Nicotinic pathways and their control over cyclical motor patterns underlying colonic propulsion

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Propulsion of pellets in the colon involves both acute distension activation of enteric circuits and cyclic motor complexes (Costa & Furness, 1976). Nicotinic transmission may be not essential for the propulsion of single pellets (Gregory & Spencer, submitted).

Purpose: To investigate the role of nicotinic transmission in distension evoked cyclic motor complexes and pellet propulsion in the same preparation.

Methods: Segments of distal colon from 5 adult guinea-pigs killed humanely, were placed in organ bath with Krebs at 37°C. Video spatio-temporal maps of changes in length and diameter were constructed (Hennig *et al.*, 1999) during short and long fixed balloon distensions and during interrupted and uninterrupted artificial pellet propulsion.

Results: Short balloon distensions (20-30s) elicited oral contraction of the circular muscle and longitudinal shortening over the entire segment, which were reduced but not abolished by hexamethonium (100μM). Distensions of 15-20min elicited similar muscle contractions in cycles at frequency of 0.27±0.03 cycles/min SEM). Hexamethonium reduced the amplitude of cyclic contractions but did not affect their frequency (0.34±0.15 cycles/min SEM; n=5). These cyclic contractions exerted a propulsive force on held pellets, which was significantly reduced by hexamethonium (7.31±1.18g to 2.31±0.80g SEM, n=5). However, after being held fixed, pellets cut free to move were still propelled in the presence of hexamethonium at a similar speed as in controls (2.73±1.37 *vs* 2.56±1.28mm/s SEM; n=5).

Conclusions: Propulsion of single pellets in the guinea-pig distal colon occurs independently from cyclic motor activity and requires minimal propulsive force that does not involve nicotinic enteric pathways.

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Gregory S, Spencer N. *Am. J. Physiol.* (submitted).
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