

RESPONSIVENESS OF LONGITUDINAL AND CIRCULAR MUSCLE TO RELAXING MEDIATORS IS DIFFERENTIALLY AFFECTED IN RAT HYPERTROPHIED ILEUM

Bertoni Simona, Ghizzardi Paola, Tognolini Massimiliano, Ballabeni Vigilio, Impicciatore Mariannina, Barocelli Elisabetta

Dipartimento di Scienze Farmacologiche, Biologiche e Chimiche Applicate. Università degli Studi di Parma. Viale Usberti 27/a, 43100 Parma, Italy

The ability of the intestinal tissue to adapt itself to a changing environment underlies the extensive morphological and neurochemical changes, experimentally described and clinically documented, in the hypertrophied intestine located orally to a chronic partial stenosis of the lumen. Distension and thickening of the gut wall along with increased expression of neuropeptides (1) are accompanied by functional alterations, such as disruption of the interdigestive motor complex *in vivo* (2), decreased efficiency of contraction (3) and altered responsiveness of longitudinal (LM) and circular muscle (CM) layers of rat hypertrophic ileum to contractile agents. In order to enrich the previous investigations, the present work focuses on the motor responses of the two smooth muscle layers of rat hypertrophic intestine to the application of inhibitory mediators. The partial occlusion of rat ileum, ensuing from the insertion of a small acetate ring proximal to the ileo-cecal junction, generated intestinal hypertrophy over 14 days. The effects of relaxing agents were evident only when LM strips were contracted by PGF_{2α} 300nM (producing a stable plateau considered as 100%). VIP 100nM, 8-Br-cGMP 100μM and forskolin 1μM produced stronger relaxations of hypertrophic (HYP) than control (C) tissues (-38% vs -9%, P<0.05; -111% vs -78% P<0.01; -116% vs -81% P<0.05 Student's t-test); on the contrary, sodium nitroprusside (SNP) 100μM equally and deeply relaxed HYP and C strips (-88% vs -77%). On basal tone of control CM rings, all the agents produced a similar degree of relaxation (ranging from -43 to -63mN/g wet weight); such effects, although increased, were not significantly modified in HYP tissues. These data indicate that, following hypertrophy, LM appears more sensitive than CM to the relaxant actions of VIP and cyclic nucleotides; the lack of potentiation of the relaxing effect of SNP may reflect the loss of sensitivity to nitric oxide already unmasked in hypertrophic rat ileum *in toto* (3). In conclusion, the different responsiveness of CM and LM following hypertrophic growth to relaxing agents may reflect their distinct anatomical organization and their reciprocal roles to allow the preservation of intestinal peristalsis also in the condition of intestine partial obstruction.

1) Gabella G. (1990) *Anat Embryol* 182: 409-24. 2) Coelho J.C.U., Gouma D.J., Moody F.G., Li F.Y. and Senninger N. (1986) *J Surg Res* 41: 274-8. 3) Bertoni S., Ghizzardi P., Ballabeni V., Impicciatore M., Lagrasta C., Arcari M.L. and Barocelli E. (2004) *Neurogastroenterol Motil* 16: 365-74.