

(様式1)

公益社団法人日本栄養・食糧学会 候補者研究業績

<学 会 賞>

1. 候補者

研究題目:(和)	緑茶ポリフェノールの生体調節作用に関する分子栄養学的研究		
(英)	Molecular nutritional studies on mechanism for green tea polyphenols sensing		
氏 名:(和)	立花宏文	生年月日:	
(英)	Hirofumi Tachibana		
所属機関:(和)	九州大学大学院農学研究院 主幹教授		
(英)	Distinguished Professor, Department of Bioscience and Biotechnology, Faculty of Agriculture, Kyushu University		
学 位:	博士(農学)	最終学歴:	平成3年5月九州大学大学院農学研究科食糧化学工学専攻博士課程退学
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	平成3年6月 九州大学大学院農学研究科助手 平成6年7月 九州大学大学院農学研究科講師 平成8年12月 九州大学農学部助教授 平成19年4月 九州大学大学院農学研究院准教授 平成24年4月 九州大学大学院農学研究院教授 平成24年5月 九州大学大学院農学研究院主幹教授 平成24年10月 九州大学食品機能デザイン研究センター長 平成26年4月 日本学術振興会学術システム研究センター研究員 現在に至る		
会員番号:		入会年度:	1997年度

## 2. 研究業績要旨(1,000字以内)

緑茶やその主要な成分であるエピガロカテキンガレート (EGCG) の多彩な生体調節作用に関する研究が世界中で盛んに行われ、その生理作用を活用した機能性食品が数多く開発されている。また、EGCG を主成分とする緑茶抽出物の抗がん作用が臨床試験において認められ医薬への応用も期待されている。一方、EGCG がなぜ多彩な生体調節作用を示すのか、その本質的なしくみの解明が待たれていた。こうした中、候補者は EGCG の生体内における抗がん作用の発現に必須な細胞膜受容体分子として 67-kDa ラミニンレセプター (67LR) を世界に先駆けて発見することに成功した。緑茶カテキン EGCG 受容体の発見は、本成果の掲載誌 *Nat. Struc. Mol. Biol.* 誌の表紙ならびに *Nature* 誌、*Nat. Rev. Cancer* 誌において重要な発見としてハイライトされた。その後今日までに、EGCG の抗アレルギー作用、炎症抑制作用、脂質代謝調節作用などの発現に 67LR が関与していることを明らかにしている。また、候補者は受容体 67LR を起点とする EGCG の生理作用発現の分子メカニズムの解明に挑み、EGCG は 67LR/Akt/内皮型 NO 合成酵素/可溶性グアニル酸シクラーゼ経路の活性化を介して cGMP の産生を誘導すること、また、産生された cGMP が様々な酵素や転写因子の活性を調節することで EGCG の多彩な生理作用の発現に重要な役割を担っていることを明らかにした。

EGCG 受容体 67LR の発見は、抗アレルギー茶成分として見出したメチル化カテキンの活性発現メカニズム解明の突破口となり、メチル化カテキンを関与成分とする機能性表示食品「べにふうき緑茶」の開発に繋がった。また、アレルギーの原因因子の一つである IgE 産生を抑制する食品因子として緑茶ポリフェノールの一種ストリクチニンを発見するとともに、その標的分子として IL-4 受容体  $\alpha$  鎖の同定に成功した。一方、EGCG の 67LR 依存的な生理作用発現メカニズムの研究を発展させ、ビタミン A、フラバノン類、飽和脂肪酸などの食品因子が 67LR からのシグナル伝達経路に作用することで EGCG の抗がん作用やメタボリックシンドローム予防作用などの生理作用を調節することを見出した。こうした研究成果は食品因子の機能的相互作用の分子栄養学的基盤の解明につながるものと期待される。

### 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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(3) 過去 5 年間の本学会での活動状況

代議員 (平成26年度～)

## 【大会・支部会でのシンポジスト、座長等】

平成30年度

- ・ 北海道・東北支部合同支部大会公開シンポジウム「食品成分および栄養素センシングと生体応答」シンポジスト

平成29年度

- ・ 第71回大会実行委員
- ・ 第71回大会シンポジウム「日本食の機能性を科学する」オーガナイザー、座長ならびにシンポジスト
- ・ 九州・沖縄支部および日本食品科学工学会西日本支部合同大会公開市民フォーラム「日本食と健康寿命」シンポジスト

平成28年度

- ・ 第70回大会シンポジウム「非栄養素の分子栄養学」シンポジスト
- ・ 第70回中部支部大会公開シンポジウム「食品機能学研究の最先端- 食品成分による疾病予防-」シンポジスト
- ・ 第34回日本骨代謝学会との合同シンポジウム「抗ロコモのためのニュートリジェネティクスの解析と栄養・食糧科学の最前線」シンポジスト

平成27年度

- ・ 第69回大会/第12回アジア栄養学会議シンポジウム「Physiological Functions of Food Factors-Return to Mechanistic Approach-」シンポジスト

平成26年度

- ・ 第68回大会シンポジウム「植物性ポリフェノール研究の最前線」オーガナイザー、座長ならびにシンポジスト

平成25年度

- ・ 第67回大会シンポジウム「食品非栄養成分の吸収・体内動態と生理作用の発現」シンポジスト
- ・ 九州・沖縄支部および日本食品科学工学会西日本支部合同大会公開市民フォーラム「食の安全と健康を考える」シンポジスト

一般講演座長：第67回大会、第70回大会

### (4) 特記事項

- 1) 平成30年 飯島藤十郎食品科学賞  
「緑茶カテキンによる生理活性発現メカニズムに関する研究」  
飯島藤十郎記念食品科学振興財団（受賞者：立花宏文）
- 2) 平成29年 文部科学大臣表彰 科学技術賞（研究部門）  
「緑茶成分の生理作用の分子基盤に関する研究」  
文部科学省（受賞者：立花宏文）
- 3) 平成29年 安藤百福賞優秀賞  
「緑茶カテキン受容体の基礎研究」  
安藤スポーツ・食文化振興財団（受賞者：立花宏文）
- 4) 平成28年 食品免疫産業賞  
「緑茶の抗アレルギー成分を特定し、その作用機構を解明して応用開発につなげる成果を挙げたことに対して」  
日本食品免疫学会（受賞者：山本（前田）万里、立花宏文、鈴木紳一郎、酒瀬川洋児）
- 5) 平成28年 農芸化学技術賞  
「健康機能を有する緑茶「べにふうき」の効果、作用機序、茶葉特性の解明ならびに飲食品の開発」  
日本農芸化学会（受賞者：山本（前田）万里、立花宏文、酒瀬川洋児、岡本武久）

- 6) 平成 22 年 日本食品免疫学会賞  
「食品免疫学の基礎および応用分野において顕著な成果をあげたことに対して」  
日本食品免疫学会（受賞者：立花宏文）
- 7) 平成 18 年 日本学術振興会賞  
「茶葉成分の生理作用の分子機構に関する研究」  
日本学術振興会（受賞者：立花宏文）
- 8) 平成 16 年 日本農学進歩賞  
「機能性食品成分の分子標的の同定とその作用機構に関する研究」  
農学会（受賞者：立花宏文）

指導学生の日本栄養・食糧学会学生優秀発表賞受賞

平成 29 年度

「緑茶カテキン EGCG のメラノーマ幹細胞形質阻害作用に関与する遺伝子の同定」

平成 28 年度

「エクオール関節リウマチ抑制作用に関与するマイクロ RNA」