

ラット門脈カテーテル留置法におけるタンパク質消化吸収機能 評価モデルの開発

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Development of evaluation model for protein digestion and absorption using rat portal vein catheterization

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Abstract

We attempted to develop an evaluation model for protein digestion and absorption using the rat portal vein catheter placement method. Sodium caseinate solution was continuously administered from a gastric catheter in rats into which catheters were placed in the stomach and portal vein, and the digestive absorption of protein was measured based on the time course of changes in amino acid concentrations in the portal vein as an index. When 5% sodium caseinate solution was continuously administered (11.25 mL/kg/h) from the gastric catheter using a peristaltic pump, the portal blood concentrations of eight amino acids (glutamine, tyrosine, methionine, tryptophan, valine, phenylalanine, isoleucine and leucine) increased with time. Significant increases were observed for these eight amino acids when compared with pre-administration values (0 minutes) up to 180 minutes after administration. Therefore, the state of protein digestion and absorption can be observed using portal blood amino acid concentrations as indicators.

Green tea is reported to suppress protein absorption, and it was therefore investigated whether this inhibitory action could be confirmed using this experimental model. A single administration of a 20% green tea extract (7.2 mL/kg) and continuously administered 5% sodium caseinate solution to rats resulted in a significant inhibitory effect in the portal blood concentrations of these eight amino acids.

These results confirm that the rat portal vein catheter placement method is useful as an experimental model for evaluating the digestion and absorption of proteins.

Keywords : タンパク質、消化吸収、評価、ラット
protein, digestive absorption, evaluation, rat

I 緒論

我が国は、世界の中でもトップクラスの長寿国であるが、近年では平均寿命よりも健康寿命、すなわち認知症や寝たきりにならずに基本的な諸動作の自立が維持されている状態で生活できる年数が注目されている。このような現状において、人々の健康への関心は高まり、それに伴い食品の三次機

能である生体調節機能を目的とした特定保健用食品や栄養機能食品などの健康食品市場が大きくなっている。健康食品を開発する上で大切なことは、その商品の有効性や安全性に関する科学的根拠の有無である。食品成分の機能性の評価に関しては、動物実験において糖質、脂質およびミネラルなどの消化吸収に与える影響の評価についての報告は数多くあるが¹⁻³⁾、その一方、タンパク質の消化吸収の評価をしている