Supplemental Figure S1: Effects of glutamine on proteasome activities in human duodenal mucosa.
Proteasome activities in the duodenal mucosa of healthy volunteers. Activities was evaluated after 5 h of enteral maltodextrins alone (Control) or with glutamine (Gln) supplementation, n=12. Values are medians and interquartile ranges.
Supplemental Figure S2: Effects of protein supplement on proteasome activities in human duodenal mucosa.

Proteasome activities in the duodenal mucosa of healthy volunteers. Activities was evaluated after 5 h of enteral maltodextrins alone (Control) or with protein (PP) supplementation, n=12. Values are medians and interquartile ranges. P values were derived by using Wilcoxon’s test. * P < 0.05 vs control.
Supplemental Figure S3: Correlation between plasma insulin or amino acids concentrations and duodenal protein synthesis using data obtained after maltodextrin delivery in the group II.

Plasma concentrations of Insulin (A), Total amino acids (B), Essential amino acids (C) and non essential amino acids (D) were correlated to duodenal protein fractional synthesis rate of healthy volunteers after 5 h of enteral maltodextrins alone (n=12, group II, closed triangles) or with glutamine (n=12, Gln, open triangles) or proteins (n=12, PP, open circles). Data for maltodextrins alone and for proteins were obtained in the same subjects (group II). Statistical analyses were assessed using non parametric Spearman correlation. EAA: essential amino acids. FSR: fractional synthesis rate. NEAA: non essential amino acids. ns: not significant.
Supplemental Figure S4: Effects of protein supplementation on markers of cell proliferation or differentiation in duodenal mucosa.

Representative results of p-p27, c-myc, iFABP and GAPDH immunoblots (A), densitometric analysis of p-p27 (B) and cyclin D1 mRNA level (C) in the duodenal mucosa of healthy subjects after 5 h of enteral maltodextrins alone (control) or with protein (PP) supplementation. n=12. Values are medians and interquartile ranges. P values were derived by using Wilcoxon’s test. * P < 0.05 vs control.
Supplemental Figure S5: Schematic representation of the effects of glutamine or amino acids on duodenal protein synthesis according to the feeding state

During fasting, low plasma insulin level is associated with an increase of whole body proteolysis that supplies essential amino acids (EAA). In this condition, glutamine or non-essential amino acids (NEAA) may be able to stimulate protein synthesis by providing energy as previously reported (1).

In a fed state, plasma insulin is increased and contributes to inhibit whole body proteolysis and thus EAA availability. In this condition, glutamine might be not able to increase protein synthesis because EAA may be the limiting factor. In contrast, protein delivery provides large amount of EAA and may stimulate protein synthesis.