The foundational research on "cancer therapy guideline and effect prediction" by the molecular imaging.

2006 Fiscal Year Final Research Report Summary

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Research Project

Project/Area Number

16591193

Research Category

Grant-in-Aid for Scientific Research (C)

Allocation Type

Single-year Grants

Section

一般

Research Field

Radiation science

Research Institution

Kanazawa University

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Project Period (FY)

2004 – 2006

Keywords

cancer / molecular imaging / tracer / therapy effect decision

Research Abstract

Fvourable effects of cytotoxic chemotherapy for tumours are characterized by the reduced accumulation of radiotracers such as ^<99m>Tc sestamibi (MIBI). Antiangiogenic therapy is primarily cytostatic consequently, its influence on tracer accumulation may differ from that of cytotoxic treatments.

Ati-angiogenic therapy employing 2-methoxyestradiol was administered in mice bearing subcutaneous xenografts of LS180 colon cancer cells. The effects of chemotherapy with 5-fluorouracil were examined as a cytotoxic counterpart. Treatments were conducted for 4 days from day 8. Distribution of ^<99m>Tc-MIBI and ^<99m>Tc-HL91, a hypoxic marker, was observed on days 8 and 12. Oxygen tension (PO_2) in tumours was measured by a microelectrode. Cellular uptake of tracers was examined in vitro in normoxic and hypoxic conditions.
^<99m>Tc-MIBI accumulation decreased with increasing tumour weight when no treatment was conducted. Tumour growth was suppressed by anti-angiogenic therapy and chemotherapy. ^<99m>Tc-MIBI accumulation in tumours decreased after chemotherapy as compared to pretherapeutic values, whereas accumulation of ^<99m>Tc-HL91 increased. In contrast, accumulation of tracers did not significantly change after anti-angiogenic therapy as compared to that observed pre-therapeutically. Tumour PO_2 decreased with increasing tumour volume when no treatment was conducted. Chemotherapy reduced PO_2 in tumours. PO_2 in tumours treated with anti-angiogenic therapy was as high as that observed before treatment. 2-Methoxyestradiol or 5-fluorouracil did not significantly affect tracer accumulation in cells under both normoxic and hypoxic conditions in vitro.
These findings indicate that scintigraphic assessment of therapeutic efficacy of anti-angiogenic therapy should be performed from a perspective distinct from that of cytotoxic treatment.

Research Products (6 results)

All 2006 2005

All Journal Article

[Journal Article] ^<99m>Tc-sestamibi to monitor treatment with antisense oligodeoxynucleotide complementary to MRP mRNA in human breast cancer cells. 2006

[Journal Article] Synthesis and binding affinities of methylvesamicol analogs for the acetylcholine transporter and sigma receptor. 2006

[Journal Article] 99mTc-sestamibi to monitor treatment with antisense oligodeoxynucleotide complementary to MRP mRNA in human breast cancer cells. 2006

[Journal Article] ynthesis and binding affinities of methylvesamicol analogs for the acetylcholine transporter and sigma receptor 2006

[Journal Article] Anti-angiogenic therapy and chemotherapy affect 99mTc sestamibi and ^<99m>Tc-HL91 accumulation differently in tumour xenografts. 2005

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URL: https://kaken.nii.ac.jp/report/KAKENHI-PROJECT-16591193/165911932006kenkyu_seika_hokoku_

Published: 2008-05-26