

THOMAS J. MANGNER
Curriculum Vitae

CONTACT INFORMATION

PET/Radiology, GP-109A
Children's Hospital of Michigan
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EDUCATION

High School: Mt. Clemens High School, Mt. Clemens, Michigan, 1964-1968
Undergraduate: University of Michigan, Ann Arbor, MI, 1968-72, B.S., Zoology
Graduate: The University of Michigan, College of Pharmacy, 1972-78, M.S.(74),
Ph.D.(78), Medicinal Chemistry

TRAINING

Postdoctoral Scholar: The University of Michigan, Division of Nuclear Medicine, NCI
postdoctoral fellow, 1979-82

FACULTY APPOINTMENTS

Visiting Assistant Professor of Medicinal and Pharmaceutical Chemistry, The University
of Michigan, College of Pharmacy, 1978-79

Adjunct Assistant Professor of Medicinal Chemistry, The University of Michigan, College
of Pharmacy, (25% appointment), 1984-86

Associate Professor of Radiology (Clinician-Educator) Full-time Affiliate, Wayne State
University School of Medicine, Department of Radiology, 1994 – 2006

Professor of Radiology (Clinician-Educator) Full-time Affiliate, Wayne State University
School of Medicine, Department of Radiology, 2006 -

HOSPITAL APPOINTMENTS

Chemist (Research Associate I), The University of Michigan, Division of Nuclear
Medicine, 1977-78

Director, Radiopharmaceutical Production and Distribution (Sr. Research Associate),
The University of Michigan, Division of Nuclear Medicine, 1982-86

Radiopharmaceutical Chemist (Sr. Research Associate); Manager, PET Radiochemistry Laboratory, The University of Michigan, Division of Nuclear Medicine, 1986-1993

Director, PET Chemistry, PET Center, Children's Hospital of Michigan, Department of Pediatric Imaging, 1993 - 2009

MAJOR PROFESSIONAL SOCIETIES:

American Chemical Society 1974 -

Division of Medicinal Chemistry 1980 -

Division of Organic Chemistry 1984 -

American Association for the Advancement of Science 1980-86

Society of Nuclear Medicine 1982 -

Academy of Molecular Imaging 2003 -

LICENSURE AND BOARD CERTIFICATION

None

HONORS/AWARDS:

- Phi Lambda Upsilon 1974
- Rho Chi 1976

SERVICE:

Patient Care

Direct responsibility for all cyclotron/chemistry operations associated with all clinical and research PET patient scans. This includes preparation of all patient PET doses according to appropriate federal (FDA, Good Manufacturing Practices) and State of Michigan (MDEQ, CIS) regulations. Activities include development of appropriate preparation procedures, record keeping, designing, fabricating and troubleshooting equipment, implementing equipment/procedures to minimize radiation exposure, and training and supervision of PET chemistry personnel. Despite the increase in the number of scheduled clinical patient studies (from 550 in 1994 to 1553 in 2007), in 2007, not a single scheduled PET dose was not delivered due to cyclotron and/or chemistry related problems.

Scientific Activities

- 2005 - 2009 Continued development of PET tracer synthesis modules. Developed completely automated control and data archival systems for synthesis modules. Used modules in the completely automated synthesis of [11C]L-Leucine, [18F]FDG and [18F]FLT.
- Coordinated, wrote and submitted CMC sections of IND for [11C]PK11195 (with Drs Harry and Diane Chugani, Pulak Chakraborty) and [18F]FLT to FDA (with Drs. Anthony Shields and Diane Chugani).
- 2004 Developed synthesis of [11C]L-Leucine for clinical research studies (with Dr. Fanrong Mu)
- Coordinated, wrote and submitted IND for [11C]L-Leucine to FDA on 12/23/04 (with Drs. Harry and Diane Chugani, Fanrong Mu)
- Development of [11C]PK11195 for clinical research studies (with Dr. Pulak Chakraborty)
- 2 RDRC Applications were written and processed
- 2003 Designed, built and implemented [11C]Cyanide module
- Designed, built and implemented new PET agent preparation module for a variety of potential C-11 and F-18-labelled tracers
- Developed [18F]fluoroacetylglucosamine and [18F]tetraacetyl-flouroacetylglucosamine for potential neural progenitor cells (with Dr. Fanrong Mu)
- Developed methods and prepared documentation for the preparation of [15O]O₂ & H₂O for use in Carotid Artery Occlusion study (Coss) (with Dr. Powers, Washington University)
- Assisted in the development of [11C]DWAY 10035 for clinical patient research (with Drs. Pulak Chakraborty and Dilip Maiti)
- 2002 Expanded and improved relational database procedures for collection and storage of all data related to PET Chemistry operation
- Developed [18F]FBAU dibenzoyl ester for neurogenesis project (with Dr. Fanrong Mu)

- 2001 Developed synthesis of [18F]FDG on new module to increase radiochemical yield, reduce quantities of reagents used and reduce preparation time (with Kristal Baird)
- Developed synthesis of [18F]FIAU and [18F]FBAU for research studies
- 1 RDRC Application was written and processed
- 2000 Designed and implemented user-friendly database for scheduling of PET patient scans and coordination with tracer preparation
- Developed synthesis of [18F]FMAU for clinical research studies
- 2 RDRC Applications were written and processed
- 1999 Designed and implemented user-friendly database for collection and storage of patient dose records
- Designed, built and implemented new preparation module for potential F-18-labelled PET tracers
- 1998 Developed synthesis of [11C]methionine for clinical research studies
- Developed synthesis of [18F]FAU for clinical research studies
- 3 RDRC Applications were written and processed
- 1997 Designed, built and implemented a [11C]MeI/Alkylation combination module
- Refined synthesis of [11C] α -methyl-tryptophan to increase reliability and radiochemical yield (with Dr. Pulak Chakraborty)
- Refined synthesis of [18F]FDG to increase radiochemical yield from 72% in 1996 to >80% (with Kristal Baird)
- 2 RDRC Applications were written and processed
- 1996 Designed, built and implemented apparatus (robot) for remote handling of [15O]water and [13N]NH₃ patient doses to reduce chemist radiation exposure.
- Developed synthesis of [18F]fluorothymidine (FLT) for clinical research studies

Developed synthesis of [11C]thymidine for clinical research studies (with Dr. Pulak Chakraborty)

11 RDRC Applications were written and processed

1995 Developed synthesis of [11C]acetate for clinical research studies

Developed synthesis of [11C]hydroxyephedrine for clinical research studies (with Dr. Pulak Chakraborty)

Developed preparation of [11C]α-methyl-tryptophan for clinical patient studies (with Dr. Pulak Chakraborty)

Coordinated, wrote and submitted IND for [11C]α-methyl-tryptophan to FDA on 03/30/95 (with Drs. Harry and Diane Chugani, Pulak Chakraborty)

13 RDRC Applications were written and processed

1994 Designed, built and implemented module for the preparation of [11C]methyl iodide and acetate.

Designed, built and implemented alkylation module for preparation of new [11C]PET tracers

Developed synthesis of [11C]flumazenil for clinical research studies

Developed preparation of [13N]NH₃ for clinical patient studies

Developed preparation of [15O]water for clinical patient studies

1993 Assisted in the initial design of PET Chemistry Laboratory.

Set up infrastructure and protocols for initial operation of cyclotron/PET chemistry Lab for PET tracer production

Developed preparation of [18F]FDG for clinical use.

Committee Service

- Chairman, Radioactive Drug Research Committee (RDRC), Children's Hospital of Michigan and Detroit Medical Center, 1994 –
- Member, Radiation Safety Committee, Children's Hospital of Michigan, 1995 -
- Grant Review
- Member, Special Study Section (Monoclonal Antibodies), NIH, 1982
- Member, DOE Study section "Innovative technologies for in vivo targeted radiopharmaceutical dose delivery and deposition" August, 2004

- Member, DOE Study Section “Radiochemistry and Instrumentation Research”; DE-PS02-08ER08-11; June, 2008.
- Member, DOE Study Section "Integrated radiochemistry research projects of excellence"; FOA 09ER09-08; May, 2009
- Ad hoc Reviewer
- Nuclear Medicine and Biology
- Reviewer, Society of Nuclear Medicine, 1995 Scientific Program

TEACHING:

- Formal Courses
- Teaching Experience at The University of Michigan:
- Course Lecturer in Medicinal Chemistry 533 (1st year graduate students), 1974-77, 80, 81, 84-86
- Course Lecturer in Medicinal Chemistry 405 (P-4 pharmacy students), 1977
- Course Director, Pharmaceutical Chemistry 441 - Drug Assay (P-4 pharmacy students, 1978-79
- Course Lecturer in Medicinal Chemistry 410 (P-4 pharmacy students), 1985-87
- Student Advisor
- Sridhar Nimmagadda Cancer Biology, Wayne State (2002-2007)
- Postdoctoral Advisor
- Fanrong Mu, Ph.D. 2002 – 2004
- Dilip Maiti, Ph.D. 2002 – 2004 (secondary advisor; Dr. Pulak Chakraborty was primary advisor)

GRANT SUPPORT:

In-Active

- “Radiopharmaceutical tracers for neural progenitor cells”

Principal Investigator: Thomas Mangner, PhD 20% Effort

DOE; DE-FG02-03R63607 \$300,000 Total per Year 08/15/03 – 08/14/04

Renewal: 08/15/04 – 08/14/05

The major goal of this project is to develop PET tracers for imaging neurogenesis in young animals and in animal seizure models as models for normal human neurogenesis in children and in epilepsy.

- “Localization of epileptic foci with PET in children”.

Principal Investigator: Harry T. Chugani, M.D.

NINDS; R01 NS 34488-01A2 \$1,496,125 Total Direct 09/01/00 - 08/31/05

Co-Investigator: Thomas J. Mangner, Ph.D. 10% Effort

The major goal of this project is to provide improved noninvasive localization of epileptogenetic brain tissue in children with medically uncontrolled epilepsy who are being evaluated for surgical treatment.

- “PET imaging of prostate cancer with fluoropyrimidines”

Principal Investigator: Anthony Shields, M.D., Ph.D.

DOD; PC030328 02/12/04 - 01/31/07

Co-Investigator: Thomas Mangner, PhD 7% Effort

- “Labeled thymidine: Development as a PET imaging agent.”

Principal Investigator: Anthony Shields, M.D., Ph.D.

NIH; R01 CA 39566 \$1,250,000 Total Direct 04/01/04 - 03/31/09

Co-Investigator: Thomas J. Mangner, Ph.D. 5% Effort

The goal of this study is to develop the tracer [F-18]deoxy-fluorothymidine (FLT) in order to obtain high quality images of tumors and high proliferating tissues.

- “Tryptophan metabolism in children with epilepsy”

Principal Investigator: Diane C. Chugani, Ph.D.

NIH; R01 NS45151 \$1,250,000 Total Direct 12/01/03 – 11/30/08

Co-Investigator: Thomas J. Mangner, PhD 10% Effort

R01 CA 39566 (PI: A.F.Shields) 08/01/00 - 07/31/04 20%

NIH \$225,000 yr 1

- Labeled thymidine: Development as a PET imaging agent.

The goal of this study is to develop the tracer [F-18]deoxy-fluorothymidine (FLT) in order to obtain high quality images of tumors and high proliferating tissues.

Type: R01 HD40007-01 09/29/00 – 09/28/03

- “Ontogeny of human GABA-A receptor complex measured with PET”

Principal Investigator: O. Muzik, Ph.D.

NICHD; R01 HD40007-01 \$550,000 Total Direct 09/29/00 – 09/28/03

Co-Investigator: Thomas Mangner, PhD

Agency: NICHD

The major goal of this project is to determine in vivo age-related changes of the GABA-A receptor complex in children using positron emission tomography and the tracer [C-11]Flumazenil.

R01 CA 83131-01 (PI: A.F. Shields) 09/15/99 - 08/31/03 20%

NIH \$331,919 yr 1

- PET imaging of drug kinetics and pathways.

The goal of this study is to provide biodistribution data of [F-18]{1-(2'-deoxy-2'-fluoro-beta-D-arabinofuranosyl)-uracil}.

R01 NS/RR38324 (PI: DC Chugani) 02/01/99 - 01/31/04 5%

NINDS \$187,170 yr 2

- Imaging tryptophan metabolism in tuberous sclerosis.

The major goals of this project are to determine whether abnormalities of tryptophan metabolism measured with PET are useful for localization of epileptic foci for surgical resection and to determine whether there are global and focal abnormalities of serotonin synthesis in children with autism in patients with tuberous sclerosis complex.

RO1 NS 34488-01A2 (PI: HT Chugani) 12/01/96 - 11/30/99 10%

NINDS \$180,526 yr 3

- Localization of epileptic foci with PET in children.

The major goal of this project is to provide improved noninvasive localization of epileptogenic brain tissue in children with medically uncontrolled epilepsy who are being evaluated for surgical treatment.

Scientist Devel. Grant (PI: M. DiCarli) 01/01/98 - 12/31/02 10%

American Heart Association

- Effects of autonomic neuropathy on coronary blood flow in patients with diabetes mellitus.

Protocol #991-156 (PI: M. DiCarli) 01/15/00 - 06/30/01 10%

Parke-Davis Pharmaceutical \$174,132 yr 1

- The effects of insulin resistance on coronary blood flow in patients with type 2 diabetes mellitus.

PATENTS

1. Zigler, S.S., Mangner, T. and Matteo, J.C.: Apparatus for Processing Radionuclides. U.S. Patent 6,599,484 B1; 07/29/2003.
2. Zigler, S.S., Matteo, J.C. and Mangner, T.: Method for multi-batch production of FDG. U.S. Patent Pending, Application No.: 10/421,324; 02/05/2004.

BIBLIOGRAPHY:

Completed Publications in Scientific Journals

Peer Reviewed

1. Green, M.M., Mangner, T.J., Turner, S.P. and Brown, F.J.: The temperature dependence of an electron induced impact stereoselective rearrangement reaction. J. Amer. Chem. Soc. 1976; 98: 7082-7083.
2. Wieland, D.M., Wu, J.L., Brown, L.E., Mangner, T.J., Swanson, D.P. and Beierwaltes, W.H.: Radiolabeled adrenergic neuron blocking agents: Adrenomedullary imaging with [131-I]-iodobenzylguanidine. J. Nucl. Med. 1980; 21: 349-353.
3. Wieland, D.M., Brown, L.E., Tobes, M.C., Rogers, W.L., Marsh, D.D., Mangner, T.J., Swanson, D.P. and Beierwaltes, W.H.: Imaging the primate adrenal medullae with [123-I] and [131-I]- iodobenzylguanidine. J. Nucl. Med. 1981; 22: 358-364.
4. Valk, T.W., Frager, M.S., Gross, M.D., Sisson, J.C., Wieland, D.M., Swanson, D.P., Mangner, T.J. and Beierwaltes, W.H.: Spectrum of pheochromocytoma in multiple endocrine neoplasia. Ann. Internal Med. 1981; 94: 762-767.
5. Mangner, T.J., Wu, J.L. and Wieland, D.M.: Solid-phase exchange radioiodination of aryl iodides. Facilitation by ammonium sulfate. J. Org. Chem. 1982; 47: 1484-1488.
6. Inbasekaran, M.I., Mangner, T.J. and Wieland, D.M.: Synthesis of [α -14-C]-benzylguanidine. J. Label. Compd. Radiopharm. 1983; 20: 1201-1205.

7. Hays, S.J. and Mangner, T.J.: Synthesis of iodine-125 labelled analogues of metyrapone and metyrapol. *J. Label. Compd. Radiopharm.* 1983; 20: 1373-1381.
8. Sisson, J.C., Shapiro, B., Beierwaltes, W.H., Glowniak, J.V., Nakajo, M., Mangner, T.J., Carey, J.E., Swanson, D.P., Copp, J.E., Satterlee, W.G. and Wieland, D.M.: Radiopharmaceutical treatment of malignant pheochromocytoma. *J. Nucl. Med.* 1984; 25: 197-206.
9. Wieland, D.M., Mangner, T.J., Inbasekaran, M.I., Brown, L.E. and Wu, J.L.: Adrenal medulla imaging agents: A structure-distribution relationship study of radiolabeled aralkylguanidines. *J. Med. Chem.* 1984; 27: 149-155.
10. Lynn, M.D., Shapiro, B., Sisson, J.C., Mangner, T.J., Wieland, D.M., Meyers, L.J., Glowniak, J.V. and Beierwaltes, W.H.: Portrayal of pheochromocytoma and normal human adrenal medulla by m-[123-I]iodobenzylguanidine: Concise communication. *J. Nucl. Med.* 1984; 25: 436-440.
11. Sisson, J.C., Shapiro, B., Beierwaltes, W.H., Nakajo, M., Glowniak, J., Mangner, T.J., Carey, J.C., Swanson, D.P., Copp, J., Satterlee, W. and Wieland D.: Treatment of malignant pheochromocytoma with a new radiopharmaceutical. *Trans. Assoc. Amer. Physicians* 1984; 97: 209-217.
12. Lynn, M.D., Shapiro, B., Sisson, J.C., Beierwaltes, W.H., Meyers, L.J., Ackerman, R. and Mangner, T.J.: Pheochromocytoma and the normal adrenal medulla: Improved visualization with I-123-MIBG scintigraphy. *Radiology* 1985; 156: 789-792.
13. Rabinovitch, M.A., Kalff, V., Allen, R., Rosenthal, A., Albers, J., Das, S.K., Pitt, B., Swanson, D.P., Mangner, T.J. and Beierwaltes, W.H.: Omega-I-123-Hexadecanoic acid metabolic probe of cardiomyopathy. *Eur. J. Nucl. Med.* 1985; 10: 222-227.
14. Otto, C.A., Lee, H., Mangner, T.J. and Wieland, D.M.: Omega-Iodophenylfatty acids: A new method of radioiodination. *Appl. Radiat. & Isotopes* 1986; 37: 205-210.
15. Mangner, T.J., Tobes, M.C., Wieland, D.M., Sisson, J.C. and Shapiro, B.: Metabolism of meta-[I-131]-iodobenzylguanidine in patients with metastatic pheochromocytoma: Concise communication. *J. Nucl. Med.* 1986; 27: 37-44.
16. Lee, H., Inbasekaran, M.I., Wieland, D.M., Sherman, P.S., Fisher, S.J., Mangner, T.J., Rogers, W.L. and Clinthorne, N.H.: Development of a kit-form analog of meta-iodobenzylguanidine. *J. Nucl. Med.* 1986; 27: 256-267.
17. Sisson, J.C., Wieland, D.M., Jaques, S.Jr., Sherman, P., Fisher, S., Mallette, S., Meyers, L. and Mangner, T.J.: Radiolabeled meta-iodobenzylguanidine and the adrenergic neurons of salivary glands. *Amer. J. Physiol. Imaging.* 1987; 2: 1-9.

18. Sisson, J.C., Wieland, D.M., Sherman, P., Mangner, T.J., Tobes, M.C. and Jaques, S. Jr.: Meta-iodobenzylguanidine as an index of the adrenergic nervous system integrity and function. *J. Nucl. Med.* 1987; 28: 1620-4.
19. Sisson, J.C., Shapiro, B., Meyers, L.J., Mallette, S., Mangner, T.J., Wieland, D.M., Glowniak, J.V., Sherman, P. and Beierwaltes, W.H.: Meta-iodobenzylguanidine to map scintigraphically the adrenergic nervous system in man. *J. Nucl. Med.* 1987; 28: 1625-36.
20. Rosenspire, K.C., Schwaiger, M., Mangner, T.J., Hutchins, G.D., Sutorik, B.S. and Kuhl, D.E.: Metabolic fate of N-13 ammonia in human and canine blood. *J. Nucl. Med.* 1990; 31: 163-167.
21. Koeppe, R.A., Mangner, T., Betz, A.L., Shulkin, B.L., Allen, R., Kollros, P., Kuhl, D.E. and Agranoff, B.W.: Use of C-11 aminocyclohexanecarboxylate for the measurement of amino acid uptake and distribution volume in human brain. *J. Cerebral Blood Flow & Metabol.* 1990; 10: 727-739.
22. Koeppe, R.A., Shulkin, B.A., Rosenspire, K.A., Shaw, L.A., Betz, A.L., Mangner, T., Price, J. and Agranoff, B.W.: Effect of aspartame-derived phenylalanine on neutral amino acid uptake in human brain: A Positron Emission Tomography Study. *J. Neurochem.* 1991; 56: 1526-1535.
23. Buck, A., Wolpers, H.G., Hutchins, G.D., Savas, V., Mangner, T.J., Nguyen, N. and Schwaiger, M.: Effect of carbon-11-acetate recirculation on estimates of myocardial oxygen consumption by PET. *J. Nucl. Med.* 1991; 32: 1950-1957.
24. Shapiro, B., Sisson, J.C., Wieland, D.M., Mangner, T.J., Zempel, S.M., Mudgett, E., Gross, M.D., Carey, J.E., Zasadny, K.R. and Beierwaltes, W.H.: Radiopharmaceutical therapy of malignant pheochromocytoma with [¹³¹I]metaiodobenzylguanidine: Results from ten years of experience. *J. Nucl. Biol. Med.* 1991; 35: 269-276.
25. Beanlands, R.S.B., Muzik, O., Mintun, M., Mangner, T., Lee, K., Petry, N., Hutchins, G.D. and Schwaiger, M.: The kinetics of copper-62-PTSM in the normal human heart. *J. Nucl. Med.* 1992; 33: 684-690.
26. Muzik, O., Beanlands, R.S.B., Hutchins, G., Mangner, T.J., Nguyen, N. and Schwaiger, M.: Validation of nitrogen-13-ammonia tracer kinetic model for quantification of myocardial blood flow using PET. *J. Nucl. Med.* 1993; 34: 83-91.
27. Dasilva, J.N., Kilbourn, M.R. and Mangner, T.J.: Synthesis of [¹¹C]tetrabenazine, a vesicular monoamine uptake inhibitor, for PET imaging studies. *J. Appl. Rad. Isotop.* 1993; 44: 673-676.

28. Del Rosario, R.B., Mangner, T.J., Gildersleeve, D.L., Shreve, P.D., Wieland, D.M., Lowe J.A. III, Drozda, S.E., and Snider, R.M.: Synthesis of a nonpeptide carbon-11 labeled substance P antagonist for PET studies. *Nucl. Med. Biol.* 1993; 20: 545-547.
29. Dasilva, J.N., Kilbourn, M.R. and Mangner, T.J.: Synthesis of a [11-C]methoxy derivative of dihydrotetrabenazine: A radioligand for studying the vesicular monoamine transporter. *Appl. Radiat. Isot.* 1993; 44: 1487-1489.
30. Van Dort, M.E., Kilbourn, M.R. and Mangner, T.J.: Synthesis of N-{N-[4-(4-{N-[11C]methylamino}phenyl)butyryl]-L-prolyl}pyrrolidine: A potential radiotracer for prolyl endopeptidase. *J. Label. Compd. Radiopharm.* 1994; 36: 447-452.
31. Charalambous, A., Mangner, T.J. and Kilbourn, M.R.: Synthesis of (N-[11C]methyl)Y-29794, a competitive inhibitor of prolyl endopeptidase. *J. Label. Compd. Radiopharm.* 1994; 36: 499-503.
32. Wolpers, H.G., Buck, A., Nguyen, N., Marcowitz, P.A., Armstrong, W.F., Starling, M.R., Hicks, R., Mangner, T.J. and Schwaiger, M.: An approach to ventricular efficiency by use of carbon 11-labeled acetate and positron emission tomography. *J. Nuclear Cardiology.* 1994; 1: 262-269.
33. Melon, P.G., Nguyen, N., Degrado, T.R., Mangner, T.J., Wieland, D.M. and Schwaiger, M.: Imaging of cardiac neuronal function following cocaine exposure using carbon-11 hydroxyephedrine and positron emission tomography. *J. Am. Coll. Cardiol.* 1994; 23: 1693-1699.
34. Charalambous, A., Mangner, T.J. and Kilbourn, M.R.: Synthesis of (2-[11C]methoxy)rotenone, a marker of mitochondrial complex I activity. *Nucl. Med. Biol.* 1995; 22: 65-69.
35. Macfarlane, D., Gonin, J., Wieland, D., Mangner, T., Froelich, J. Beierwaltes, W. and Shapiro, B.: Successful and unsuccessful approaches to imaging carcinoids: Comparison of a radiolabelled tryptophan hydroxylase inhibitor with a tracer of biogenic amine uptake and storage, and a somatostatin analogue. *Eur. J. Nucl. Med.*, 1996; 23: 131-140.
36. Chakraborty, P.K., Mangner, T.J., Chugani, D.C., Muzik, O. and Chugani, H.T.: A high yield and simplified procedure for the synthesis of a-[C-11]methyl-L-tryptophan. *Nucl. Med. Biol.* 1996; 23: 1005-1008.
37. Melon, P.G., Boyd, C.J., McVey, S., Mangner, T.J., Wieland, D.M. and Schwaiger, M.: Effects of active chronic cocaine use on cardiac sympathetic neuronal function assessed by carbon-11-hydroxyephedrine. *J. Nucl. Med.*, 1997; 38: 451-456.

38. DiCarli, M.F., Tobes, M.C., Mangner, T.J., Levine, A.B., Muzik, O., Chakraborty, P.K. and Levine, B.: Effects of cardiac sympathetic innervation on coronary blood flow. *New Eng. J. Med.* 1997; 336: 1208-1215.
39. Muzik, O., Chugani, D.C., Chakraborty, P., Mangner, T. and Chugani, H.T.: Analysis of [C-11]alpha-methyl-tryptophan kinetics for the estimation of serotonin synthesis rate in vivo. *J. Cereb. Blood Flow Metab.*, 1997; 17: 659-669.
40. Vinas, F.C., Zamorano, L., Mueller, R.A., Jiang, Z., Chugani, H., Fuerst, D., Muzik, O., Mangner, T.J. and Diaz, F.G.: [15O]-Water PET and intraoperative brain mapping: A comparison in the localization of eloquent cortex. *Neurological Research*, 1997; 19: 601-608.
41. Müller, R-A., Rothermel, R.D., Behen, M.E., Muzik, O., Mangner, T.J. and Chugani, H.T.: Receptive and expressive language activations for sentences: a PET study. *NeuroReport*, 1997; 8(17): 3767-3770.
42. Chugani, D.C., Muzik, O., Chakraborty, P., Mangner, T. and Chugani, H.T.: Human brain serotonin synthesis capacity measured in vivo with alpha-[C-11]methyl-L-tryptophan. *Synapse*, 1998; 28: 33-43.
43. Mueller, R.A., Muzik, O., Watson, C.E., daSilva, E., Mangner, T.J., Chakraborty, P.K. and Chugani, H.T.: Motor activation in the temporal lobe following perinatal MCA stroke - a single-case study. *Annals of Neurology*, 1997; 42: 518-519.
44. Chugani, D.C., Muzik, O., Rothermel, R., Behen, M., Chakraborty, P., Mangner, T., da Silva, E.A. and Chugani, H.T.: Altered serotonin synthesis in the dentato-thalamo-cortical pathway in autistic boys. *Annals of Neurology*, 1997; 42: 666-669.
45. Müller, R.A., Rothermal, R.D., Behen, M.E., Muzik, O., Mangner, T.J., Chakraborty, P.K. and Chugani, H.T.: Brain organization of language after early unilateral lesion. *Brain and Language*, 1998; 62: 422-451.
46. Müller, R.A., Rothermal, R.D., Muzik, O., Becker, C., Fuerst, D., Behen, M.E., Mangner, T.J. and Chugani, H.T.: Determination of language dominance by [O-15] water PET in pediatric patients: A comparison with the Wada test. *J. Epilepsy*, 1998; 11:152-161.
47. Müller, R.A., Behen, M.E., Muzik, O., Rothermal, R.D., Downey, R.A., Mangner, T.J. and Chugani, H.C.: Task-related activations in heterotropic brain malfunctions: A PET study. *Neuroreport*, 1998; 9:2527-2533.
48. Müller, R.A., Rothermal, R.D., Behen, M.E., Muzik, O., Mangner, T.J. and Chugani, H.T.: Differential patterns of language and motor reorganization following early left hemisphere lesion. *Archives of Neurology*, 1998; 55: 1113-1119.

49. Müller, R.A., Rothermal, R.D., Behen, M.E., Muzik, O., Mangner, T.J. and Chugani, H.T.: Developmental changes in cortical and cerebellar motor control: A clinical positron emission tomography study with children and adults. *J. Child Neurology*, 1998; 13: 550-556.
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