5-Hydroxytryptamine limits infarct size in the rat isolated heart

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Background: In acute coronary syndromes 5-hydroxytryptamine (5-HT) release promotes platelet aggregation and thrombus formation. To date there is a separation in reported effects of 5-HT in experimental models of ischaemia-reperfusion. 5-HT has been shown to trigger post-ischaemic contractile dysfunction and apoptosis, however more recent reports suggest that 5-HT can protect the myocardium against ischaemia-reperfusion injury (Takano et al, 2004). We hypothesised that 5-HT limits infarct size when administered at reperfusion in a concentration dependant manner.

Methods: Langendorff-perfused rat hearts were subjected to 35 minutes of left descending coronary artery occlusion and 120 minutes of reperfusion, following which infarct size was determined by tetrazolium staining. Treatment with a range of 5-HT concentrations (50nM, 1μM, 10μM and 30μM) was commenced 5 minutes prior to reperfusion and continued until 10 minutes after reperfusion. Control experiments received the appropriate volume and composition of vehicle, with n=6-8 for all determinations. Infarct size was expressed as a percentage of the ischaemic risk zone. Statistical comparison was made with ANOVA followed by Newman-Keuls multiple comparison post-hoc test, with a p-value<0.05 considered statistically significant.

Results: Control infarct size (% of ischaemic risk zone) was 60.8 ± 8.4%. The administration of 50nM 5-HT at reperfusion induced a significant reduction of infarct size (31.5 ± 4.5% $p<0.05$ vs. control). The was a suggestion that 5-HT at higher concentration also reduced infarct size but this did not reach statistical significance (1μM 38.3 ± 5.7%, 10μM 39.1 ± 3.7% and 30μM 36.4 ± 7.9%).

Conclusion: This finding supports that low concentration of 5-HT are cardioprotective against reperfusion injury. Further work will establish the mechanism of action of 5-HT.

Takano, S. et al (2004). J Cardiovasc Pharmacol Ther **9(1)**, 43-50.