Hochschule Zittau/Görlitz
University of Applied Sciences
FG Biotechnologie

Kolloquium 3/2011

Dr. rer. nat. Holger Stephan

Helmholtz-Zentrum Dresden-Rossendorf
Institut für Radiopharmazie

zum Thema

„Radiopharmaka: Herstellung, Charakterisierung und Anwendungsmöglichkeiten"

Zeit: Mittwoch, 20. April 2011, 15.00 Uhr

Ort: Haus IV, Raum 0.04

Alle Interessenten, KollegInnen und StudentInnen sind sehr herzlich eingeladen!

gez.:
Prof. Dr. rer. nat. habil. Manfred Gey

PS:
Im Anschluss (ca. ab 16.30 Uhr) findet noch eine Nachsitzung bei Kaffee/Wie.-Würstchen in der **„Mäuseburg zu Zittau"** statt: **Come as you are!**

Holger Stephan

Date and place of birth: 17-05-1955, Dresden (Germany)

Affiliation: Helmholtz-Zentrum Dresden-Rossendorf, Institute of Radiopharmacy

Current Position: Head of the working group "Nanoscalic systems"

Education:

1976 –1981	to study chemistry at the Mining Academy Freiberg
1981	dipl. Chem., Mining Academy Freiberg
1989	Ph.D. degree with Prof. J. Beger (Freiberg); Thesis: "Amido podands – synthesis and investigations of solvent extraction of metal salts"

Professional Career:

1981 – 1984	Centre of Research and Technology of Microelectronics Dresden (Head of a working group)
1984 – 1989	Technical University Mining Academy Freiberg/Company of Synthetic Fibres Schwarza (Assistant research scientist)
1989 – 1993	Central Institute of Solid State Physics and Material Research Dresden (Assistant research scientist)
1994 – 1997	Technical University Dresden (Senior scientist with Prof. K. Gloe)
1998 -	Research Centre Rossendorf (HZDR) / Institute of Radiopharmacy (Head of the working group "Nanoscalic Systems")

Visiting Appointments:

1990	Institute of Chemistry and Chemical Technology Krasnojarsk (Russia)
1994	Science University Tokyo; Kyoto Institute of Technology; Saga University (Japan)*
1996	University of British Colombia/Vancouver; University of Victoria (Canada)
2000	JAERI (Japan Atomic Energy Research Institute) Tokai; Saga University (Japan)*
2003	Kitakyushu University, Tohoku University, TIT; JAERI (Japan)*
2009	Nikolaev Institute of Inorganic Chemistry, Novosibirsk (Russia)
2010	Monash University, Melbourne (Australia)

* Invitation by JSPS ((Japan Society for Promotion of Science)

Research Interests:
Development and characterization of new radiotracer and extractants, Supramolecular Chemistry, Dendrimer Chemistry, Coordination Chemistry and Thermodynamics of Liquid Two-phase Systems.

Other activities:
Coordinator of national projects; COST D31/WG Coordinator
Co-organizer (together with Luisa De Cola) of the annual Supraphone Workshop
Organizer of the annual workshop "HPLC in life sciences"
Member of Scientific Technical Council of HZDR
Reviewer of scientific journals and scientific organizations

Expertise:
Comprehensive experiences for undertaking radiotracer experiments, different spectroscopic techniques, characterization of colloid-chemical properties and *in vitro/in vivo* studies in view of the development and characterization of novel radiotracers, including functionalized nanoparticles. The design and development of chemically, metabolically and radiolytically stable radiometal complexes on the basis of ^{64}Cu/^{67}Cu, ^{86}Y/^{90}Y and ^{99m}Tc/^{188}Re is of special interest. Furthermore, polynuclear metal compounds (polyoxometalates, Re clusters) for anti-tumor activity, photosensitizing, and radiation-sensitizing properties are under investigation. The characterization of binding and transport behavior of novel receptors by solvent extraction studies represents one main topic.

Publications:
About 100 publications in referred journals and proceedings, 3 chapters in books, 7 patents, >200 contributions to scientific meetings.

Institut für Radiopharmazie

FORSCHUNGSSCHWERPUNKT

Molekulare Bildgebung und Therapie von Tumoren

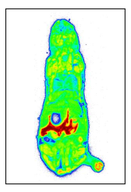
- Tumordiagnostik
- Tumortherapie
- Pathogenese von Tumor- und inflammatorischen Erkrankungen

RADIOPHARMAKA-ENTWICKLUNG

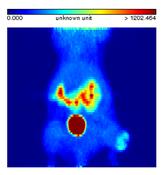
- Integratives System - Übersetzung von Grundlagenarbeiten:
  Chemie/ Biowissenschaften → Mensch

- Medizinisches Problem
  → Grundlagenarbeiten
  → Radiotracerentwicklung
  → GMP – gerechte Radiopharmaka
  → ...
  → Klinik

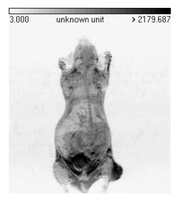
Forschungslabors →



Kleintier-PET →



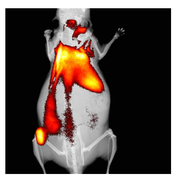
Kleintier-MRT →



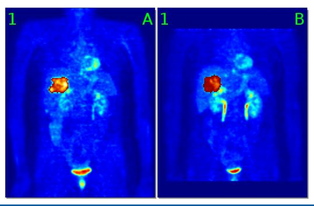
Kleintier-CT →

Kleintier-SPECT/CT →

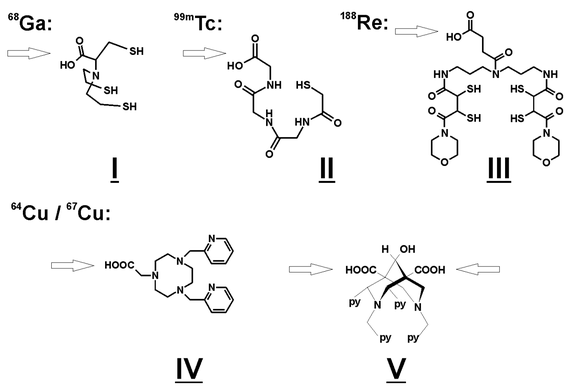
Kleintier-Optische Bildgebung →



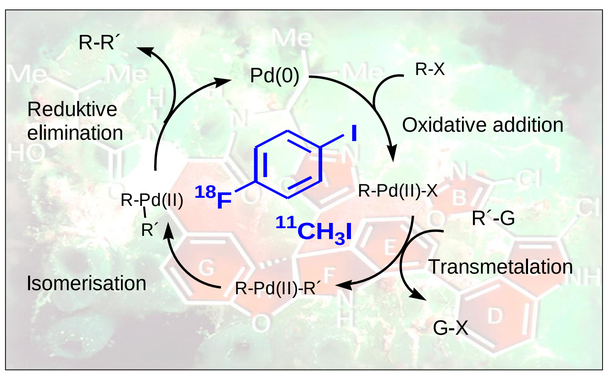
Klinische PET-Kamera →



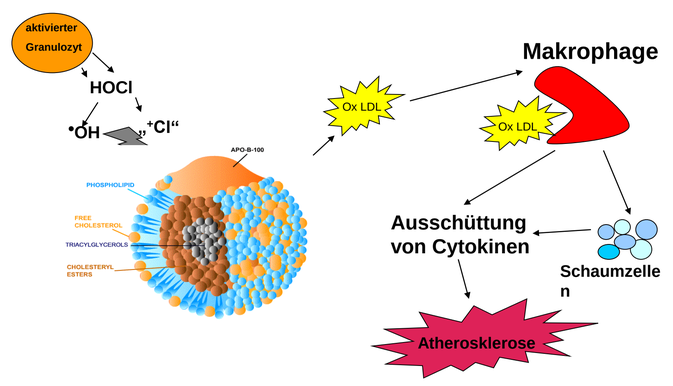
CHEMISCHE, RADIOCHEMISCHE UND BIOLOGISCHE ENTWICKLUNGSARBEITEN



Radiometallkomplexe



Synthesen organischer Radiotracer



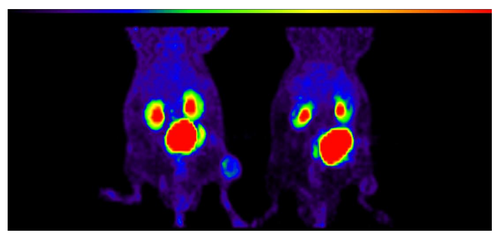
Aufklärung von Entzündungsprozessen

FORSCHUNGSTECHNIK

Zyklotron zur Radionukliderzeugung

Radiopharmakasynthese

Kleintier-PET-Kamera



Bildliche Darstellung eines Tumors im Mausmodell

FORSCHUNGS- UND GRADUIERUNGSMÖGLICHKEITEN

Wir bieten Ihnen folgende Möglichkeiten:

Praxissemester/Bachelorarbeiten
Diplomarbeiten/Masterarbeiten
Promotionen

Sprechen Sie uns an!

Prof. Dr. Jörg Steinbach, Dr. Holger Stephan | Institut für Radiopharmazie | j.steinbach@hzdr.de, h.stephan@hzdr.de | 0351 – 260-3091| http://www.hzdr.de

INSTITUT FÜR RADIOPHARMAZIE

ABTEILUNG FÜR RADIOTHERAPEUTIKA

HZDR

HELMHOLTZ ZENTRUM DRESDEN ROSSENDORF

Grundlagen- und Entwicklungsarbeiten zur Nutzung radioaktiver Metalle für Diagnostik, Therapie und Therapiekontrolle

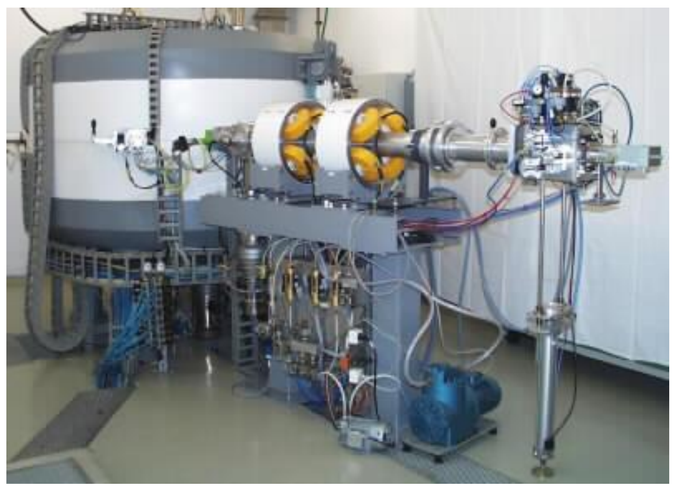
Ziel der Arbeiten ist die Entwicklung von Radionuklidtherapeutika auf der Basis von Peptiden, Proteinen und Oligonukleotiden, die einen zielgerichteten Transport verbunden mit der Deposition der Strahlendosis im Tumor gestatten.

(I) Radionuklide

$^{99m}Tc/^{188}Re$, $^{64}Cu/^{67}Cu$, $^{86}Y/^{90}Y$, ^{68}Ga

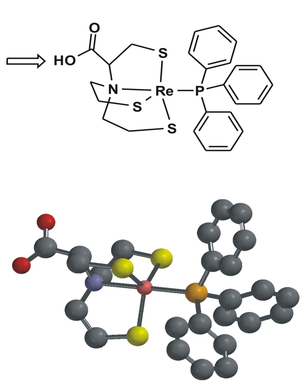
Generator

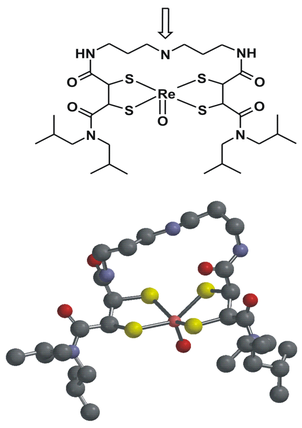
Zyklotron

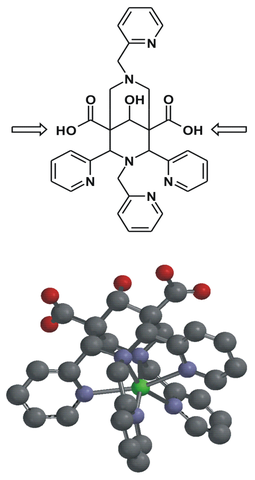


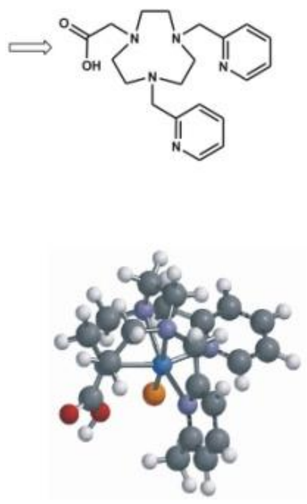
(II) Entwicklung neuer Chelatsysteme

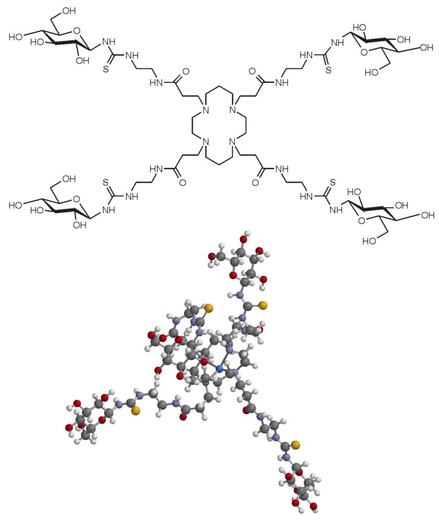
Entwicklung von Radiometallkomplexen hoher chemischer, metabolischer und radiolytischer Stabilität











Rheniumkomplexe (^{188}Re)

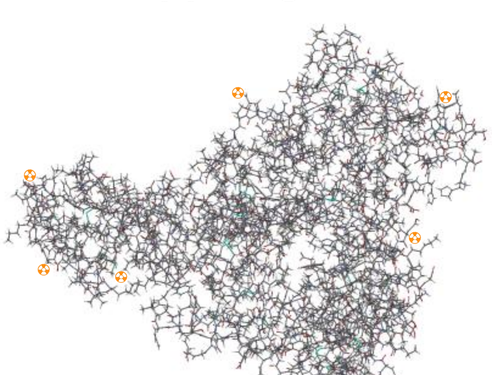
„4+1“-Ligandkonzept **Verbrückte DMSA-Einheiten**

Kupferkomplexe ($^{64}Cu/^{67}Cu$)

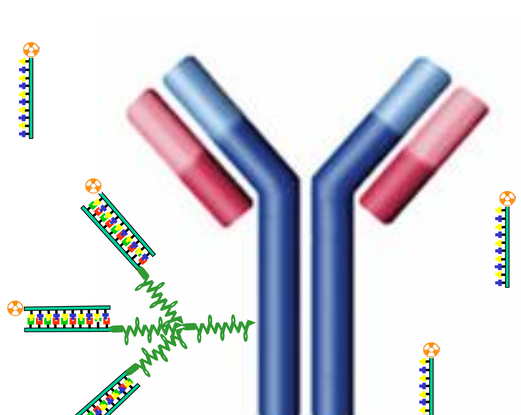
Bispidinkomplexe **Makrocyclische Amine**

(III) Weiterentwicklung und Anwendung radiochemischer Markierungsmethoden für Peptide, Proteine, Oligonukleotide, Mikrosphären und Nanoteilchen

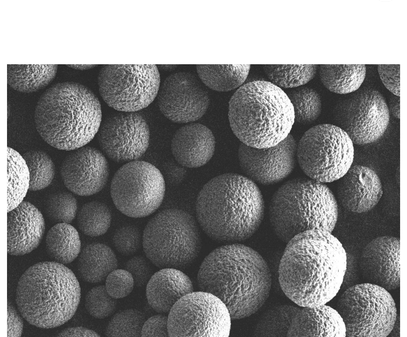
Kupplung von Radiometallkomplexen an (Bio)makromoleküle im Hinblick auf ein biologisches Targeting

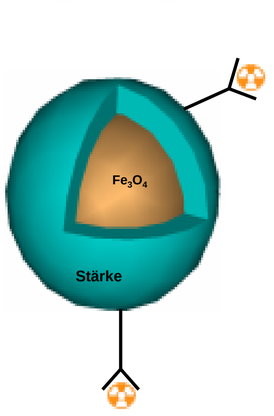


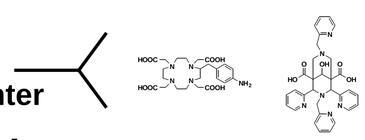
Spezifische Markierung von Proteinen und Antikörpern mit Radiometallen vorzugsweise über Prelabelling



Kupplung metabolisch stabiler, hydrophiler Komplexe an therapierelevante Systeme (Untersuchungen zum Pretargeting mittels komplementärer Oligonukleotide)







Stabile Fixierung therapeutisch relevanter Radionuklide (^{188}Re, ^{90}Y, ^{67}Cu ...) an HSA-Mikrosphären und magnetische Nanopartikel

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