Coronary angiography of rats in vivo

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Background: Although analysis of coronary microcirculation with monochromatized synchrotron radiation microangiography has been performed using the isolated rat heart, little is known about the coronary microcirculation of the in vivo rat heart.

The aim of this study then is to visualize rat coronary microvessels in vivo using synchrotron radiation microangiography.

Methods and Results: Male SD rats weighing 350-400g were anesthetized with pentobarbital sodium (50 mg/kg i.p.). Each rat was intubated with an endotracheal tube and artificially ventilated with room air.

Protocol 1: The heart was exposed by bilateral thoracotomy. A cannula was introduced from the right carotid artery to just above the aortic valve. Contrast medium (0.5-1.2 ml, Iopamiron) was injected at a rate of 2.0-4.5 ml/s, and the microangiogram of the left anterior descending coronary arteries (1 AT) was recorded. (Heart rate was 350-500/min.) Under baseline condition, the main trunk and the first branch of LAD were clearly visualized only at the end-diastolic phase. Intravenous infusion of acetylcholine (ACh, 100 microgram/kg) induced a significant dilatation of those arteries.

Protocol 2: The microangiograms of LAD were recorded, without bilateral thoracotomy, under baseline conditions and conditions of ACh (10 microgram/kg/min) infusion. Under both conditions, the main trunk of LAD was clearly visualized, while the first branch was not.