



**An electrophysiological investigation of colonic afferent  
sensitivity in the rat and mouse – *in vitro***

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## General Abstract

1. Two novel *in vitro* preparations were developed from which recordings were made from colonic afferents in the rat and the mouse. Fibres with endings in the mucosa are described, along with those in muscle and serosa, and their responses to a range of mechanical and chemical luminal stimuli.
2. Mechanosensitivity was investigated. Stimuli included stretch, mucosal blunt probing and stroking (Von Frey hairs 10-1000mg). 52 fibres were recorded for investigating classification criteria. 12 showed characteristics consistent with the literature of endings in the mucosa, 10 in the muscle and 27 in the serosa. 3 fibres were not mechanosensitive but were chemosensitive.
3. Chemosensitivity was investigated. Stimuli were applied into a ring placed over the mechanoreceptive field of the fibre. 24 serosal, 6 muscular and 20 mucosal fibres were investigated. Mucosal, muscular and serosal fibres were chemosensitive and responded to >1 chemical stimulus. Muscular fibres responded to chemical stimuli independently of muscular activity.
4. Stretch sensitivity was investigated in all classifications of fibres. 0 fibres responded to graded tension, but 1/6 serosal fibres responded to graded length. 2/2 muscular fibres demonstrated a discharge pattern that was most closely correlated to the acceleration phase of an oscillating stretch stimulus.
5. Fibres with multiple receptive fields were investigated. Four fibres showing characteristics of serosal fibres had 2-3 punctate receptive fields otherwise all fibres had single receptive fields.
6. The response to NaCl 308mM in 15 fibres (6 mucosal, 9 serosal) was potentiated in the presence of endogenous prostaglandins (after indomethacin removal). 1/13 fibres responded to mucosal application of PGE<sub>2</sub>.
7. A novel *in vitro* preparation of mouse distal colon was developed. 5 recordings were made. Classification criteria appropriate for the mouse are described. Afferents were generally chemosensitive.
8. This is the first characterisation of colonic afferent fibres in an *in vitro* preparation both in the rat and the mouse and first documentation of afferent fibres in colonic mucosa, luminal chemosensitivity of serosal afferents and



potentiation of chemical stimuli by endogenous prostaglandins in the gut. This study contributes significantly to the understanding of normal sensation in the colon.