学会/受賞報告書

2010 American Association of Pharmaceutical Scientists (AAPS)

Pharmaceutical Research Meritorious Manuscript Award

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(薬物送達学分野)

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2010 AAPS Pharmaceutical Research Meritorious Manuscript Awardは、American Association of Pharmaceutical Scientists (AAPS、米国薬科学者会議)の学会誌であるPharmaceutical Researchにおいて2008年に掲載された285報の中から、high scientific impact, demonstrating new concepts and new experimental proceduresと評価される最も優秀な論文1報に授与されます。今回の受賞は、質量分析装置を用いた蛋白質絶対定量法の開発とその細胞膜輸送担体発現解析への応用が極めて高く評価されたものです。本論文で報告した新しい蛋白質定量手法は、標的絶対蛋白質科学を基盤とした基礎研究から創薬科学や臨床診断などの応用研究など多方面への波及効果が期待されています。また、本GCOEにおいては癌の薬剤感受性に関する蛋白質ネットワークの解析の中心的技術です。今回の受賞は、技術と共にPharmacoproteomicsという新しいコンセプトの学問の始まりを海外においても高く評価していただいた点を大変うれしく感じております。

受賞論文：

Quantitative atlas of membrane transporter proteins: Development and application of a highly sensitive simultaneous LC/MS/MS method combined with novel in-silico peptide selection criteria. Pharm. Res., 25: 1469-1483 (2008).

抄録：

Purpose. To develop an absolute quantification method for membrane proteins, and to construct a quantitative atlas of membrane transporter proteins in the blood–brain barrier, liver and kidney of mouse.

Methods. Mouse tissues were digested with trypsin, and mixed with stable isotope labeled-peptide as a quantitative standard. The amounts of transporter proteins were simultaneously determined by liquid chromatography–tandem mass spectrometer (LC/MS/MS).

Results. The target proteins were digested in-silico, and target peptides for analysis were chosen on the basis of the selection criteria. All of the peptides selected exhibited a detection limit of 10 fmol and linearity over at least two orders of magnitude in the calibration curve for LC/MS/MS analysis. The method was applied to obtain the expression levels of 34 transporters in liver, kidney and blood–brain barrier of mouse. The quantitative values of transporter proteins showed an excellent correlation with the values obtained with existing methods using antibodies or binding molecules.

Conclusion. A sensitive and simultaneous quantification method was developed for membrane proteins. By using this method, we constructed a quantitative atlas of membrane transporter proteins at the blood–brain barrier, liver and kidney in mouse. This technology is expected to have major implications for various fields of biomedical science.