The digestive tract is exposed to a large variety of chemical and physical stimuli from the external world in the form of ingested materials that represent a rich and varied environment. The brain receives information from this enclosed environment via afferent pathways. However, while the brain receives strong and definite sensory input from the external environment, it normally receives similar strong and definite inputs only from the two ends of the digestive tract. What goes on in the rest of the digestive tract is detected by the brain only via visceral afferent, mechanoreceptor, and chemoreceptor pathways. Such afferent traffic seldom reaches a level of awareness (left side of fig 1). Similarly, the control that the brain exerts on the digestive tract, via autonomic efferent pathways, occurs well below the aware intentionality. The influence of the digestive tract on the brain and that of the brain on the digestive tract are no less important simply because they operate at the unconscious level. A great part of the control of the digestive tract occurs in an even more autonomous fashion within the enteric circuits and with the involvement of intestinospinal or brain stem circuits. Thus under normal conditions, the sensory-motor operations that ensure the appropriate progression of contents along the digestive tract occur with little or no awareness. The complex interaction between the muscular apparatus and the enteric nervous system may be regarded as a form of particular locomotion in which the contents act as the medium and the muscular wall the propulsive mechanism.

As insults from the luminal environment by inflammatory agents, infections, and toxins may occur, the level of signalling that activates both local and central pathways increases (right side of fig 1). Just as complex escape and repairing mechanisms have evolved to enable animals to protect themselves from unfriendly environments, the intestine may have evolved equivalent mechanisms. The balance between the mechanisms that ensure the appropriate extraction of energy source from food and avoidance of harmful insults is probably continuously challenged. Thus the line that separates physiological states from pathophysiological ones is not sharp and many of the functional disturbances of the digestive tract are likely to represent maladaptive responses to these challenges.

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Figure 1 Physiopathology of the digestive tract.