Functional analysis of carbohydrate antigens in chemically induced tumor cells derived from beta-1,4-galactosyltransferase-I knockout mice

2004 Fiscal Year Final Research Report Summary

Functional analysis of carbohydrate antigens in chemically induced tumor cells derived from beta-1,4-galactosyltransferase-I knockout mice

Research Project

Project/Area Number

15500298

Research Category

Grant-in-Aid for Scientific Research (C)

Allocation Type

Single-year Grants

Section

一般

Research Field

Laboratory animal science

Research Institution

Kanazawa University

Principal Investigator

HASHIMOTO Noriyoshi Kanazawa University, Advanced Science Research Center, Associate Professor, 学際科学実験センター, 助教授 (50242524)

Co-Investigator(Kenkyū-buntansha)

ASANO Masahide Kanazawa University, Advanced Science Research Center, Professor, 学際科学実験センター, 教授 (50251450)

Project Period (FY)

2003 – 2004

Keywords

Carbohydrate / Knockout mice / Galactosyltransferase / Tumor antigen / Galactose / Chemical carcinogen / Skin tumor / Malignancy

Research Abstract

Beta-1,4-galactosyltransferase I (beta4GalT-I) is an essential glycosyltransferase to synthesize some kinds of type 2 N-glycans and core 2 O-glycans. We have generated beta4GalT-I knockout (KO) mice to study the multiple in vivo function of these carbohydrates. First, we have generated embryonic fibroblast cell lines from both beta4GalT-I homozygously mutated and heterozygously mutated, phenotypically normal, mice. Both cell lines were immortalized by repetitive passages. Transfection of mouse beta4GalT-I expression vector to beta4GalT-I null fibroblast cell line have no effect on immortalization of cells. In order to evaluate tumor specific carbohydrate antigens such as sialyl Lewis antigens in tumorigenesis, we have conducted functional analysis of carbohydrate antigens using chemically induced skin tumor cell lines derived from beta4GalT-I KO mice. No significant differences in cellular growth and adherent abilities to fibronectin were observed between beta4GalT-I null cells and those which were transfected with mouse beta4GalT-I expression vector. When motility and invasiveness of beta4GalT-I null cell lines through fibronectin-coated and/or Matrigel-coated transwells were assessed, significant migrations and invasions were observed. Moreover, the cell motility and invasiveness were declined by the transfection of mouse beta4GalT-I expression vector in an expression level dependent manner. Though sialyl Lewis antigens have not be detected after beta4GalT-I transfections to beta4GalT-I null cell lines, significant expressions of galactose residuedetected by RCA 120 lectin in the beta1,4-linkage was observed. These results suggest that carbohydrates synthesized by beta4GalT-I regulate the malignancy of tumor cells.

Research Products (6 results)

All | 2005 | 2004 | 2003

All | Journal Article (6 results)

- [Journal Article] Characterization of serum IgA in beta4GalT-I-deficient mice developing IgAN-like disease — 2005
- [Journal Article] Characterization of serum IgA in beta4GalT I-deficient mice developing IgAN-like disease. — 2005
- [Journal Article] Analysis of human IgA nephropathy-like disease in galactosyltransferase KO mice — 2004
- [Journal Article] Analysis of human IgA nephropathy-like disease in galactosyltransferase KO mice. — 2004
- [Journal Article] Impaired selectin ligand biosynthesis and reduced inflammatory responses in β-1,4-galactosyltransferase-I-deficient mice. — 2003
- [Journal Article] Impaired selectin-ligand biosynthesis and reduced inflammatory responses in beta-1,4-galactosyltransferase-I-deficient mice. — 2003

URL: https://kaken.nii.ac.jp/report/KAKENHI-PROJECT-15500298/155002982004kenkyu_seika_hokoku_

Published: 2007-12-12