The existence of the hormone gastrin in the distal stomach (antrum) has been known for almost 110 years, and the physiological function of this amidated peptide in regulating gastric acid secretion via the CCK2 receptor is now well established. In this brief review we consider important additional roles of gastrin, including regulation of genes encoding proteins such as plasminogen activator inhibitors and matrix metalloproteinases that have important actions on extracellular matrix remodelling. These actions are, at least in part, effected by paracrine signalling pathways and make important contributions to maintaining functional integrity of the gastric epithelium. Recent studies also provide support for the idea that gastrin, in concert with other hormones, could potentially contribute a post-prandial incretin effect. We also review recent developments in the biology of other gastrin gene products, including the precursor progastrin, which causes proliferation of the colonic epithelium and in certain circumstances may induce cancer formation. Glycine-extended biosynthetic processing intermediates also have proliferative effects in colonic mucosa and in some oesophageal cancer cell lines. Whether these additional gene products exert their effects through the CCK2 receptor or a separate entity is currently a matter of debate.