

Author: [ADVANCED](#)

Volume Page

Keyword: [TOP](#) > [Available Issues](#) > [Table of Contents](#) > [Abstract](#)

ONLINE ISSN : 1881-1361

PRINT ISSN : 0287-4547

Dental Materials Journal

Vol. 29 (2010) , No. 4 p.369-373

[\[PDF \(1058K\)\]](#) [\[References\]](#)**Chromatography of carbon nanotubes separated albumin from other serum proteins: a method for direct analysis of their interactions**

[Yoshinori KUBOKI](#)¹⁾, [Takamitsu KOSHIKAWA](#)²⁾, [Hiroko TAKITA](#)²⁾, [Ryuichi FUJISAWA](#)²⁾, [Min-ho LEE](#)³⁾, [Shigeaki ABE](#)²⁾, [Tsukasa AKASAKA](#)²⁾, [Motohiro UO](#)²⁾, [Fumio WATARI](#)²⁾ and [Rachel SAMMONS](#)⁴⁾

1) Emeritus Professor, Hokkaido University

2) Department of Oral Health Science, Graduate School of Dental Medicine, Hokkaido University

3) Department of Dental Biomaterials, School of Dentistry and Institute of Oral Bioscience

4) Department of Biomaterials, School of Dentistry, University of Birmingham

(Received October 15, 2009)

(Accepted March 2, 2010)

Abstract:

Chromatography technology was employed to clarify the mechanism of interaction between multi-wall carbon nanotubes (MWCNT) and proteins. A column (16×100 mm) was packed with purified MWCNT, and various proteins were eluted with phosphate buffered saline (PBS) with and without gradient systems. It was found that albumin in bovine serum was eluted immediately from the column without any adsorption to MWCNT. Conversely, the non-albumin proteins, including a protein of 85 kDa molecular mass and a group of proteins with molecular masses higher than 115 kDa, exhibited considerably high affinity towards MWCNT. A sample of pure bovine serum albumin was also eluted immediately from the column, while lysozyme did not elute as a peak with PBS, but eluted with 0.6 M NaCl. Fundamentally, carbon nanotubes are devoid of any electrical charge. Therefore, other forces including the hydrogen bonds, hydrophilic interactions, and van der Waals forces were most probably responsible for the differential elution behaviors. In conclusion, this chromatographic method provided a simple and direct analysis of the interactions between carbon nanotubes and the various proteins.

Key words:

[Carbon nanotubes](#), [Proteins](#), [Chromatography](#)

[\[PDF \(1058K\)\]](#) [\[References\]](#)

Download Meta of Article [\[Help\]](#)

[RIS](#)

[BibTeX](#)

To cite this article:

Yoshinori KUBOKI, Takamitsu KOSHIKAWA, Hiroko TAKITA, Ryuichi FUJISAWA, Min-ho LEE, Shigeaki ABE, Tsukasa AKASAKA, Motohiro UO, Fumio WATARI and Rachel SAMMONS. Chromatography of carbon nanotubes separated albumin from other serum proteins: a method for direct analysis of their interactions . Dent. Mater. J. 2010; 29: 369-373 .

doi:10.4012/dmj.2009-097

JOI JST.JSTAGE/dmj/2009-097

Copyright (c) 2010 The Japanese Society for Dental Materials and Devices

[View "Advance Publication" version \(July 2, 2010\).](#)



[Japan Science and Technology Information Aggregator, Electronic](#)

