

Cardiac and vascular toxicities: overview

- Chemicals may effect the rate (chronotropic), contractile (inotropic), conductive (dromotropic) and/or excitatory (bathotropic) properties of the heart
- Any xenobiotic that effects ion movement across membranes or intracellular homeostasis may cause cardiotoxicity
- Once a xenobiotic reaches the circulation it contacts vascular endothelial cells
- Vascular toxicity may involve membrane effects, oxidative stress, metabolism, accumulation of toxic agent---toxicity of chemicals may exacerbated by chronic diseases such as diabetes

Cardiovascular Toxicology

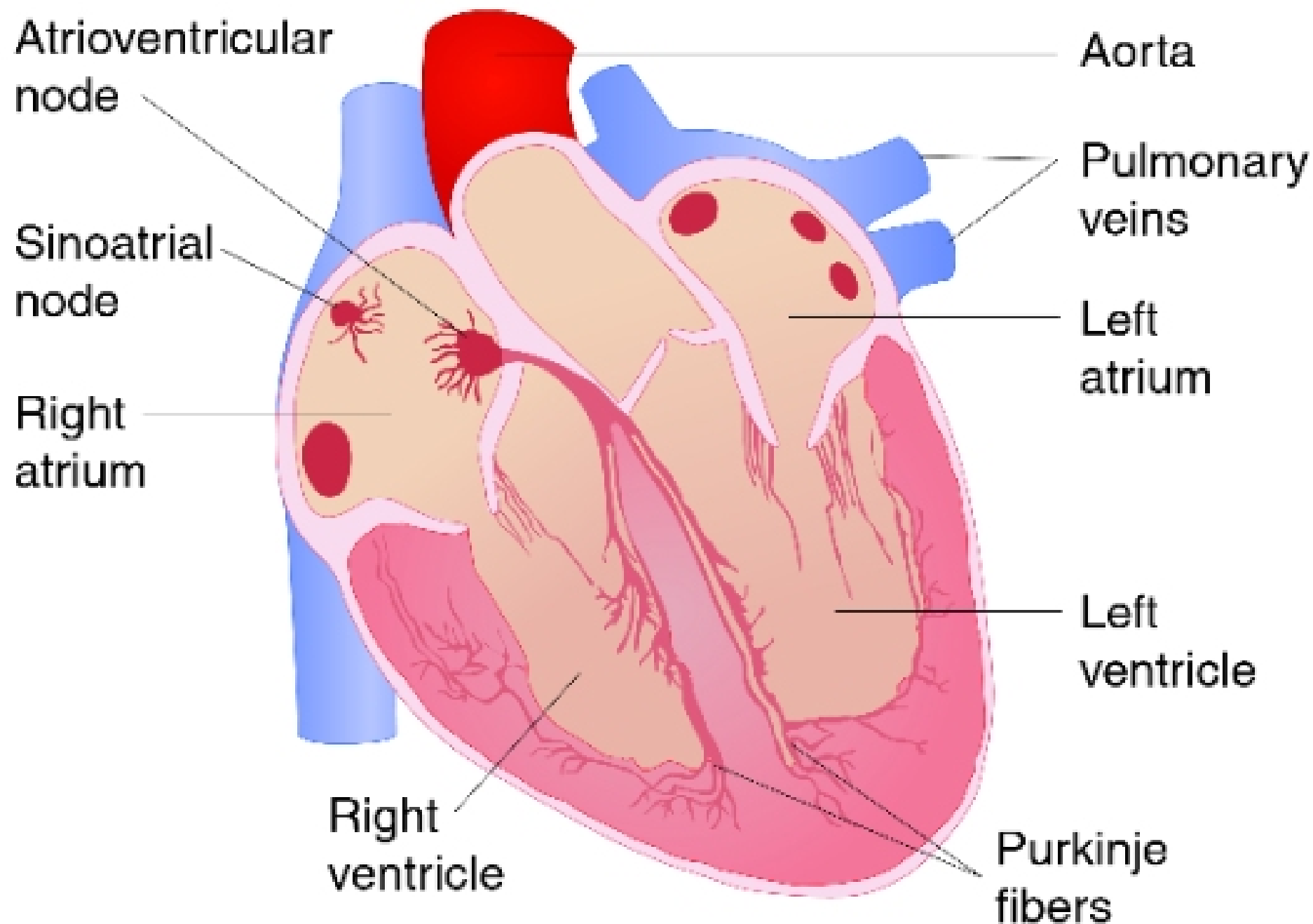


Figure 18-1. Diagram illustrating the basic anatomy of the heart.

Cardiac output is typically ~ 5 liters/min at rest and can triple during extreme exertion

Spontaneous signal generation

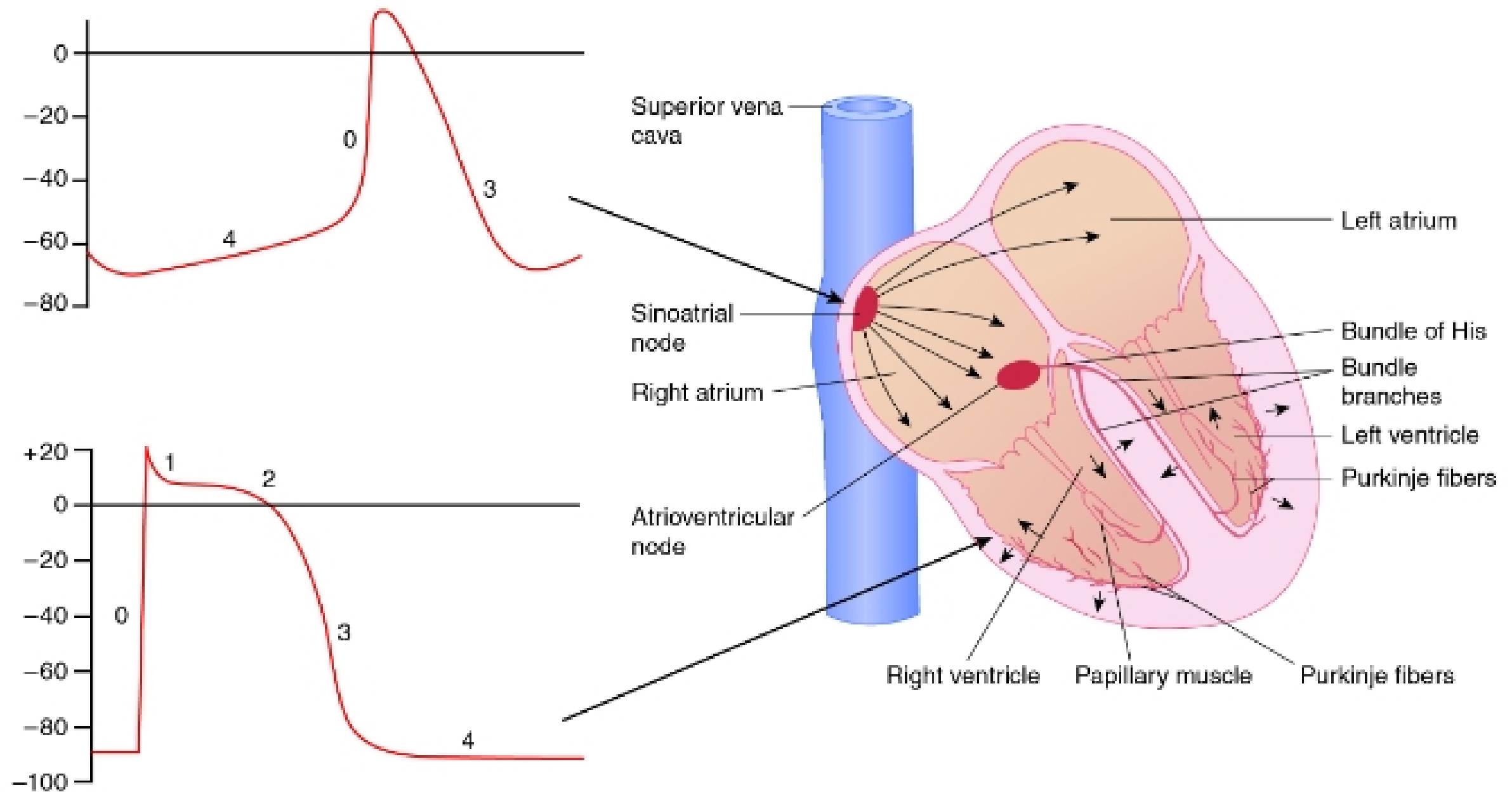


Figure 18-3. Characteristic cardiac action potential recorded from sinoatrial node and Purkinje fibers as indicated. (From Berne and Levy, 1983. With permission from Elsevier.)

0=sodium ion influx, 1=Ca influx and K ion efflux, 2=Ca ion influx, 3 = Na efflux, K influx, 4 = rest