); intercellular electrical communication (Class IV) and longer term structural change (Class VII). The scheme also proceeds to draw attention to multiple drug targets and actions and possible adverse, even pro- arrhythmic, effects.

This revised Oxford classification will therefore clarify a rational clinical use of existing available anti-arrhythmic drugs in relation to their particular mechanisms of action. It will aid the identification and development of novel drugs relating their future clinical applications to their molecular mechanisms of action.

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