

Adrenergic and Non-Adrenergic Control of Mesenteric Blood Vessels of Calves

Authors : A. Elmajdoub, A. El-Mahmoudy

Abstract : The present study was designed to investigate the neurotransmitters that mediate the excitatory response of the circular muscle of final branches of mesenteric artery in bovine calves. Mesentery was dissected and the iliac branches were separated and used. The final mesenteric branches of diameter 400 micrometers and less responded strongly to norepinephrine and moderately to ATP. However, the mesenteric branches of wider diameters were gradually less responsive to norepinephrine and those of diameter 700 micrometers were exclusively nonresponsive. These arteries were strongly responsive to ATP (100 μ M). Norepinephrine response was sensitive to phentolamine (3 μ M) and prazosin (5 μ M) indicating that it is mediated by α 1 receptor; while ATP response was sensitive to suramin (200 μ M), PPADS (50 μ M), but not to cibacron blue (100 μ M) indicating that it is mediated via P2X receptor. Further confirmatory experiments were performed including application of α 1 and P2X receptor specific agonists which are methoxamine and α,β -methylene ATP. Methoxamine (1 μ M) showed effects similar to norepinephrine in final branches and was without effect in wider branches. α,β -methylene ATP (1 μ M), exhibited more pronounced effects on both wide and narrow branches but in parallel manner to that of ATP. Agonists for α 2 and P2Y receptors as clonidine (10 μ M) and 2-meThio ATP (10 μ M), respectively, were without effect indicating that involvement of these receptors is unlikely. The neuropeptide-Y (200 nM) did not have any effects on either the narrow or the wide rings. Conclusion: These data may imply that in the most peripheral mesenteric arteries a strong vasopressor power represented by norepinephrine and ATP integration is needed for maintaining peripheral resistance; on the other hand a mild vasopressor power mediated only by ATP is enough to maintain the vascular tone in the relatively central mesenteric branches.

Keywords : ATP, calves, mesenteric artery, norepinephrine

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