The protein composition of endogenous losses in the human gut.

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Warren Miner-Williams

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Abstract

During the digestion of food there is a significant amount of endogenous proteinaceous material secreted into the gut. A dynamic equilibrium exists in the gastrointestinal tract (GIT) between dietary protein intake and the secretion of endogenous proteinaceous material into the lumen with the concomitant absorption from the gut of digested materials, both exogenous and endogenous in origin. There have been no systematic studies of the protein composition (i.e. sources of protein) of ileal digesta in humans. The objectives of this study were to quantify the endogenous protein components of ileal digesta collected from the terminal ileum of both humans and pigs (the growing pig was used as an animal model for the adult human).

Preliminary work was undertaken to ascertain the best methods for quantifying mucin and bacterial protein in digesta from the terminal ileum. Preferred methods for the determination of mucin utilised the markers N-acetylglucosamine and N-acetylgalactosamine, and diaminopimelic acid as a marker for bacterial protein.

Of the total nitrogen lost at the terminal ileum of pigs fed a casein-based diet nearly 73% was proteinaceous; nearly 45% originated from bacteria, 13% from soluble free protein and 11% from mucin. Of the non-protein nitrogen 11% was ammonia and 5% urea. Only 8.3% of the total nitrogen remained unidentified. Mucin was the single most abundant truly endogenous component (13% of total dry matter). In humans fed the same casein-based diet 86% of total nitrogen at the terminal ileum was proteinaceous; nearly 60% originated from bacterial protein, 15% from mucin and 6% from soluble free protein. Of the non-protein nitrogen 5% was ammonia and 4% urea. Only 4% of the total nitrogen remained unidentified. Once again mucin was the single most abundant truly endogenous component (13% of total dry matter). In a final study the ileal endogenous protein components were determined in human subjects given three isonitrogenous diets, which differed only in the form that nitrogen was supplied. In comparison with a synthetic amino acid based-diet casein and enzyme hydrolysed casein increased endogenous nitrogen losses, including both the concentration and flow of mucin in the terminal ileal digesta. The form of dietary protein did not affect the proportion of bacterial protein in the ileal effluent.

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"To see is to see a better way; to perceive any problem clearly is to begin to create its solution. All we need is the wisdom and patience to keep looking."

Laurence Boldt.

"If I can see at all it is because I have stood on the shoulders of giants."

Warren Miner-Williams.

An adaptation of a remark made by Isaac Newton in a letter to Robert Hooke February 5, 1676.

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