This Week's Citation Classic®

Furness J B & Costa M. Types of nerves in the enteric nervous system. *Neuroscience* 5:1-20, 1980.
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This paper was written because of our concern that inadequate correlation had been made between types of enteric neurons defined by unparallel definitions such as histochemical features, pharmacological responses, physiological roles, or biophysical properties. The paper detailed the differences that exist and urged correlative studies. [The *SCI*® indicates that this paper has been cited in over 260 publications.]

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Our fascination with the enteric nervous system developed from a realization that this was the only mammalian neuronal network that could exhibit coordinated reflex activity when completely separated from the central nervous system. The paper is probably highly cited because it brought this fact home to neuroscientists who had thought of enteric neurons as parasympathetic neurons that were relay stations for messages from the central nervous system. Suddenly, many scientists have become alert to the intriguing features of the enteric nervous system and to the fact that studies of this system may reveal principles of neuronal organization that will have implications for other parts of the nervous system. It is pleasing to us that our work may have contributed to this awakening of interest.

We have come from quite different backgrounds; JBF has degrees in physics and mathematics from Melbourne, and MC has a degree in medicine from Turin. We met in the Department of Zoology in Melbourne in 1970 where JBF was a PhD student and MC was a postdoctoral fellow. Almost immediately, we started our collaboration. The Department of Zoology, led by Geoff Burnstock, now professor of anatomy at University College London, offered an ideal environment to satisfy our natural inclination to approach our studies with a variety of techniques: histochemistry, biophysical methods, pharmacology, functional studies, electronmicroscopy, and biological chemistry. The multiple approach has allowed us to demonstrate the correlations that exist between neurochemical, functional, and morphological properties of neurons.[1] It has also led us to find that neurons are multiply coded by various intracellular substances, which may all participate in chemical transmission.[2,3] We have found some enteric neurons that contain up to six different potential transmitter substances. It is becoming apparent that chemical codings also occur in other neuronal systems, for example in sympathetic and sensory pathways.

The type of correlative approaches that we have adopted are gradually leading to solutions to the enduring enigmas of the roles of enteric neurons in the control of gastrointestinal motility, blood flow, water and electrolyte transport, and hormone release.[3]

1. Bornstein J C, Costa M, Furness J B & Lees G M. Electrophysiology and enkephalin immunoreactivity of identified myenteric plexus neurones of guinea-pig small intestine. *J. Physiology* 351:313-25, 1984.
2. Costa M, Furness J B & Gibbins I L. Chemical coding of enteric neurons. *Prog. Brain Res.* 68:217-40, 1986.
3. Furness J B & Costa M. *The enteric nervous system.* Edinburgh: Churchill Livingstone, 1987. 287 p.

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