

(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)	肥満と脂肪・エネルギー代謝に関する食品機能学的研究		
(英)	Studies on obesity, fat energy metabolism and food functions		
氏 名:(和)	河田 照雄		
(英)	Teruo Kawada		
所属機関:(和)	京都大学大学院 農学研究科 食品生物科学専攻 教授		
(英)	Professor, Division of Food Science and Biotechnology, Graduate School of Agriculture, Kyoto University		
学 位:	農学博士	最終学歴:	昭和 58 (1983) 年 3 月, 京都大学大学院農学研究科食品工学専攻博士課程単位取得認定退学
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 58 年 (1983) 4 月 日本学術振興会 奨励研究員 昭和 59 年 (1984) 11 月 京都大学農学部 助手 平成 6 年 (1994) 6 月 京都大学農学部 助教授 平成 9 年 (1997) 4 月 京都大学大学院農学研究科 助教授 平成 16 年 (2004) 7 月 京都大学大学院農学研究科 教授 平成 23 年 (2011) 4 月 京都大学学際融合教育研究推進センター 生理化学研究ユニット 教授 (兼任) 現在に至る		
会員番号:	99027745	入会年度:	1983

2. 研究業績要旨(1,000字以内)

研究業績は下記の3項目に要約される。

1. 白色脂肪組織の発達と機能制御に関する研究 (論文番号 3, 4, 6, 7)

肥満は白色脂肪細胞の過剰な発達によるインスリン抵抗性などの惹起が問題となる。白色脂肪細胞の分化および機能調節のマスターレギュレーターである核内受容体(ペルオキシソーム増殖剤応答性受容体: PPAR γ)に焦点を当て、それに関わる内因性および外因性因子を探索した。その結果、内因性因子としてイソプレノイド合成経路のファルネシルピロリン酸を見出し、脂肪細胞内で生成され、分化を促進するとともに細胞機能を改善することを示した。また、外因性因子として、多数の食品由来成分を同定し、血糖値の低下作用などを発揮することを示した。さらに、食品成分により肥満状態での炎症反応を抑制することにより、肥満から発生する高血糖および脂質異常症が改善することなども明らかにした。

2. 脂肪・エネルギー代謝の食品機能学的応用に関する研究 (論文番号 1, 2, 5, 8)

生体での主要な脂肪代謝臓器である肝臓に着目し、そこでの脂肪酸酸化系や脂肪酸合成系に関する食品成分を探索した。その結果、 β 酸化系遺伝子発現を制御する PPAR α のリガンドとなるものや脂肪酸合成系遺伝子を制御する肝臓 X 受容体 (LXR) α のアンタゴニストとなるものなどを見出し、今後の食品開発への応用展開が期待されている。さらに、ヒトエネルギー消費器官として最近重要な位置づけとなっている、褐色脂肪細胞についても長年研究を行ってきた。その結果、香辛料辛味成分や甘味料などの食品成分が、交感神経活動などを介して褐色脂肪の増殖や機能を亢進すること、またそれらは肥満に伴う糖・脂質代謝の改善をもたらすことなどを明らかにした。

3. 香辛料辛味成分の脂質代謝に及ぼす影響に関する研究 (論文番号 9, 10)

トウガラシ辛味成分の体内動態についてラットを用いて詳細に検討を行った。その結果、辛味成分は腸管で速やかに吸収され、代謝・抱合化された後、尿中に排泄されることを明らかにした。さらに、高脂肪食負荷ラットを用いて辛味成分の脂質代謝への影響を検討したところ、体脂肪の蓄積抑制作用を見出すとともに、その作用機序として、辛味成分が交感神経-副腎-アドレナリン分泌系を活性化し、エネルギー代謝の亢進をもたらすものであることを明らかにした。現在、この抗肥満効果の原理は他の食品成分にも応用され、機能性食品開発の一翼を担っている。

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)

1. Kim YI, Hirai S, Goto T, Ohyane C, Takahashi H, Tsugane T, Konishi C, Fujii T, Inai S, Iijima Y, Aoki K, Shibata D, Takahashi N, **Kawada T**. Potent PPAR α Activator Derived from Tomato Juice, 13-oxo-9,11-Octadecadienoic Acid, Decreases Plasma and Hepatic Triglyceride in Obese Diabetic Mice. *PLoS One*, **7**, e31317 (2012).
2. Lee JY, Takahashi N, Yasubuchi M, Kim YI, Hashizaki H, Kim MJ, Sakamoto T, Goto T, **Kawada T**. Triiodothyronine Induces UCP1 Expression and Mitochondrial Biogenesis in Human Adipocytes. *Am J Physiol Cell Physiol*, **302**, C463-C472 (2012).
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9. **Kawada T**, Watanabe T, Takaishi T, Tanaka T, Iwai K. Capsaicin-induced beta-adrenergic action on energy metabolism in rats: influence of capsaicin on oxygen consumption, the respiratory quotient, and substrate utilization. *Proc Soc Exp Biol Med*, **183**, 250-256 (1986).
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(2) その他の論文(編数制限なし)

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<主な総説>

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(3) 過去5年間の本学会での活動状況

<学会役員等>

平成 17(2005)年度	～現在	JNSV 誌エキスパートエディター
平成 20(2008)年度	～平成 21(2009)年度	理事／参与／学会活動強化委員会委員
平成 22(2010)年度	～平成 23(2011)年度 8月	評議員
平成 23(2011)年度 9月	～現在	代議員
平成 24(2012)年度	～現在	日本栄養・食糧学会誌編集委員／ 国際交流委員会委員

<学会シンポジウム・座長関係>

平成 20(2008)年度	第 62 回日本栄養・食糧学会大会 シンポジウム「栄養食糧学の新たな展開」 講師「メタボリックシンドロームの発生機構と予防」／ 一般講演座長
平成 21(2009)年度	第 48 回近畿支部大会 一般講演座長
平成 22(2010)年度	第 64 回日本栄養・食糧学会大会 一般講演座長
平成 23(2011)年度	第 65 回日本栄養・食糧学会大会 シンポジウム「肥満の基礎と臨床への展開」座長 第 50 回近畿支部大会 シンポジウム「生体機能情報としての栄養素」座長 第 2 回栄養学を志す若手のためのフォーラム 講師「肥満・メタボリック症候群の基盤研究」

(4) 特記事項

<学会受賞暦>

平成 3(1991)年度	日本栄養・食糧学会奨励賞受賞 「香辛料辛味成分の機能に関する栄養生化学的研究」
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