

(様式1)

公益社団法人日本栄養・食糧学会 研究業績

<学 会 賞>

1. 候補者

研究題目：(和)	消化管で作用する疾病予防成分に関する栄養学的研究		
(英)	Nutritional studies on protective food factors against diseases through the effects in intestine		
氏 名：	加藤 範久		
(和)			
(英)	Kato Norihisa		
所属機関：(和)	広島大学大学院生物圏科学研究科・教授		
(英)	Hiroshima University, Graduate School of Biosphere Science, Professor		
学 位：	農学博士 (昭和55年6月)	最 終 学 歴：	昭和54年3月 名古屋大学農学研究科 博士課程後期単位取得退学
専門分野	①栄養生理学、②栄養生化学、③分子栄養学、④公衆栄養学、⑤臨床・病態 栄養学、⑥食生態学、⑦調理科学、⑧食品化学・食品分析学、⑨食品機能学 ⑩食品工学、⑪食品加工・流通・貯蔵学、⑫食品衛生・安全学、⑬生理学、 ⑭生化学、⑮分子生物学、⑯臨床医学（内科系）、⑰臨床医学（外科系） ⑱その他		
履 歴	昭和56年4月広島大学生物生産学部助教授、平成13年4月広島大学生物生 産学部教授、平成14年4月広島大学大学院生物圏科学研究科教授		
会員番号：	0095023208	入 会 年 度：	昭和50年

2. 研究業績要旨 (1,000 字以内)

候補者は、消化管内の栄養素や食品成分のユニークな挙動に着目して、それらの疾病予防作用について研究を行ってきた。その中で特に、以下に示すレジスタントプロテインの研究、及びビタミン B6 の大腸がん発現抑制作用の発見は新たな研究領域の端緒となった。

そばタンパク質が他の植物性タンパク質よりも遥かに強力なコレステロール低下作用を示すことを見出した。その機構解析の過程で、そばタンパク質の消化抵抗性がその作用の鍵となっていることを示し、「レジスタントプロテイン」という概念を世界に先駆けて導入した (1997 年)。消化が低いことが健康にプラスになるという新しい考え方である。この着想をもとに、そばタンパク質の大腸がん発現抑制作用、乳がん発現抑制作用、肥満抑制作用、コレステロール胆石形成抑制作用などを見出し、いずれも大豆タンパク質を大きく上回る作用であった。この概念を発展させるため高純度に精製した絹タンパク質セリシンをレジスタントプロテインのモデルとして研究を行ったところ、極めて強力な大腸がん抑制作用やインシュリン抵抗性改善作用、アディポネクチン増加作用、血中脂質低下作用、便秘改善作用、腸内発酵促進作用、腸管免疫改善作用など数多くの有用作用が見出された。

2001 年に候補者は、ビタミン B6 のマウス大腸がん発現抑制作用を世界に先駆けて見出した。この発見をもとに、我国を含む世界各国で数多くの疫学的研究が行われ、今日、このビタミンが大腸がんの代表的予防因子であるとされている。ビタミン B6 の抗腫瘍作用の機構として、細胞増殖や炎症、酸化ストレス、血管新生などの抑制機構を示唆した。これらの抑制機構の共通の分子基盤として抗腫瘍の分子標的である PPAR γ の活性化が関与することも提示した。ビタミン B6 の抗腫瘍作用は、特に大腸で顕著に見られる。その理由として、消化管のビタミン B6 濃度が食餌ビタミン B6 量に強く依存するためであることを示した。

ビタミン B6 は大腸の腸内細菌によって生合成され、体内のビタミン B6 栄養に一部寄与している。候補者は、セリシンや難消化性オリゴ糖の摂取が腸内細菌によるビタミン B6 産生を亢進させて、大腸のビタミン B6 栄養の改善と疾病予防に寄与することを明らかにした。

3. 報文等リスト

(1) この研究に直接関連するもの (10 編以内)

- 1) Okazaki Y, Tomotake H, Tsujimoto K, Sasaki M, Kato N. Consumption of a resistant protein, sericin elevates fecal immunoglobulin A, mucin, and cecal organic acids in rats fed a high-fat diet. *J. Nutr.* 141, 1975-1981 (2011).
- 2) Yanaka N, Ohata T, Toya K, Kanda M, Hirata A, Kato N. Vitamin B6 suppresses serine protease inhibitor 3 expression in the colon of rats and in TNF- α -stimulated HT-29 cells. *Mol. Nutr. Food Res.* 55, 635-643 (2011).
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- 10) Kayashita J, Shimaoka I, Nakajoh M, Yamazaki M, Kato N. Consumption of buckwheat protein lowers plasma cholesterol and raises fecal neutral sterols in cholesterol-fed rats because of its low digestibility. *J. Nutr.* 127, 1395-1400 (1997).

(2) その他の論文 (編数制限なし)

i) この研究に関連する論文

- 11) Kayashita T, Tanaka K, Okazaki Y, Matsubara K, Yanaka N, Kato N. Consumption of vitamin B6 reduces colonic damage and protein expression of HSP70 and HO-1 in rats exposed to 1,2-dimethylhydrazine. *Oncol. Lett.* 2, 1243-1246 (2011).
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- 14) 加藤範久. II. 3. ビタミン B6. 新しい機能- 疾病との関係. *ビタミン総合事典*. ビタミン学会編集. 朝倉書店 pp235-237 (2010).

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ii) この研究に直接は関連しない論文

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(3) 過去5年間の本学会での活動状況

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