

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

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.