Visualization of vasodilation of renal arteries with acetazolamide in rats using synchrotron radiation microangiography

Kazuhito Fukushima 1), Kazuro Sugimura 2), Kensuke Uotani, 3) Masakatsu Tsurusaki 4), Keiji Umetani, 5) Katsumi Yamasaki, 6) and Sadao Kamidono 7)

1) Department of Radiology, Kobe University
2) Experimental Research Div., JASRI
3) Department of Urology, Kobe University

Vasodilatory effect of acetazolamide has been confirmed in cerebrovascular system. However, the effect for renal artery is still controversial. The aim of this study was to evaluate vascular response in renal artery to acetazolamide with isolated perfused kidney using synchrotron radiation microangiography system.

**Material and Method:** Anaesthesia being with pentobarbitone (75 mg/kg, i.p.), 100 I.U. heparin was administered intraperitoneally to a Wistar Kyoto rat and the abdomen was opened then the kidneys were excised. The isolated kidney was mounted on a steel cannula and perfused with a modified Krebs–Henseleit buffer according to the Langendorf technique. The perfusate was warmed to 37°C and gassed with 95% O2/5% CO2. The perfusion pressure was kept at 65 mmHg isovolumetrically. Microangiography was performed with synchrotron radiation microangiography system and non-ionic contrast media with 370 mg/ml iodine into renal artery by an automated injector.

First, baseline angiography was performed. After a 10 min wash-out of the contrast media by perfusing with the perfusate, it was changed to the Krebs–Henseleit containing 0.1 mmol/l acetazolamide. The perfusion pressure was monitored for 10 min and then the second microangiography was performed. Vascular response was valued by a ratio of baseline to acetazolamide vascular diameter in rats kidney.

**Results:** The glomerulus and arteriole of the kidney were visualized using synchrotron radiation microangiography system. After perfusing the Krebs–Henseleit containing acetazolamide, the perfusion pressure was decreasing from 65 to 57 mmHg and the arterioles of renal artery were dilated from 432 to 488 μm.

**Conclusion:** Acetazolamide had vasodilatory effect of the arterioles of renal arteries in isolated perfused rats kidney.

Visualization of vasoconstriction of intrahepatic preterminal portal venules with endothelin-1 in rats using synchrotron radiation microangiography

Masakatsu Tsurusaki 4), *Yoshide Hayashi 6), Kazuhito Fukushima 1), Kensuke Uotani 3), Keiji Umetani 5), Katsumi Yamasaki, 6) and Kazuro Sugimura 2)

1) Department of Radiology, Kobe University
2) Experimental Research Div., JASRI
3) Department of Pathology, Kobe University

There is little doubt that endothelin-1 (ET-1) caused a significant increase in portal pressure in rat livers and that ET-1-mediated vasoconstriction in the portal vascular tree was strikingly heterogeneous. However, the site of ET-1-induced vasoconstriction is still controversial. The aim of this study was to evaluate vascular response in intrahepatic portal venules to ET-1 with isolated perfused rat liver using synchrotron radiation microangiography system.

**Material and Method:** Anaesthesia being with pentobarbitone (75 mg/kg, i.p.), 100 I.U. heparin was administered intraperitoneally to a Wistar Rat and the abdomen was opened then the liver were excised. The isolated liver was mounted on a polyethylene cannula and perfused with a modified Krebs–Henseleit buffer (KHB) according to the Langendorf technique. The perfusate was warmed to 37°C and gassed with 95% O2/5% CO2. KHB was perfused at a constant flow rate of 8-10 ml/min. Microangiography was performed with synchrotron radiation microangiography system and non-ionic contrast media with 370 mg/ml iodine into extrahepatic portal vein by automated injector. First, baseline angiography was performed. After a 10 min wash-out of the contrast media by perfusing with the perfusate, it was changed to the Krebs–Henseleit containing ET-1 (0.1-1.0 nM) and then the second microangiography was performed. The site of ET-1-induced vasoconstriction was valued by vascular diameter of constrictive venules in rats liver.

**Results:** The distal segment of preterminal portal venules (40-80 μm) and the proximal segment of terminal portal venules (10-40 μm) of the rats liver were visualized using synchrotron radiation microangiography system. After perfusing the Krebs–Henseleit containing ET-1, it induced a dose-dependent vasoconstriction of preterminal and terminal portal venules in the isolated Langendorff-perfused rats liver. A little change of vasoconstriction was visualized under perfusion of low concentration of ET-1 (0.1nM).

**Conclusion:** ET-1 had vasocontractility effect of the terminal and preterminal portal venules in isolated perfused rats liver.