

CURRICULUM VITAE

Manouchehr Seyedi Vafae

Languages spoken: English, French, Azeri, Farsi, Danish

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Work address: University of Copenhagen, Faculty of Medical Sciences, Dept. Neuroscience and Pharmacology, Blegdamsvej 3B, 2200 Copenhagen N

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Education:

B.Sc.: Physics, Shahid Beheshti University, Tehran, Iran,

M.Sc.: Biology/physiology, McGill University, Montreal, Canada

M.Sc.A.: Medical physics, McGill University, Montreal, Canada

Ph.D.: Neuroscience, McGill University, Montreal, Canada

Post-doctoral fellow: Dept. Neurology/neuroscience, Emory University, Atlanta, USA

Candidate for the degree of doctor of medical sciences (dr.med.) from the University of Copenhagen; (to be defended in 2014).

Expertise:

Medical Imaging (PET/MRI/CT) of neurological/psychiatric/cardiovascular diseases.

Scientific Memberships:

Member of the Society for Neuroscience

Member of the International Society of the Cerebral Blood Flow and Metabolism,

Member of the International Society for the Human Brain Mapping

Member of American Heart Association

Member of World Stroke Organization

Current and previous appointments:

Associate Prof., University of Copenhagen (2011-current)

Assistant Prof., University of Copenhagen (2010-2011)

Assistant Prof., Århus University (2005-2010)

Research scientist, Århus General Hospital, PET Center (2000-2005).

Research fellow, Montreal Neurological Inst. (1998-2000)

Research profile :

Research scientist; Brain imaging of neurological disorders (Montreal Neurological Institute, Canada; 1997-2000).

Senior research scientist: Image evaluation of neurological patients candidate for neurosurgery; Investigation of cerebral blood flow and metabolism relationship in health and disease (Aarhus General Hospital, Denmark; 2000-2002).

Assistant Professor; Investigator and co-supervisor for the research and clinical projects carried out at the research unit of university hospital (Aarhus University Hospital, Denmark: 2002-2005)

Senior research scientist; Aarhus General Hospital, Denmark; Clinical Research Unit, 2005-2009.

Research Experiences:

a. Basic research

1. General principles of study design, image processing, and image analysis of PET/MRI (human/animal) studies.
2. Application of kinetic modeling for biomarker studies in PET.
3. General principles of receptor studies.
4. PET/fMRI investigations of the relationship among blood flow, oxygen and glucose metabolism.

b. Clinical research

1. Investigation of the relationship among brain glucose metabolism, blood flow, and receptors in healthy population as well as Alzheimer's patients.
2. PET studies of the effect of subthalamic nucleus stimulation (STN) in Parkinson's patients.
3. PET studies of state of blood flow, metabolism and receptors in epileptic patients (mitochondrial disorders).
4. Renal blood flow/glucose metabolism measurements in diabetic patients.
5. Study of the effects of anaesthetics on cerebral blood flow.
6. Study of effect of oxygen and carbon dioxide on stroke patients.
7. Investigation of neuronal basis of nicotine addiction in human brain.
8. Evaluation and implementation of an Automated Blood Sampling System for Positron Emission Tomography (PET)
9. Implementation and validation of $^{15}\text{O-O}_2$ labeled oxyhemoglobin administration for the measurement of cerebral oxygen utilization by PET

Teaching experience:

1. Canada: McGill University, Faculty of Science, Dept. Mathematics/Physics
2. Canada: McGill University, Faculty of Science, Dept. Physiology
3. McGill University, Faculty of Medicine (Central Nervous System)
4. University of Copenhagen, Faculty of Biology: In vivo Neurobiology, brain imaging and its application in pharmacology. (Ph.D. course,)

International Journal Peer Review: (approx. 20 per year)

Grants:

1. Lundbeckfonden, Denmark, Brain energy metabolism, 5-HT_{1A} serotonin receptor binding, and amyloid plaque formation in Alzheimer's patients, and young and elderly healthy volunteers, 2,000,000 DKK

2.National Science foundation, Denmark (contributed to the neuroenergetics column headed by Prof.Albert Gjedde). Five year grant for the CFIN (Center of Functionally Integrated Neuroscience, Århus University Hospital), 40,000,000 DKK.

3. National Science Foundation, Denmark (co-applicant with Prof. Peter Bie, University of Southern Denmark), Study of renal blood flow in humans, 300,000 DKK

Awards:

JTC fellowship of Montreal Neurological Institute.

JTC major fellowship on Montreal Neurological Institute.

McGill University major research fellowship (1994-1996).

Other Research activities:

1.Procurement of a 9.4 Tesla fMRI scanner (BRUKER) for animal research for the University of Copenhagen

2. Establishing a link between Faculty of Medicine of University of Copenhagen and SBIC (Singapore Brain Imaging Consortium) for research collaboration involving state-of-art imaging modalities.

3. Establishment of a scientific/research link between the Montreal Neurological Institute and Faculty Medicine of University of Copenhagen.

4. Establishment of a scientific collaboration agreement between the Faculty of Medicine of University of Copenhagen and Tabriz Medical University (Neuroscience Research Center)

Current Student Supervision:

Co-supervisor for the following Ph.D. and dr.med. students:

Mahmoud Ashkanian M.D. M.Eng.(Ph.D.) Thesis: Improvement of regional cerebral metabolism of oxygen in stroke patients by inhalation of combined CO₂ and O₂ gases. An fMRI/PET study.

Joel Aanerud M.D. (Ph.D.) Thesis: The relationship between brain metabolism and 5HT_{1A} serotonin receptor bindings and its influence on behavioral and cognitive decline of Alzheimer's patients.

Per Borghamer M.D. (Ph.D.); Thesis: Dopaminergic regulation of cerebral microcirculation: Implication in Parkinson's diseases.

Lise Schluzen M.D. (dr.med.); Thesis: Investigation of the effects of anaesthetics on local cerebral blood flow (PET project).

Mads Pedersen M.D. (Ph.D.); Thesis: PET scanning of renal diseases

Peer Reviewed Scientific Publications and book chapters:

1. **Vafaee M.**, Murase K., Gjedde A., Meyer E. (1996) Dispersion correction for automatic sampling of O-15 labeled H₂O and red blood cells. In: *Quantification of Brain Function Using PET*, edited by R. Myers, V.J. Cunningham, D.L. Bailey and T. Jones. San Diego: Academic Press, Ch. 15, pp. 72-75.
2. Murase K., Kuwabara H., **Vafaee M.**, Toussaint P.J., Gjedde A., Evans A.C., Meyer E. (1996) Generation of maps of dispersion time constant and tracer arrival delay using [O-15]carbonmonoxide. In: *Quantification of Brain Function Using PET*, edited by R. Myers, V.J. Cunningham, D.L. Bailey and T. Jones. San Diego: Academic Press, Ch. 39, pp. 201-205.
3. **Vafaee M.**, Meyer E., Marrett S., Paus T., Evans A.C., Gjedde A. (1998) Frequency-dependent changes in cerebral metabolic rate of oxygen during activation of human visual cortex studies by PET. In: *Quantitative functional brain imaging with positron emission tomography* edited by R. Carson, M. Daube-Witherspoon, and P. Herscovitch. San Diego: Academic Press, Ch. 25, pp. 173-176.
4. **Vafaee M.S.**, Meyer E., Marrett S., Evans AC., Gjedde A. (1998) Increased oxygen consumption in human visual cortex: Response to visual stimulation. *Acta Neurol Scand* 98:85-89.
5. **Vafaee M.S.**, Meyer E., Marrett S., Paus T., Evans AC., Gjedde A. (1999) Frequency-dependent changes in cerebral metabolic rate of oxygen during activation of human visual cortex. *J Cereb Blood flow Metab* 19(3):272-277.
6. **Vafaee M.S.**, Gjedde A. (2000) Model of blood-brain transfer of oxygen explains non-linear flow-metabolism coupling during stimulation of visual cortex. *J Cereb Blood Flow* 20(4):747-754.
7. **Vafaee M.S.**, Meyer E., Gjedde A. (2000) Impaired activation of oxygen consumption and blood flow in visual cortex of patients with mitochondrial encephalomyopathy. *Annals Neurol* 48(4):676-679.
8. Okazawa H., **Vafaee M.** (2001) Effect of vascular radioactivity on regional values of cerebral blood flow: Evaluation of methods for H₂¹⁵O PET to distinguish cerebral perfusion from blood volume. *J Nuc Med* 42(7):1032-9.
9. Cumming P., Danielsen EH., **Vafaee M.**, Falborg L., Steffensen E., Sørensen J.C., Gillings N., Bender D., Marthi K., Andersen F., Munk O.L., Smith D., Møller A., Gjedde AH. (2001)

Normalisation of Markers for Dopamine Innervation in Striatum of MPTP-Lesioned Miniature Pigs with Intrastratial Grafts. *Acta Neurol Scand* 103:309-315.

10. Gjedde A., Marrett S., **Vafaee M.** (2002) Oxidative and Nonoxidative Metabolism of Excited Neurons and Astrocytes. *J Cereb Blood Flow* 22:1-14 (Review Article).

11. **Vafaee M.S.**, Gjedde A. (2004) Spatially dissociated flow-metabolism coupling in brain activation. *NeuroImage* 21:507-515.

12. **Vafaee M.S.**, Østergaard K., Sunde N., Gjedde A., Dupont E., Cumming P. (2004) Focal activation of oxygen consumption in brain of patients with parkinson's disease during subthalamic stimulation. *NeuroImage* 22:966-974.

13. Schlunzen L., **Vafaee M.S.**, Cold GE., Rasmussen M., Feldback J., Gjedde A. (2004) Focal cerebral blood flow increases during sevoflurane induced unconsciousness in healthy humans. *Acta Anaesthesiol Scand* 48:1268-1276.

14. Schlunzen L., Cold GE., Rasmussen M., Feldback J., Gjedde A., **Vafaee M.S.** (2006) Focal changes of cerebral blood flow during isoflurane induced unconsciousness in healthy humans *Acta Anaesthesiol Scand* 50:306-312.

15. Schlunzen L., **Vafaee M.S.**, Cold GE., Rasmussen M., Feldback J., Gjedde A. (2006) "Different concentrations" are more than one. *Acta Anaesthesiol Scand* 50:123-124.

16. Schlunzen L., **Vafaee M.S.** Cold GE. (2007) Acupuncture of LI-4 in anesthetised healthy humans decreases cerebral blood flow in putamen measured with positron emission tomography. *Anaesthesia and analgesia* 104:308-311.

17. Borghammer P., **Vafaee M.S.**, Østergaard K., Rodell A, Bailey C.J., Cumming P. (2008) Effect of memantine CBF and CMRO₂ in patients with early Parkinson's diseases. *Acta Neurol Scand* 117:317-323.

18. Borghammer P., Jonsdottir K., Cumming P., Østergaard K., Vang K., Ashkanian M., **Vafaee M.S.**, Iversen P., Gjedde A. (2008) Normalization in PET group studies. The importance of valid reference region. *Neuroimage*: 40:529-540.

19. Ashkanian M., Borghammer P., Gjedde A., Østergaard L., **Vafaee M.** (2008) Improvement of brain tissue oxygenation by inhalation of carbogen. *Neuroscience* 156:932-938.

20. Iversen P., Sørensen M., Bak LK., Waagepetersen HS., **Vafaee M.S.**, et al (2009) Low cerebral oxygen consumption and blood flow in patients with cirrhosis and acute episode of hepatic encephalopathy. *Gastroenterology* 136:863-71.

21. Ashkanian M., Gjedde A., Mouridsen K., **Vafaee M.**, Vang K., Østergaard L., Andersen G. (2009) Carbogen inhalation increases oxygen transport to hypoperfused brain tissue in patients with occlusive carotid artery disease. *Brain Res.* 1304:90-95.
22. Schlunxen L., **Vafaee MS.**, Juul N., Cold GE, (2010) Regional cerebral blood flow responses to hyperventilation during sevoflurane anaesthesia studied with PET. *Acta Anaesthesio Scand* 54:610-615.
23. Damkjaer M., **Vafaee M.**, Møller ML., Braadd PE., Petersen H., Høilund Carlsen PF, Bie P., (2010) Renal cortical and medullary blood flow responses to altered NO availability in humans. *Am. J. Physiol Regul Integr Comp Physiol* 299:R1449-55.
24. Gjedde A., Aanerud J., Peterson E., Ashkanian M., Iversen P., **Vafaee M.**, Møøler A., Borghammer P. (2011) Variable ATP yields and uncoupling of oxygen consumption in human brain. *Adv Exp Med Biol*:701:243-248.
25. Borghammer P., Cumming P., Østergaard K., Gjedde A., Rodell A., Bailey CJ, **Vafaee M** (2012). Cerebral oxygen metabolism in patients with early Parkinson's disease. *J Neuroscience* 313:123-128.
26. Aanerud J.,Borghammer P., Chakravarty MM., Vang K., Rodell AB., Jonsdottir KY., Møller A., Ashkanian M., **Vafaee M.S.**, Iversen P., Johannsen P., Gjedde A. (2012) Brain energy metabolism and blood flow differences in healthy aging. *J Cereb Blood Flow Metab* 32:1177-88.
27. Damkjær M., **Vafaee M.**, Braad PE., Petersen H., Carlsen PF., Bie P. (2012) Renal cortical and medullary blood flow during modest saline loading in humans. *Acta Physiol* 205: 472-83.
28. **Vafaee MS.**, Vang K., Bergersen L., Gjedde A. (2012) Oxygen consumption and blood flow coupling in human motor cortex during intense finger tapping: Implication for a role of lactate. *J Cereb Blood Flow Metab* 32:1859-68.
29. Andalib S., **Vafaee MS.**, Gjedde A. (2014) Parkinson's disease and mitochondrial variations: A review. (accepted) *J. Neurol Sci.*
30. Mahmoudi J, Sadigh-Eteghad A, Saber B., A., **Vafaee M.S.**, Farhoudi M. (2014) Memory function in Parkinsonian rats. *J. Neurol Sci.* (online ahead of publication)
31. **Vafaee MS.**, Cumming P., Gjedde A. Neuronal basis of cigarette addiction. A PET study of cerebral blood flow and cerebral oxygen consumption. (submitted).
32. **Vafaee MS.**, Gjedde A (2014) Amyloid cascade hypothesis: A cause or an effect? (submitted)