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Curriculum vitae

- 1975 Master's Diploma, University of Cologne
1979 PhD, University of Cologne
1979-1981 PostDoc, Research Center Jülich
1981-1982 Visiting assistant professor, George Washington University, Washington, DC, USA
1982-1985 Staff member at Institute of Nuclear Chemistry, Research Centre Jülich
1985-1991 Head of the Radiopharmaceutical Chemistry Group at the Institute of Nuclear Chemistry, FZJ
1990 Habilitation, University of Cologne
1991-1996 Assoc. Professor of Nuclear Chemistry and Radiopharmacy, University of Essen
since 1996 Full Professor of Nuclear Chemistry, University of Cologne
since 1996 Director of Institute of Neuroscience and Medicine, INM-5: Nuclear Chemistry at FZJ

Activities in the scientific community, awards

- Editorial board member of journals:
1985 - *Nuclear Medicine and Biology*
1999 - *Journal Labelled Compounds and Radiopharmaceuticals*
1988-1998 Board Member of Radiopharmaceutical Committee of DGN
1994-2002 Board Member of Nuclear Chemistry Section of GDCh
since 1999 Vice Chairman of Radiopharmacy Section of DPhG
2000-2005 Vice Chairman of the EU COST action B12
since 2005 Member of PSI-Advisory-Board (PAB) of Paul-Scherrer-Institute, Villigen, CH
2005-2011 President of the Society of Radiopharmaceutical Sciences (SRS)
1990 Mallinckrodt-Promotion Award, German Society of Nuclear Medicine (DGN)
2013 President's Award, Society of Radiopharmaceutical Sciences (SRS)

Research fields

My main research interests comprise all aspects of radiopharmaceutical sciences, from nuclide production to translation of radioindicators into radiodiagnostics applied in man with *in vivo* imaging methods. Bases are measurements of nuclear data and development of medically relevant radionuclides at cyclotrons. Labelling methods using short-lived isotopes, such as fluorine-18, bromine-75,76, iodine-120,123,124, as well as carbon-11 and selenium-73,75 are a special focus. The "no-carrier-added" production of tracers in subnano-molar amounts concentrates on biomolecules, such as amino acids, or builds on lead structures of pharmaceuticals binding to receptors, transporters or enzymes. The development of preclinical evaluation methods for the no-carrier-added, short-lived radiotracers represents a further topic. This comprises *in vitro* and *in vivo* studies on biodistribution and metabolism with the help of modern radioanalytical methods. Those find also application in the pharmaceutical quality control of radiodiagnostics produced for routine human application. In cooperation with different institutes of medicine, the new developed radiotracers and -ligands are examined by emission-tomography imaging methods (SPECT or PET) with respect to their suitability for translation into *in vivo* diagnostic agents, or in collaboration with pharmaceutical industry used for evaluation of research drugs.

Selected publications

PUBLICATIONS FROM 1985 TO 2015

1. Cornelius J, Stoffels G, Filss C, Galldiks N, Slotty P, Kamp M, et al. Uptake and tracer kinetics of O-(2-F-18-fluoroethyl)-L-tyrosine in meningiomas: preliminary results. European Journal of Nuclear Medicine and Molecular Imaging. 2015;42(3):459-67.
2. Dunkl V, Cleff C, Stoffels G, Judov N, Sarikaya-Seiwert S, Law I, et al. The Usefulness of Dynamic O-(2-F-18-Fluoroethyl)-L-Tyrosine PET in the Clinical Evaluation of Brain Tumors in Children and Adolescents. Journal of Nuclear Medicine. 2015;56(1):88-92.
3. Kugler F, Ermert J, Kaufholz P, Coenen H. 4-[F-18]Fluorophenylpiperazines by Improved Hartwig-Buchwald N-Arylation of 4-[F-18]fluoroiodobenzene, Formed via Hypervalent lambda(3)-Iodane Precursors: Application to Build-Up of the Dopamine D-4 Ligand [F-18]FAUC 316. Molecules. 2015;20(1):470-86.
4. Olma S, Ermert J, Sihver W, Coenen H. Synthesis and First Evaluation of [F-18]Fluorocyano- and [F-18]Fluoronitro-quinoxalinedione as Putative AMPA Receptor Antagonists. Medicinal Chemistry. 2015;11(1):13-20.
5. Buchholz M, Spahn I, Coenen H. Cross section measurements of proton and deuteron induced reactions on natural europium and yields of SPECT-relevant radioisotopes of gadolinium. Applied Radiation and Isotopes. 2014;91:8-16.
6. Cardinale J, Ermert J, Humpert S, Coenen H. Iodonium ylides for one-step, no-carrier-added radiofluorination of electron rich arenes, exemplified with 4-(([F-18] fluorophenoxy)-phenylmethyl) piperidine NET and SERT ligands. Rsc Advances. 2014;4(33):17293-9.
7. Coenen H, Kuhn S, Spahn I. Development of the non-standard PET radionuclides Sc-43,Sc-44g and Ti-45. Nuclear Medicine and Biology. 2014;41(7):647-8.
8. Filss C, Galldiks N, Stoffels G, Sabel M, Wittsack H, Turowski B, et al. Comparison of F-18-FET PET and Perfusion-Weighted MR Imaging: A PET/MR Imaging Hybrid Study in Patients with Brain Tumors. Journal of Nuclear Medicine. 2014;55(4):540-5.
9. Filss C, Stoffels G, Galldiks N, Sabel M, Wittsack H, Coenen H, et al. Histogram analysis reveals a better delineation of tumor volume from background in F-18-FET PET compared to CBV maps in a hybrid PET-MR studie in gliomas. Nuclear Instruments & Methods in Physics Research Section a-Accelerators Spectrometers Detectors and Associated Equipment. 2014;734:175-8.
10. Kugler F, Roehrens D, Stumpf M, Drerup C, Ermert J, Hamacher K, et al. Optimizing the transfer of [F-18]fluoride from aqueous to organic solvents by electrodeposition using carbon electrodes. Applied Radiation and Isotopes. 2014;91:1-7.
11. Qaim S, Sudar S, Scholten B, Koning A, Coenen H. Evaluation of excitation functions of Mo-100(p,d+pn)Mo-99 and Mo-100 (p,2n)Tc-99m reactions: Estimation of long-lived Tc-impurity and its implication on the specific activity of cyclotron-produced Tc-99m. Applied Radiation and Isotopes. 2014;85:101-13.

12. Shah N, Herzog H, Weirich C, Tellmann L, Kaffanke J, Caldeira L, et al. Effects of Magnetic Fields of up to 9.4 T on Resolution and Contrast of PET Images as Measured with an MR-BrainPET. *Plos One*. 2014; 9(4).
13. Striepens N, Matusch A, Kendrick K, Mihov Y, Elmenhorst D, Becker B, et al. Oxytocin enhances attractiveness of unfamiliar female faces independent of the dopamine reward system. *Psychoneuroendocrinology*. 2014;39:74-87.
14. Zhang K, Herzog H, Mauler J, Filss C, Okell T, Kops E, et al. Comparison of cerebral blood flow acquired by simultaneous [O-15]water positron emission tomography and arterial spin labeling magnetic resonance imaging. *Journal of Cerebral Blood Flow and Metabolism*. 2014;34(8):1373-80.
15. Zhang K, Langen K, Neuner I, Stoffels G, Filss C, Galldiks N, et al. Relationship of regional cerebral blood flow and kinetic behaviour of O-(2-F-18-fluoroethyl)-L-tyrosine uptake in cerebral gliomas. *Nuclear Medicine Communications*. 2014;35(3):245-51.
16. Buchholz M, Spahn I, Scholten B, Coenen H. Cross-section measurements for the formation of manganese-52 and its isolation with a non-hazardous eluent. *Radiochimica Acta*. 2013;101(8):491-9.
17. Ermert J, Coenen H. Methods for 11C-and 18F-labelling of amino acids and derivatives for positron emission tomography imaging. *Journal of Labelled Compounds & Radiopharmaceuticals*. 2013;56(3-4):225-36.
18. Galldiks N, Rapp M, Stoffels G, Fink G, Shah N, Coenen H, et al. Response assessment of bevacizumab in patients with recurrent malignant glioma using [F-18]Fluoroethyl-L-tyrosine PET in comparison to MRI. *European Journal of Nuclear Medicine and Molecular Imaging*. 2013;40(1):22-33.
19. Galldiks N, Stoffels G, Ruge M, Rapp M, Sabel M, Reifenberger G, et al. Role of O-(2-F-18-Fluoroethyl)-L-Tyrosine PET as a Diagnostic Tool for Detection of Malignant Progression in Patients with Low-Grade Glioma. *Journal of Nuclear Medicine*. 2013;54(12):2046-54.
20. Geisler S, Willuweit A, Schroeter M, Zilles K, Hamacher K, Galldiks N, et al. Detection of remote neuronal reactions in the Thalamus and Hippocampus induced by rat glioma using the PET tracer cis-4-[F-18]fluoro-D-proline. *Journal of Cerebral Blood Flow and Metabolism*. 2013;33(5):724-31.
21. Helfer A, Ermert J, Coenen H. Ebselen, first radiotracer labelled with the positron emitter selenium-73. *Journal of Labelled Compounds & Radiopharmaceuticals*. 2013;56:S221-S.
22. Helfer A, Melean J, Ermert J, Infantino A, Coenen H. Bis(4-benzoyloxyphenyl)iodonium salts as effective precursors for the no-carrier-added radiosynthesis of 4-[F-18]fluorophenol. *Applied Radiation and Isotopes*. 2013;82:264-7.
23. Kranert T, Menzel C, Bartenstein P, Brust P, Coenen H, Krause B, et al. Hirnperfusions-SPECT with 99mTc-labelled Radiopharmaceuticals DGN-Guidance (S1 Guideline). *Nuklearmedizin-Nuclear Medicine*. 2013;52(5):157-62.
24. Kugler F, Ermert J, Coenen H. Labeling of benzodioxin piperazines with fluorine-18 as prospective radioligands for selective imaging of dopamine D-4 receptors. *Journal of Labelled Compounds & Radiopharmaceuticals*. 2013;56(12):609-18.

25. Piroth M, Liebenstund S, Galldiks N, Stoffels G, Shah N, Eble M, et al. Monitoring of Radiochemotherapy in Patients with Glioblastoma Using O-(2-[F-18]Fluoroethyl)-L-Tyrosine Positron Emission Tomography: Is Dynamic Imaging Helpful? *Molecular Imaging*. 2013;12(6).
26. Piroth M, Prasath J, Willuweit A, Stoffels G, Sellhaus B, van Osterhout A, et al. Uptake of O-(2-[F-18]fluoroethyl)-L-tyrosine in reactive astrocytosis in the vicinity of cerebral gliomas. *Nuclear Medicine and Biology*. 2013;40(6):795-800.
27. Rapp M, Heinzel A, Galldiks N, Stoffels G, Felsberg J, Ewelt C, et al. Diagnostic Performance of F-18-FET PET in Newly Diagnosed Cerebral Lesions Suggestive of Glioma. *Journal of Nuclear Medicine*. 2013;54(2):229-35.
28. Ross T, Sihver W, Ermert J, Coenen H. Synthesis and preliminary pharmacological evaluation of a new putative radioiodinated AMPA receptor ligand for molecular imaging. *Radiochimica Acta*. 2013;101(9):571-5.
29. Cardinale J, Ermert J, Coenen H. Convenient preparation of (4-iodophenyl)aryliodonium salts. *Tetrahedron*. 2012;68(22):4112-6.
30. Cardinale J, Ermert J, Kugler F, Helfer A, Brandt M, Coenen H. Carrier-effect on palladium-catalyzed, nucleophilic 18F-fluorination of aryl triflates. *Journal of Labelled Compounds & Radiopharmaceuticals*. 2012;55(12):450-3.
31. Galldiks N, Langen K, Holy R, Pinkawa M, Stoffels G, Nolte K, et al. Assessment of Treatment Response in Patients with Glioblastoma Using O-(2-F-18-Fluoroethyl)-L-Tyrosine PET in Comparison to MRI. *Journal of Nuclear Medicine*. 2012;53(7):1048-57.
32. Galldiks N, Stoffels G, Filss C, Piroth M, Sabel M, Ruge M, et al. Role of O-(2-F-18-Fluoroethyl)-L-Tyrosine PET for Differentiation of Local Recurrent Brain Metastasis from Radiation Necrosis. *Journal of Nuclear Medicine*. 2012;53(9):1367-74.
33. Piroth M, Pinkawa M, Holy R, Klotz J, Schaar S, Stoffels G, et al. Integrated boost IMRT with FET-PET-adapted local dose escalation in glioblastomas Results of a prospective phase II study. *Strahlentherapie Und Onkologie*. 2012;188(4):334-9.
34. Shehata M, Scholten B, Spahn I, Coenen H, Qaim S. Radiochemical separation of Br-76,Br-77 and Ga-66,Ga-67 from irradiated ZnSe targets using anion-exchange chromatography. *Radiochimica Acta*. 2012;100(10):785-92.
35. Al-Abyad M, Spahn I, Scholten B, Spellerberg S, Qaim S, Coenen H, et al. Cross Section Measurements of Proton Induced Reactions on Mn-55 and Comparison of Experimental Results with Different Nuclear Model Calculations. *Journal of the Korean Physical Society*. 2011;59(2):1888-91.
36. Floeth F, Sabel M, Ewelt C, Stummer W, Felsberg J, Reifenberger G, et al. Comparison of F-18-FET PET and 5-ALA fluorescence in cerebral gliomas. *European Journal of Nuclear Medicine and Molecular Imaging*. 2011;38(4):731-41.
37. Herzog H, Langen K, Weirich C, Kops E, Kaffanke J, Tellmann L, et al. High resolution BrainPET combined with simultaneous MRI. *Nuklearmedizin-Nuclear Medicine*. 2011;50(2):74-82.

38. Kugler F, Sihver W, Ermert J, Hubner H, Gmeiner P, Prante O, et al. Evaluation of F-18-Labeled Benzodioxine Piperazine-Based Dopamine D-4 Receptor Ligands: Lipophilicity as a Determinate of Nonspecific Binding. *Journal of Medicinal Chemistry*. 2011;54(24):8343-52.
39. Langen K, Bartenstein P, Boecker H, Brust P, Coenen H, Drzezga A, et al. PET and SPECT Studies of Brain Tumors with Radiolabeled Amino Acids. *Nuklearmedizin-Nuclear Medicine*. 2011;50(4):167-73.
40. Melean J, Ermert J, Coenen H. Enantiospecific synthesis of 2-[F-18]fluoro-L-phenylalanine and 2-[F-18]fluoro-L-tyrosine by isotopic exchange. *Organic & Biomolecular Chemistry*. 2011;9(3):765-9.
41. Piroth M, Holy R, Pinkawa M, Stoffels G, Kaiser H, Galldiks N, et al. Prognostic impact of postoperative, pre-irradiation F-18-fluoroethyl-L-tyrosine uptake in glioblastoma patients treated with radiochemotherapy. *Radiotherapy and Oncology*. 2011;99(2):218-24.
42. Piroth M, Pinkawa M, Holy R, Klotz J, Nussen S, Stoffels G, et al. PROGNOSTIC VALUE OF EARLY [(18)F]FLUOROETHYLTYROSINE POSITRON EMISSION TOMOGRAPHY AFTER RADIOTHERAPY IN GLIOBLASTOMA MULTIFORME. *International Journal of Radiation Oncology Biology Physics*. 2011;80(1):176-84.
43. Piroth M, Pinkawa M, Holy R, Klotz J, Schaar S, Stoffels G, et al. Integrated Boost IMRT (IMRT-IB) with FET-PET-adapted local Dose Escalation in Glioblastoma - Results of a prospective Phase II Study. *Strahlentherapie Und Onkologie*. 2011;187:51-2.
44. Piroth M, Pinkawa M, Holy R, Klotz J, Schaar S, Stoffels G, et al. Recurrence Patterns after FET-PET-adapted Radiochemotherapy for Glioblastoma - a prospective Analysis. *Strahlentherapie Und Onkologie*. 2011;187:52-3.
45. Ross T, Ermert J, Coenen H. Synthesis of No-Carrier-Added 4-[F-18]Fluorophenol from 4-Benzoyloxyphenyl-(2-thienyl)iodonium Bromide. *Molecules*. 2011;16(9):7621-6.
46. Shehata M, Scholten B, Spahn I, Coenen H, Qaim S. Separation of radioarsenic from irradiated germanium oxide targets for the production of As-71 and As-72. *Journal of Radioanalytical and Nuclear Chemistry*. 2011;287(2):435-42.
47. Shehata M, Scholten B, Spahn I, Qaim S, Coenen H. Radiochemical studies relevant to the separation of Ga-68 and Ge-68. *Journal of Radioanalytical and Nuclear Chemistry*. 2011;288(3):887-93.
48. Skakun Y, Utenkov S, Dovbnya A, Qaim S, Coenen H. Half-lives of the Isomeric States Rh-102m,Rh-g. *Journal of the Korean Physical Society*. 2011;59(2):1487-90.
49. Spahn I, Shehata M, Spellerberg S, Scholten B, Coenen H, Qaim S, et al. Investigation of Production Possibilities of Radiobromines for Diagnostic and Therapeutic Applications. *Journal of the Korean Physical Society*. 2011;59(2):1983-6.
50. Uddin M, Hermanne A, Scholten B, Spellerberg S, Coenen H, Qaim S. Small scale production of high purity Pt-193m by the Os-192(alpha, 3n)-process. *Radiochimica Acta*. 2011;99(3):131-5.
51. Uddin M, Hermanne A, Sudar S, Aslam M, Scholten B, Coenen H, et al. Excitation functions of alpha-

- particle induced reactions on enriched Sb-123 and Sb-nat for production of I-124. Applied Radiation and Isotopes. 2011;69(4):699-704.
52. Coenen H, Elsinga P, Iwata R, Kilbourn M, Pillai M, Rajan M, et al. Fluorine-18 radiopharmaceuticals beyond [F-18]FDG for use in oncology and neurosciences. Nuclear Medicine and Biology. 2010;37(7):727-40.
 53. Melean J, Ermert J, Coenen H. Efficient synthesis of fluorobenzylloximidazolidinone derivatives: precursors for the radiosynthesis of [F-18] fluorophenylamino acids. Tetrahedron. 2010;66(52):9996-10001.
 54. Muhlhausen U, Sihver W, Ermert J, Coenen H. Synthesis, radiofluorination and first evaluation of [F-18]fluorophenylsulfonyl- and [F-18]fluorophenylsulfinyl-piperidines as serotonin 5-HT2A receptor antagonists for PET. Nuclear Medicine and Biology. 2010;37(5):605-14.
 55. Qaim S, Kettern K, Shubin Y, Sudar S, Coenen H. Excitation functions of nuclear reactions leading to the soft-radiation emitting radionuclides Ca-45, V-49 and Tl-204 in beam collimator materials used in proton therapy. Radiochimica Acta. 2010;98(8):447-57.
 56. Salber D, Stoffels G, Oros-Peusquens A, Shah N, Reifenberger G, Hamacher K, et al. Comparison of O-(2-(18)F-Fluoroethyl)-L-Tyrosine and L-(3)H-Methionine Uptake in Cerebral Hematomas. Journal of Nuclear Medicine. 2010;51(5):790-7.
 57. Spahn I, Steyn G, Vermeulen C, Kovacs Z, Szelecsenyi F, Shehata M, et al. New cross section measurements for the production of the Auger electron emitters Br-77 and Br-80m. Radiochimica Acta. 2010;98(12):749-55.
 58. Uddin M, Scholten B, Hermanne A, Sudar S, Coenen H, Qaim S. Radiochemical determination of cross sections of alpha-particle induced reactions on Os-192 for the production of the therapeutic radionuclide Pt-193m. Applied Radiation and Isotopes. 2010;68(10):2001-6.
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 61. Jahnke S, Menzel M, van Dusschoten D, Roeb G, Buhler J, Minwuyelet S, et al. Combined MRI-PET dissects dynamic changes in plant structures and functions. Plant Journal. 2009;59(4):634-44.
 62. Kettern K, Coenen H, Qaim S. Quantification of radiation dose from short-lived positron emitters formed in human tissue under proton therapy conditions. Radiation Physics and Chemistry. 2009;78(6):380-5.
 63. Muhlhausen U, Ermert J, Coenen H. Synthesis, labelling and first evaluation of [F-18]R91150 as a serotonin 5-HT2A receptor antagonist for PET. Journal of Labelled Compounds & Radiopharmaceuticals. 2009;52(1-2):13-22.
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65. Pauleit D, Stoffels G, Bachofner A, Floeth F, Sabel M, Herzog H, et al. Comparison of F-18-FET and F-18-FDG PET in brain tumors. *Nuclear Medicine and Biology*. 2009;36(7):779-87.
66. Qaim S, Hilgers K, Sudar S, Coenen H. Excitation function of the Os-192(He-3,4n)-reaction for production of Pt-191. *Applied Radiation and Isotopes*. 2009;67(6):1074-7.
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81. Ermert J, Ludwig T, Gail R, Coenen H. [F-18]fluorophenyl organometallics as intermediates of no-carrier-added F-18-fluoroarylation reactions. *Journal of Organometallic Chemistry*. 2007;692(19):4084-92.
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- with no-carrier-added [F-18]Fluoride. *Journal of the American Chemical Society*. 2007;129(25):8018-25.
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