（様式1）

社団法人日本栄養・食糧学会　研究業績

# ＜学　会　賞＞

1. 候補者

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|---|---|---|---|
| 研究題目:(和) | 分岐鎖アミノ酸代謝の調節機構に関する研究 | | |
| (英) | Study on regulatory mechanisms of branched-chain amino acid metabolism | | |
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2. 研究業績要旨(1,000 字以内)

分岐鎖アミノ酸（BCAA：ロイシン、イソロイシン、バリン）は、必須アミノ酸であるため、哺乳動物の体内ではその分解系のみが存在する。この分解系（代謝系）は、ほぼ全てミトコンドリアに存在し、最初の２つのステップは３つの BCAA に共通であり、この分解系の大きな特徴を示す反応である。第一ステップは、BCAA アミノ基転移酵素による可逆的なアミノ基転移反応である。第二ステップは、分岐鎖α-ケト酸脱水素酵素（BCKDH）複合体による不可逆的な酸化的脱炭酸反応である。以下に述べる候補者等の研究により、BCKDH 複合体は特異的キナーゼ（BCKDH キナーゼ（BDK））による酵素タンパク質のリン酸化により活性調節されることが明らかにされた。これらの事実より、第二ステップの酵素活性調節が BCAA 代謝を調節するとされている。候補者らは、BCKDH 複合体の活性調節機構に関する初期の研究において、ラット肝臓と心臓より BDK の精製を試みた。その結果、44 kDa の単一のタンパク質が精製され、BDK が同定された。次いで、BDK 遺伝子クローニングにも成功し、これはミトコンドリアのタンパク質キナーゼとして初めてクローニングされた遺伝子であった。さらに、候補者等の BDK の存在状態に関する研究において、BDK が BCKDH 複合体に結合する結合型と結合していない遊離型として存在することが明らかにされ、BCKDH 複合体は BDK の結合型酵素量に依存して活性調節（抑制）されることが明らかにされた。これらの生化学的研究を基礎として、候補者等は種々の栄養状態および生理状態における BCAA 代謝調節機構を明らかにした。すなわち、高タンパク質食摂取、筋収縮活動（運動）は、BCKDH 複合体から BDK を解離してその複合体を活性化し、BCAA 代謝を促進すること、一方、低タンパク質食摂取は逆の機構で BCAA 代謝を抑制することが判明した。この BDK による BCKDH 複合体の活性調節により、BCAA 代謝の臓器特異性、BCAA 代謝に対するホルモン（エストロゲンと甲状腺ホルモン）作用、および疾病（肝硬変と糖尿病）の影響を説明することができた。以上のように、候補者等の BCAA 代謝における BDK の役割の研究により、BCAA 代謝調節機構の多くの部分が明らかにされた。

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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(3) 過去 5 年間の本学会での活動状況

＜学会役員等＞

・ 平成 18 年度ー平成 21 年度　支部選出理事
・ 平成 20 年度ー平成 21 年度　庶務担当理事
・ 平成 18 年度ー平成 21 年度　参与
・ 平成 22 年度ー現在　評議員
・ 平成 16 年度ー現在　JNSV 誌編集委員
・ 平成 22 年度ー現在　日本栄養・食糧学会誌編集委員
・ 平成 22 年度ー現在　新公益法人制度対応 WG 委員
・ 平成 22 年度ー現在　第 12 回アジア栄養会議（2015ACN）組織委員

＜学会大会の座長、シンポジスト＞

・ 平成 18、19、22 年度　学会大会の座長
・ 平成 21 年度　学会大会シンポジウム-4「アミノ酸の新しい機能とこれからの展開」のシンポジスト

(4) 特記事項

平成 13 年度　味の素賞 BCAA 基礎研究賞