

(様式1)

社団法人日本栄養・食糧学会 候補者研究業績

<学 会 賞>

1. 候補者

研究題目:(和)	非栄養素ポリフェノールの探索研究と生理機能解析		
(英)	Investigations of phytochemicals, polyphenols and its physiological functions		
氏 名:(和)	五十嵐 喜治		
(英)	Kiharu Igarashi		
所属機関:(和)	山形大学農学部教授		
(英)	Faculty of Agriculture, Yamagata University		
学 位:	農学博士(東京大学)	最終学歴:	昭和 44 年、山形大学農学部卒業
会員番号:	009-602-0130	入会年度:	昭和 51 年

2. 研究業績要旨(1,000 字以内)

食品・食品素材・未利用緑葉資源に含まれるポリフェノールの栄養学・食品学上での意義を明らかにするため、その探索とその生理機能の解明を行ない、主として以下のような知見を得た。

緑茶カテキン類の化学構造と生理機能との関連について体内産生ラジカルが原因となる肝障害誘発ラットを用いて比較検討し、エピガロカテキンガレートの肝障害予防機能が最も強く、続いてエピカテキンガレート、エピガロカテキンが強く、エピカテキンではほとんど効果のないことを明らかにした。また、カテキン類の抗糖尿病効果についてもその作用機構を含めて明らかにし、カテキン類が体内酸化の亢進の抑制を通して糖尿病の亢進に予防的に作用することを明らかにした。また、地域在来作物などに含まれるフラボノイドを取り上げ、その体内酸化ストレス制御についても古くから取り組み、イソラムネチンの肝障害予防機能を明らかにするとともに、その血中への移行を明らかにした。その後、配糖体の構造と肝障害予防機能との関連にもついても食品素材から単離した各種フラボノイドを用いて検討し、イソラムネチン配糖体では、3 位の配糖体では障害予防効果を示すが、3.7 位の配糖体では効果が消失することなどを明らかにし、体内利用に有効なフラボノイドの化学構造の提示などを行なった。また、ルテオリンやアピゲニンとその配糖体、マロニル体の体内酸化制御と構造との関連などについても検討し、各種フラボノイドの構造と機能との関連を詳細に検討した。また、血中コレステロール低下作用とフラボノイドの化学構造との関連についても検討を行い、タキシフォリン、アスチルビン、アンペロプシンなどのフラバノール類もその効果を有することを示した。

一方、ポリフェノールの一つ、アントシアニン類の化学構造と抗酸化・ラジカル消去機能との関連についても *in vitro* で明らかにするとともに、その体内機能についても実験動物による検討を行ない、そのいくつかには血清コレステロール低下作用、酸化ストレス抑制、耐糖能改善などの抗糖尿病効果作用などを有することを示し、アントシアニン生理機能研究の端緒の一つを築いた。また、生理機能を有するポリフェノールの食品素材からの高い・容易な摂取をめざして、その植物体内での濃縮と環境因子との関連についても検討を行ない、光、水分ストレスが濃縮の要因の一つとなることを示した。

### 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)

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(2) その他の論文(編数制限なし)

1) Sugawara, T. and Igarashi, K.: Identification of the major flavonoids in petals of edible chrysanthemum flowers and their suppressive effect on carbon tetrachloride-Induced liver injury in mice. *Food Sci. Technol. Res.*, 15(5), (2009). in press

2) O.Yoshinari, H. Sato, and K. Igarashi: Anti-diabetic effects of pumpkin and its components, trigonelline and nicotinic acid on Goto-Kakizaki rats. *Biosci. Biotechnol. Biochem.*, 73(5), 1031-1041 (2009)

3) 菅原哲也, 五十嵐喜治: オウトウのアントシアニンおよびルチン含有量と品種間差異, *日本食品科学工学会誌*, 55(5), 239-244(2008).

\*4) A. Takenaka, A. Kita, M. Ikeya, H. Arai, and K. Igarashi: Galactosamine-induced acute liver injury in rats reduces hepatic  $\alpha$ -tocopherol transfer protein production. *J Nutr. Sci. Vitaminol.*, 53, 366-371 (2007).

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(3) 過去 5 年間の本学会での活動状況

平成 16 年～現在 本部評議員・参与

平成 16 年～現在 支評議員

支部大会の座長など

(4) 特記事項

平成 12～15 年 東北支部長、理事