

(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.

研究題目：(和)	健康寿命延伸に資する食品成分の新たな機能性に関する基礎研究		
(英)	Fundamental research on the novel functionalities of food ingredients that contribute to extending healthy life expectancy		
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所属機関：(和)	東北大学 大学院農学研究科 食品天然物化学講座 栄養学分野 教授		
(英)	Professor, Laboratory of Nutrition, Department of Food and Natural Product Science, Graduate School of Agricultural Science, Tohoku University		
学 位：	博士(農学)	最終学歴：	東北大学大学院農学研究科博士前期課程修了(1988年3月)
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	東京理科大学助手(1988年4月～1997年9月)、米国国立健康研究所博士研究員(1997年10月～1999年9月)、東北大学助手(1999年9月～2003年3月)、東北大学助教授(2003年4月～2007年3月)、東北大学准教授(2007年4月～2019年3月)、東北大学大学院農学研究科教授(2019年4月～現在)		
		入会年度：	2003年度

2. 研究業績要旨(1,000 字以内)

本候補者は、健康寿命の延伸に寄与する食品成分の新たな機能性について解析を行い、次に示す成果をあげた。

1) ビタミン K は血液凝固因子や骨タンパク質の活性化において必須の因子である。この作用以外のビタミン K の機能について検索を行い、細胞内シグナル分子を修飾(転写因子 NF- κ B の活性化抑制、アデニル酸シクラーゼの活性化、核内受容体 PXR の活性化)することによる、抗炎症、テストステロン産生増強、インスリン分泌増強、PXR を介した胆汁酸合成遺伝子の発現調節といった新たな作用を有することを明らかにした。(報文リスト 1,4,5,8)

2) ビオチンは4種のカルボキシラーゼの補酵素として働き、糖、アミノ酸、脂肪酸代謝に関わっているが、新たなビオチンの作用として、グアニル酸シクラーゼの活性化を介した高血圧症改善作用、核内受容体 HNF4 α の発現制御による糖新生律速酵素の発現調節(抗糖尿病作用)、アデニル酸シクラーゼの活性化によるテストステロン産生増強作用を明らかにした。(報文リスト 2, 9)

3) 余剰の米糠、特に脱脂米糠の再資源化と高度利用を目的に、糖質分解酵素による処理、または麹菌と乳酸菌による多段階発酵によって加工した脱脂米糠を開発して、これらによる血圧低下、インスリン抵抗性改善、潰瘍性大腸炎の発症抑制、抗ロコモティブシンドローム効果を疾病モデル動物で明らかにして、脱脂米糠の利用拡大に繋がる成果を示した。さらに、それらに含まれる活性成分の分離・同定を行い、アデノシン、トリプトファンやその代謝物の健康機能性を明らかにした。特に、トリプトファンの微生物代謝物であるトリプタミンが転写因子 AHR を活性化して抗炎症作用を示すことを、*Ahr* 欠損マウスを用いて明確にした。(報文リスト 3,6,7,10)

4) ビタミン K₂ の側鎖類縁体であり、アナトー色素や米糠油に含まれるゲラニルゲラニオール(GGOH)が抗炎症作用を持つこと、さらにこの作用が NF- κ B 活性化経路上流の TRAF6、IRAK1 のタンパク質発現の抑制によることを明らかにした。また、GGOH、黒ウコン抽出物中のポリメトキシフラボノイド、ネギ属野菜に含まれる含硫化合物によるテストステロン産生増強作用を解析し、これらの食品成分による男性更年期障害の予防・改善効果の作用点を明確にした。

以上の成果は、栄養素や食品成分が生活習慣病の予防と改善を通じて、健康寿命の延伸に貢献する可能性を示すものであり、栄養学・食品科学の領域に重要な知見をもたらした。

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) 大崎雄介、白川仁 ビタミンKとビタミンK 関連物質による抗炎症作用とその機序 日本栄養・食糧学会誌 77, 103-108, 2024.
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(3) 過去 5 年間の本学会での活動状況

学会役員

- ・理事(2022 年度～現在)
- ・代議員(2021 年度～2023 年度)
- ・参与(2007 年度～現在)

各種委員

- ・学会活動強化委員会 委員長(2022 年度～現在)
- ・ダイバーシティ推進委員会 委員(2024 年度～現在)
- ・日本栄養・食糧学会誌編集委員会 委員(2022 年度～2023 年度)
- ・用語委員会 委員(2022 年度～2023 年度)
- ・学会創立 75 周年記念誌刊行委員会 委員(2022 年～2023 年)

支部役員

- ・東北支部支部長(2022 年度～現在)
- ・第 74 回日本栄養・食糧学会大会 大会実行委員(2019 年～2020 年)

大会座長

- ・第 74 回大会シンポジウム「脂溶性ビタミン研究の新展開」座長 (2020 年 5 月 16 日)

(4) 特記事項

受賞歴

- ・日本ビタミン学会 2024 年度 学会賞「ビタミン K および関連イソプレノイドのもつ新たな健康機能性に関する研究」
- ・日本農芸化学会東北支部 2004 年度 東北支部奨励賞「ヌクレオソーム結合タンパク質による遺伝子発現調節機構の研究」