Isolated hemoperfused heart model of slaughterhouse pigs

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Abstract
A model of hemoperfused slaughterhouse pig hearts is described providing a wide range of applications which leads to a reduction in animal experiments. The size of a pig heart, heart rate, coronary perfusion, metabolism, etc. are more comparable to conditions in patients than those in hearts of small laboratory animals. Global heart function can be assessed either by measuring stroke volume, ejection fraction, Emax etc. in the working model or by measuring intraventricular pressure with balloon catheters in the isovolumetric model. Regional cardiac function can be measured by sonomicrometry and ischemic and non-ischemic areas can be compared. Local metabolic changes are measurable as well with microdialysis. Cardiac function can be kept on any given functional level by infusion of norepinephrine in spite of the fact that functional parameters are lower without adrenergic drive in vitro than in vivo. Stable heart function can be maintained for several hours with only 500 to 1000 ml of blood because the blood is permanently regenerated by a special dialysis system. This model can be applied in many research projects dealing with reperfusion injuries, inotropic, antiarrhythmic or arrhythmogenic effects of certain drugs, immunological rejection, evaluation of imaging systems (NMR, echocardiography etc.) or cardiac assist devices.