

Maintenance of the pH gradient in the gastric mucus layer

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The gastric mucus is a complex gel-like layer of various proteins and solutes coating the epithelial surface of the stomach. This layer is widely recognized to serve a protective function, shielding the epithelium and the rest of the gastric mucosa from the extremely low pH and digestive enzymes present in the stomach lumen. Often described as a “diffusion barrier” the mucus layer is thought to hinder the transport of diffusive species from the lumen, to the stomach wall. However, there is still a lack of consensus on the mechanism by which the mucus layer hinders lumen-to-wall transport while allowing acid and enzymes secreted from the mucosa unimpeded transport to the lumen. Using a model of two-phase fluid motion coupled with electro-diffusion, we test one hypothesis. Furthermore, we explore what regulatory mechanisms are necessary to segregate an acidic stomach lumen from a pH neutral stomach wall.