

**Restoration of viscerosensory innervations following capsaicin- and vagotomy-induced nerve damage in adult rats** Ryu, V., Gallaher, Z.R. and Czaja, K.

In this study, we tested the hypothesis that the restoration of viscerosensory pathways following peripheral nerve injury in adult rats is due to the regeneration of damaged terminals as well as neural proliferation. We used capsaicin to destroy unmyelinated afferent axons, and vagotomy to damage NG neurons. Adult SD rats received an i.p. injection of capsaicin or vehicle. Another group underwent subdiaphragmatic vagotomy. NG neurons were retrogradely labeled with Fast Blue (FB). A primary antibody against 2G13 was used to study neurite outgrowth from perikarya located in NG as well as in cervical (CV), thoracic (TV) and abdominal (AV) vagal trunks. Co-labeling with an antibody against NOS was used to label growth cones (GC) from preexisting and regenerating neurons. Capsaicin treatment significantly increased the number of GC in the NG compared to vehicle-treated controls. Capsaicin and vagotomy increased the number of NOS-positive GC in CV and TV on day 37. However, capsaicin, but not vagotomy, significantly increased numbers of NOS-negative GC over controls in NG, CV, TV, and AV regions on day 37. FB tracing revealed a dramatic fall in the number of projections after capsaicin (~80%) and vagotomy (~96%) on day 10, followed by a restoration found only in capsaicin-treated rats. We conclude that the restoration of viscerosensory connections following a capsaicin-induced nerve injury is due to the regeneration of damaged terminals and to the extension of axons from newborn neurons.