Annual Report 2010

Neurobiology Research Unit
Rigshospitalet and University of Copenhagen

Dept. Neurology, Neuroscience Centre
Rigshospitalet
Faculty of Health Sciences
Copenhagen University

www.nru.dk

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1. Research Facilities

Since June 1996 the Neurobiology Research Unit has been located at Juliane Maries Vej 24 in an old villa named Building 92 at the Rigshospitalet campus. In this house, NRU has offices and facilities for data analysis; with approx. 500 square meters, 19 offices and a conference room with kitchen.

The SPECT laboratory of NRU is located at the Department of Neurology on the 8th floor in the main complex of Rigshospitalet. The laboratory includes a room for the Philips IRIX SPECT scanner, a type B approved isotope laboratory, and a small office. Further office and laboratory facilities are shared with other employees at the department.

The NRU experimental laboratory resides in Building 93, Juliane Maries Vej 20, just opposite Building 92. The ground floor of Building 93 is shared with the Cardiovascular Laboratory. Four laboratory rooms (in total 92.5 m^2) are allocated for NRU, and it shares another three rooms and two offices with the above mentioned research group.

NRU conducts its PET research activities in close collaboration with the PET- and Cyclotron Unit at the Department of Clinical Physiology/Nuclear Medicine, and has access to the PET scanners in the Finsen Building at Rigshospitalet. NRU has a close collaboration with radio-chemists and other key staff members at the PET- and Cyclotron Unit both in research and developmental activities.

2. Objectives, Organization, and Staff

NRU has its main interest within neurotransmission brain research, with particular focus on neuroreceptor imaging and molecular brain imaging. The unit is part of Center for Integrated Molecular Brain Imaging (Cimbi, www.cimbi.org) and is the main partner within Cimbi.

The research group is chaired by Professor, DMSc Gitte Moos Knudsen, Chief Engineer, PhD Claus Svarer is responsible for the data analysis section, and Adjunct Professor, DMSc Jens D. Mikkelsen for the basic neuroscience section. The Chief Technologist is Gerda Thomsen and laboratory leader is PhD Susana Aznar.

In 2010 the research staff consisted of:

Senior Researchers:
Susana Aznar, Biologist, PhD
Anders Ettrup, Human Biologist
Ling Feng, Engineer,
Patrick Fisher, MD, PhD
Vibe Frøkjær, MD, PhD
Steen Hasselbalch, MD, DMSc (half time)
Matthias Herth, Chemist, PhD
Klaus Holst, Biostatistician
Anders Bue Klein, Human Biologist
Gitte Moos Knudsen, Professor, MD, DMSc
Cecilie Löe Licht, Human Biologist, PhD
Lisbeth Marner, MD, PhD
Jens Damsgaard Mikkelsen, MD, PhD
Finn Årup Nielsen, Engineer, PhD*
Olaf B. Paulson, Professor, MD, DMSc
Lars Pinborg, MD, DMSc (half time)
Karam Sidaros, Engineer, PhD*
Morten Skøtt Thomsen, Human Biologist, PhD
Claus Svarer, Engineer, PhD

PhD students:
Agnete Bentsen, Human Biologist
El-Sayed, Mona, human biologist
Mette Haahr, MD
Hanne D. Hansen, Molecular Biologist
Mikael Palner, Engineer
Karine Madsen, MD
Martin Santini, Human Biologist
Morten Ziebell, MD

Junior Researchers:
Christian Gaden Jensen, psychologist
Peter Steen Jensen, Engineer, Center Manager
Brenda McMahon, MD

Students:
Andersen, Anne-Sofie Bech, medical student
Tine Arentzen, biochemistry student
Christian Arndt, medical student
Julie Jacobsen. human biology student
Majbrit Myrup Jensen, human biology student
Christinna Vangsgaard, Jørgensen,
Sofie Lange, molecular biomedical student
Cecilia Ratner, human biology student
Dea Siggaard Stenbæk, psychology student
Muhammad Wasim, student

Technical Administrative Personnel:
Astrid Beck, technologist student
Lasse Kofoed Bech, chemistry student
Ba-Ali, Ashraf, engineer student, IT support
Dorte Frejwald Christiansen, secretary
Lone Freyr, nurse
Dorthe Givard, secretary
Dainius Griguzauskas, engineer student
Troels Kofoed Jacobsen, IT support
Jakob Janot, IT support
Christine B. Janssens, medical technologist
Hans Jørgen Jensen, medical technologist
Jack Frausing Nielsen, medical technologist
Kenneth Nielsen, IT support
Svitlana Olsen, medical technologist
Jahangeer Sakhi, psychologist, conscientious objector
Rasmus Sichlau, research assistant
Glenna Skouboe, medical technologist
Mikkel Søllbeck, pharmacy student
Gerda Thomsen, Chief technologist
Paul Weisbjerg, pharmacy student

* shared with another research group

Guest Researchers:
Caroline Ancel, human biologist Andersen, INCI Strasbourg, Frankrig
Ana del Mar Ruiz Munoz, University of Almeria, Spain
Annelies Weyn, human biology student, Max Planck Institute of Immunobiology, Germany

3. Collaborators in 2010

Center for Integrated Molecular Brain Imaging, Cimbi

www.cimbi.org

Cimbi consists of a multidisciplinary collaboration among institutes and departments in the Copenhagen area. These institutions include:

- Department of Medicinal Chemistry, The Danish University of Pharmaceutical Sciences
- Danish Research Center for Magnetic Resonance, Hvidovre Hospital
- The PET and Cyclotron Unit, Rigshospitalet
- Informatics and Mathematical Modelling, Technical University of Denmark
- Neurobiology Research Unit, Rigshospitalet
- Department of Psychology, University of Copenhagen
- Department of Medical Biochemistry & Genetics (IMBG), University of Copenhagen
- Department of Health Psychology, University of Copenhagen

EU 6th Framework Programme

DiMI - Diagnostic Molecular Imaging (LSHB-CT-2005-512146)

The goal of the Network of Excellence "Diagnostic Molecular Imaging" (DiMI) - Molecular Imaging for Diagnostic Purposes - is to integrate multidisciplinary research for the development of new probes and multimodal non-invasive imaging technology for early diagnosis, assessment of disease progression and treatment evaluation.

The general objectives of DiMI are to coordinate and efficiently integrate more than 50 research groups from various disciplines to study non-invasively gene expression and function in major diseases such as neurodegeneration, stroke, heart failure, atherosclerosis and autoimmune diseases.

For further information, please visit www.dimi-net.org.

NRU is training platform for image and data analyses for DiMI partners.

The program terminated in October 2010.

EU 7th Framework Programme

EURIPIDES - European Research initiative to develop Imaging Probes for early In-vivo Diagnosis and Evaluation of response to therapeutic Substances is a four year, i7 million project, funded by the European Union under European Framework Programme 7 (FP7). Co-ordinated by Dr. Matthias Koepp from the Institute of Neurology at University College London, the project aims to develop new radiotracers for imaging of the P-glycoprotein (P-gp) transporter using PET and validating current PET tracers in patients with suspected over-expression of P-gp function, contributing to drug resistance.

It is hoped that the study will provide both functional evidence in support of the transporter hypothesis of drug resistance, and a potential tool for the prediction of transporter-mediated resistance in patients with major neurological or neurodegenerative conditions as well as patients with tumours.

Measuring Endogeneous Transmitter Release with PET-tracers (METPETS)

Neurotransmitters are mediating a large part of the communication between nerve cells in the brain, so a key goal of neuroscience is to identify the factors regulating this release. PET and SPECT techniques are currently the only way in which neurotransmitter release in the brain can be measured; this is well proven for one transmitter, dopamine, where studies have revealed important roles in addiction, schizophrenia, and depression. However, the challenges of developing such tracers are so immense that over the past decade there has been little progress with tracers for other transmitters despite the clear need. The best way to progress this critical area is to enable the major European imaging centres to act as an integrated network.

European Network of Excellence for Brain Imaging under the umbrella of the EANM

SPECT Centres from Italy, Germany, Belgium, Netherlands, Austria, Denmark, United Kingdom, France, and Spain.

Companies

EGIS, Budapest, Hungary

Glaxo SmithKline Beecham, London, UK

H. Lundbeck A/S

MAP Medical, Helsinki, Finland

NeuroSearch A/S

Philips Medical Systems

4. Publications

Doctoral and PhD theses

de Nijs R. Corrections in clinical Magnetic Resonance Spectroscopy and SPECT: Motion correction in MR spectroscopy, Downscatter correction in SPECT. Forsvaret 2. marts 2010 ved Danmarks Tekniske Universitet, Institut for Informatik og Matematisk Modellering.

Ettrup, A. Serotonin receptor studies in the pig brain: pharmacological intervention and positron emission tomography tracer development. København:Eget Forlag 2010:1-52. Forsvaret d. 15. oktober 2010 ved Københavns Universitet, Det Sundhedsvidenskabelige Fakultet.

Klein AB. Brain-Derived Neurotrophic Factor (BDNF): Interactions with the serotonergic system and its potential as a biomarker in neurological and neuropsychiatric diseases. København:Eget forlag 2010:1-62. Forsvaret d. 17. september 2010 ved Københavns Universitet, Det Sundhedsvidenskabelige Fakultet.

Master theses

Cecilia Ratner: The serotonergic transmitter system in relation to appetite and body weight (Supervisor Gitte Moos Knudsen).

Majbrit Myrup Jensen: In Vitro Studies of Dopamine Release (Supervisor Gitte Moos Knudsen and Jens D. Mikkelsen)

Peer-Reviewed Full-Length Publications

Ansel L, Bolborea M, Bentsen AH, Klosen P, Mikkelsen JD, Simonneaux V. Differential regulation of kiss1 expression by melatonin and gonadal hormones in male and female Syrian hamsters. J Biol Rhythms. 2010;25(2):81-91.

Axel AM, Mikkelsen JD, Hansen HH. Tesofensine, a Novel Triple Monoamine Reuptake Inhibitor, Induces Appetite Suppression by Indirect Stimulation of alpha(1) Adrenoceptor and Dopamine D(1) Receptor Pathways in the Diet-Induced Obese Rat. Neuropsychopharmacology 2010;35(7):1464-76.

Aznar S, Klein AB, Santini MA, Knudsen GM, Henn F, Gass P, Vollmayr B. Aging and depression vulnerability interaction results in decreased serotonin innervation associated with reduced BDNF levels in hippocampus of rats bred for learned helplessness. Synapse 2010;64(7):561-5.

Baaré WF, Vinberg M, Knudsen GM, Paulson OB, Langkilde AR, Jernigan TL, Kessing LV. Hippocampal volume changes in healthy subjects at risk of unipolar depression. J Psychiatr Res 2010;44(10):655-62.

Bentsen AH, Ansel L, Simonneaux V, Tena-Sempere M, Juul A, Mikkelsen JD. Maturation of kisspeptinergic neurons coincides with puberty onset in male rats. Peptides 2010;31(2):275-83.

Benveniste H, Fowler JS, Rooney WD, Scharf BA, Backus WW, Izrailtyan I, Knudsen GM, Hasselbalch SG, Volkow ND. Cocaine is Pharmacologically Active in the Non-Human Primate Fetal brain. Proc Natl Acad Sci U S A 2010;107(4):1582-7.

Bundzikova J, Pirnik Z, Zelena D, Mikkelsen JD, Kiss A. The alpha(2)-adrenoceptors do not modify the activity of tyrosine hydroxylase, corticoliberine, and neuropeptide Y producing hypothalamic magnocellular neurons ion the Long Evans and Brattleboro rats. J Physiol Pharmacol 2010;61(4):391-8

Castellano JM, Bentsen AH, Romero M, Pineda R, Ruiz-Pino F, Garcia-Galiano D, Sanchez-Garrido MA, Pinilla L, Mikkelsen JD, Tena-Sempere M. Acute inflammation reduces kisspeptin immunoreactivity at the arcuate nucleus and decreases responsiveness to kisspeptin independently of its anorectic effects. Am J Physiol Endocrinol Metab 2010;299(1):E54-61.

Castellano JM, Bentsen AH, Mikkelsen JD, Tena-Sempere M. Kisspeptins: Bridging energy homeostasis and reproduction. Brain Res 2010;1364:129-38.

Christensen DZ, Mikkelsen JD, Hansen HH, Thomsen MS. Repeated administration of α7 nicotinic acetylcholine receptor (nAChR) agonists, but not positive allosteric modulators, increases α7 nAChR levels in the brain. J Neurochem 2010;114(4):1205-16.

de Nijs R, Holm S, Thomsen G, Ziebell M, Svarer C. Experimental determination of the weighting factor for the energy window subtraction-based downscatter correction for I-123 in brain SPECT studies. J Med Phys 2010;35(4):215-22.

Desroziers E, Mikkelsen J, Simonneaux V, Keller M, Tillet Y, Caraty A, Franceschini I. Mapping of kisspeptin fibres in the brain of the pro-oestrous rat. J Neuroendocrinol. 2010 Oct;22(10):1101-12.

Ebdrup BH, Glenthøj B, Rasmussen H, Aggernaes B, Langkilde AR, Paulson OB, Lublin H, Skimminge A, Baaré W. Hippocampal and caudate volume reductions in antipsychotic-naive first-episode schizophrenia. J Psychiatry Neurosci 2010;35(2):95-104.

Erritzøe D, Frøkjær VG, Haahr MT, Kalbitzer J, Svarer C, Holst KK, Hansen DL, Jernigan TL, Lehel S, Knudsen GM. Cerebral serotonin transporter binding is inversely related to body mass index. Neuroimage 2010;52(1):284-9.

Erritzøe D, Holst K, Frøkjær VG, Licht CL, Kalbitzer J, Nielsen FA, Svarer C, Madsen J, Knudsen G. A Nonlinear Relationship between Cerebral Serotonin Transporter and 5-HT2A Receptor Binding: An In Vivo Molecular Imaging Study in Humans. J Neurosci 2010;30(9):3391-7.

Ettrup A, Palner M, Gillings N, Santini MA, Hansen M, Kornum BR, Rasmussen LK, Någren K, Madsen J, Begtrup M, Knudsen GM. Radiosynthesis and evaluation of [11C]Cimbi-5 as a 5-HT2A receptor agonist radioligand for PET. J Nucl Med 2010;51(11):1763-70

Frøkjær VG, Erritzøe D, Juul A, Nielsen FA, Holst K, Svarer C, Madsen J, Paulson OB, Knudsen GM. Endogenous plasma estradiol in healthy men is positively correlated with cerebral cortical serotonin 2A receptor binding. Psychoneuroendocrinology. 2010;35(9):1311-20.

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Hansen HH, Hansen G, Tang-Christensen M, Larsen PJ, Axel AM, Raben A, Mikkelsen JD. The novel triple monoamine reuptake inhibitor tesofensine induces sustained weight loss and improves glycemic control in the diet-induced obese rat: Comparison to sibutramine and rimonabant. Eur J Pharmacol 2010;636(1-3):88-95.

Holm P, Ettrup A, Klein AB, Santini MA, El-Sayed M, Elvang AB, Stensbøl TB, Mikkelsen JD, Knudsen GM, Aznar S. Plaque deposition dependent decrease in 5-HT_2A serotonin receptor in APP**swe/PS1dE9 amyloid overexpressing mice. J Alzheimers Dis 2010;1;20(4):1201-13

Kalbitzer J, Erritzoe D, Holst KK, Nielsen FA, Marner L, Lehel S, Arentzen T, Jernigan TL, Knudsen GM.

Seasonal changes in brain serotonin transporter binding in short serotonin transporter linked polymorphic region-allele carriers but not in long-allele homozygotes. Biol Psychiatry. 2010;67(11):1033-9.

Kelsen J, Larsen MH, Sørensen JC, Møller A, Frøkiær J, Nielsen S, Nyengaard JR, Mikkelsen JD, Rønn LC. Neuronal precursor cell proliferation in the hippocampus after transient cerebral ischemia: a comparative study of two rat strains using stereological tools. Exp Transl Stroke Med 2010;6;2:8.

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Knudsen S, Mikkelsen JD, Bang B, Gammeltoft S. og Jennum PJ: Intravenous immunoglobulin treatment and screening for hypocretin neuron-specific autoantibodies in recent onset childhood narcolepsy with cataplexy: Neuropediatrics. 2010;41(5), 217-22.

Koefoed P, Woldby DPD, Hansen TO, Hansen ES, Knudsen GM, Bolwig TG, Rehfeld JF. Gene variations in the cholecystokinin system in patients with panic disorder. Psychiatr Genet 2010;20(2):59-64.

Kornum BR, Stott SR, Mattsson B, Wismann L, Ettrup A, Hermening S, Knudsen GM, Kirik D. Adeno-associated viral vector serotypes 1 and 5 targeted to the neonatal rat and pig striatum induce widespread transgene expression in the forebrain. Exp Neurol 2010;222:70-85

Kramer V, Herth MM, Santini MA, Palner M, Knudsen GM, Rösch F. Structural combination of established 5-HT2A receptor ligands: New aspects of binding mode. Chem Biol Drug Des. 2010;76(4):361-6.

Kupers R, Chebat DR, Madsen KH, Paulson OB, Ptito M. Neural correlates of virtual route recognition in congenital blindness. Proc Natl Acad Sci U S A 2010;107(28):12716-21.

Licht CL, Kirkegaard L, Zueger M, Chourbaji S, Gass P, Aznar S, Knudsen GM. Changes in 5-HT4 receptor and 5-HT transporter binding in olfactory bulbectomized and glucocorticoid receptor heterozygous mice. Neurochem Int 2010;56(4):603-10.

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Madsen KS, Baaré WF, Vestergaard M, Skimminge A, Ejersbo LR, Ramsøy TZ, Gerlach C, Akeson P, Paulson OB, Jernigan TL. Response inhibition is associated with white matter microstructure in children. Neuropsychologia 2010;48(4):854-62.

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Nielsen SB, Franzmann M, Basaiawmoit RV, Wimmer R, Mikkelsen JD, Otzen DE. beta-sheet aggregation of kisspeptin-10 is stimulated by heparin but inhibited by amphiphiles. Biopolymers. 2010;93(8):678-89.

Palner M, McCormick P, Gillings N, Begtrup M, Wilson AA, Knudsen GM. Radiosynthesis and ex vivo evaluation of (R)-(-)-2-chloro-N-[1-11C-propyl]n-propylnorapomorphine. Nucl Med Biol 2010;37(1):35-40.

Palner M, McCormick P, Parkes J, Knudsen GM, Wilson AA. Systemic catechol-O-methyl transferase inhibition enables the D1 agonist radiotracer R-[11C]SKF 82957. Nucl Med Biol 2010;37(7):837-43.

Paterson LM, Tyacke RJ, Nutt DJ, Knudsen GM. Measuring endogenous 5-HT release by emission tomography: promises and pitfalls. J Cereb Blood Flow Metab. 2010;30(10):1682-706

Paulson OB, Hasselbalch SG, Rostrup E, Knudsen GM, Pelligrino D. Cerebral blood flow response to functional activation. J Cerebral Blood Flow Metab 2010;30(1):2-14

Prabhakaran J, Majo JM, Milak MS, Kassir SA, Palner M, Savenkova L, Mali P, Arango V, Mann JJ, Parsey RV. Synthesis, in vitro and in vivo evaluation of [11C]MMTP: A potential PET ligand for mGluR1 receptors. Bioorg Med Chem Lett 2010;20(12):3499-501.

Rasmussen H, Erritzøe D, Andersen R, Ebdrup BH, Aggernaes B, Oranje B, Kalbitzer J, Madsen J, Pinborg LH, Baaré W, Svarer C, Lublin H, Knudsen G, Glenthoj B. Decreased frontal serotonin2A receptor binding in antipsychotic-naïve patients with first-episode schizophrenia. Arch Gen Psychiatry 2010;67(1):9-16

Thomsen MS, Hansen HH, Mikkelsen JD. Opposite effect of phencyclidine on activity-regulated cytoskeleton-associated protein (arc) in juvenile and adult limbic rat brain regions. Neurochem Int 2010;56(2):270-5.

Thomsen MS, Hansen HH, Timmerman DB, Mikkelsen JD. Cognitive improvement by activation of alpha7 nicotinic acetylcholine receptors: from animal models to human pathophysiology. Curr Pharm Des 2010;16(3):323-43.

Thomsen MS, Hay-Schymidt A, Hansen HH, Mikkelsen JD. Distinct neural pathways mediate alpha7 nicotinic acetylcholine receptor-dependent activation of the forebrain. Cereb Cortex 2010;20(9):2092-102.

Thomsen MS, Hansen HH, Mikkelsen JD. Alpha 7 nicotinic receptor agonism mitigates phencyclidine-induced changes in synaptophysin and Arc gene expression in the mouse prefrontal cortex. Neurochem Int. 2010;57(7):756-61.

Vinberg M, Frøkjær VG, Kessing LV. Coping styles in healthy individuals at risk of affective disorder. J Nerv Ment Dis 2010;198(1):39-44

Vrang N, Meyre D, Froguel P, Jelsing J, Tang-Christensen M, Vatin V, Mikkelsen JD, Thirstrup K, Larsen LK, Cullberg KB, Fahrenkrug J, Jacobson P, Sjöström L, Carlsson LM, Liu Y, Liu X, Deng HW, Larsen PJ. The imprinted gene neuronatin is regulated by metabolic status and associated with obesity. Obesity (Silver Spring) 2010;18(7):1289-96.

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Ziebell M, Holm-Hansen S, Thomsen G, Wagner A, Jensen P, Pinborg LH, Knudsen GM. Serotonin transporters in dopamine transporter imaging: A head-to-head comparison of dopamine transporter SPECT radioligands [123I]FP-CIT and [123I]PE2I. J Nucl Med 2010;51(12):1885-91.

Textbooks and Reviews

Eskesen V, Paulson OB. Bevidsthedssvækkelse og bevidstløshed. I Paulson OB, Gjerris F, Sørensen PS (eds). Klinisk neurologi og neurokirurgi. 5. udg. København: FADL, 2010:195-211.

Hansen K, Knudsen GM. Nervesystemets infektioner. I Paulson OB, Gjerris F, Sørensen PS (eds). Klinisk neurologi og neurokirurgi. 5. udg. København: FADL, 2010:451-471.

Knudsen GM, Sørensen PS. Neurologiske komplikationer til systemsygdomme. I Paulson OB, Gjerris F, Sørensen PS (eds). Klinisk neurologi og neurokirurgi. 5. udg. København: FADL, 2010:639-657

Knudsen GM, Paulson OB. Hjernens fysiologi. I Paulson OB, Gjerris F, Sørensen PS (eds). Klinisk neurologi og neurokirurgi. 5. udg. København: FADL, 2010:239-254.

Paulson OB, Højgaard, L. Kortlægning af hjernens fysiologi og funktioner – de danske bidrag og den danske udvikling. Medicinsk Teknologi og Informatik 2010;7(4):30-32.

Paulson OB, Gjerris F, Sørensen PS (eds). Klinisk neurologi og neurokirurgi. 5. udg. København: FADL, 2010:1-675.

Paulson OB, Gjerris F. Introduktion til klinisk neurologisk undersøgelse. I Paulson OB, Gjerris F, Sørensen PS (eds). Klinisk neurologi og neurokirurgi. 5. udg. København: FADL, 2010:15-19.

Paulson OB, Sørensen PS. Det sensoriske system. I Paulson OB, Gjerris F, Sørensen PS (eds). Klinisk neurologi og neurokirurgi. 5. udg. København: FADL, 2010:51-62.

Paulson OB, Gjerris F. Det motoriske system. I Paulson OB, Gjerris F, Sørensen PS (eds). Klinisk neurologi og neurokirurgi. 5. udg. København: FADL, 2010:63-107.

Paulson OB, Sørensen PS. Intoksikationer og ernæringsdeficit. I Paulson OB, Gjerris F, Sørensen PS (eds). Klinisk neurologi og neurokirurgi. 5. udg. København: FADL, 2010:565-584.

Thomsen G, Knudsen GM. Procedure Guideline for Brain Perfusion SPECT Using 99mTc Radiopharmaceuticals 3.0. J Nucl Med Technol 2010;38(4):209.

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Other (abstracts not included)

Frøkjær V. Ny viden om vinterdepression. DR Update 17.02.2010

Knudsen GM. Et gen kan give vinterdepression. Sundhed på P1, DR, 18.01.2010. http://www.dr.dk/P1/Sundhed/Udsendelser/2010/01/14154311.htm

Knudsen GM. Nyt om vinterdepressioner. Lounge TV2 Lorry 03.03.2010 http://www.tv2regionerne.dk/?id=532486&r=5

Multicenter Studies without co-authorship

Teodorczuk A, Firbank MJ, Pantoni L, Poggesi A, Erkinjuntti T, Wallin A, Wahlund LO, Scheltens P, Waldemar G, Schrotter G, Ferro JM, Chabriat H, Bazner H, Visser M, Inzitari D, O'Brien JT; LADIS Group. Relationship between baseline white-matter changes and development of late-life depressive symptoms: 3-year results from the LADIS study. Psychol Med. 2010;40(4):603-10

Verdelho A, Madureira S, Moleiro C, Ferro JM, Santos CO, Erkinjuntti T, Pantoni L, Fazekas F, Visser M, Waldemar G, Wallin A, Hennerici M, Inzitari D; LADIS Study. White matter changes and diabetes predict cognitive decline in the elderly: the LADIS study. Neurology. 2010 Jul 13;75(2):160-7.

5. Other Activities

5.1 Congress Participation

The staff of NRU has participated in 38 international and national meetings and congresses related to their research fields. Staff members have participated as evaluators of abstracts and as chairmen at scientific sessions.

5.2 Congress/Symposium Organizing

Anniversary Symposium in honour of the 70th birthday of Professor Olaf B. Paulson August 13 2010, Rigshospitalet, Copenhagen.
NRU Christmas Symposium, December 17, 2010

5.3 Pre- and Postgraduate Teaching

PhD course: Basic Kinetic Modeling in Molecular Imaging, Copenhagen, 1.-5.2.2010 (Gitte Moos Knudsen)

Pregraduate Supervision:

Human Biology Project II: Cecilia Friis Ratner: The serotonergic transmitter system in relation to appetite and body weight (Supervisor: Gitte Moos Knudsen)

Master Thesis: Majbrit Myrup Jensen: In Vitro Studies of Dopamine Release (Supervisor: Jens D. Mikkelsen)

Bachelor project: Morten Sommerfeldt Skeid: The effect of MDMA on the serotonin system (Supervisor: Gitte Moos Knudsen)

Bachelor project: Christian Arndt: Sæsonvariationer i det serotonerge system - fokus på serotonin transporteren (Supervisor: Gitte Moos Knudsen)

Bachelor project: Usman Khalid: Brain-derived neutrophic factor in Parkinson's disease (Supervisor: Gitte Moos Knudsen)

Bachelor project: Muhammed Ali Hadi: The importance of microglia in developing neurological disorders and the use of positron emission tomography in monitoring it. (supervisor: Lars H. Pinborg)

5.4 International Exchange

Master Thesis student Sofie Lange: The City College of New York, Sophie Davis School of Biomedical Education at Dr. Haou-Yan Wang, New York,

5.5 National and International Committees

National Committees:

Vice Chairman, Department of Neurology, Psychiatry and Sensory Sciences, University of Copenhagen (Olaf B. Paulson)

Chairman of the Research Committee of the Neuroscience Centre at Rigshospitalet (Olaf B. Paulson)

Member of the Research Committee of Hvidovre Hospital (Olaf B. Paulson)

President of the Danish Society of Neurology (Olaf B. Paulson)

Member of the board of directors of the Elsass Foundation (Olaf B. Paulson)

President of the Danish Society for Neuroscience (Gitte Moos Knudsen)

Chairman for the steering group for research laboratories at Rigshospitalet from 1999 (Gitte Moos Knudsen)

Board member of the Strategic Research Council, Ministry of Science and Innovation (Gitte Moos Knudse)

RH representative in the Danish Agency for Science, Technology and Innovation's EU 7th Framework Programme Committee (Gitte Moos Knudsen)

Chairman of the neuro-group regarding Neuropsychiatry Publications, Danish Agency for Science, Technology and Innovation since 2008 (Gitte Moos Knudsen)

Vice-chairman and member of the board of directors of the Danish Alzheimer Association (Steen Hasselbalch)

Member of the board of the Danish Society of Neurology (Lars H. Pinborg)

International Committees:

Member of the Executive Committee for the European Collegium of Neuropsychopharmacology (Gitte Moos Knudsen)

Member of the program committee for Training Courses at the Brain11 Meeting in Barcelona.

Member of the Editorial Board of the Journal of Cerebral Blood Flow and Metabolism from 2000 (Gitte Moos Knudsen)

Member of the Editorial Board of the Journal of Cerebral Blood Flow and Metabolism from 2009 (Steen Hasselbalch)

Member of the Steering Group for the Network of Excellence Diagnostic Molecular Imaging (DiMI) since 2005 (Gitte Moos Knudsen)

Scientific Advisory Board Member, Health Science Faculty, University of Lund since 2008 (Gitte Moos Knudsen)

Scientific Advisory Board Member, NevroNor, The Norwegean Research Council since 2008 (Gitte Moos Knudsen)

Scientific Advisor for the British Medical Research Council (Olaf B. Paulson)

Evaluation:

Evaluator of PhD thesis: Nele Evans, Leuwen: Synthesis and biological evaluation of radioligands for in vivo visualization of type 2 cannabinoid receptor using positron emission tomography (Gitte Moos Knudsen)

Evaluator of PhD thesis: Stephan Bramow: Pathological correlates of multiple sclerosis - New emphasis on the progressive forms (Gitte Moos Knudsen)

Evaluator for EFU (erhvervsforskerudvalget), Danish Agency for Science, Technology and Innovation (Jens Damsgaard Mikkelsen)

Evaluator for the EU 7th framework programme (Jens Damsgaard Mikkelsen)

External examiner at the Technical University of Denmark and Aalborg University (Claus Svarer)

Finally, staff members of NRU regularly conduct peer-reviews for several international journals and at international congresses

6. SPECT Laboratory

Clinical scans

A total of 420 clinical scans have been performed in 2010, 102 with the dopamine transporter ligand [^{123}I]-PE2I, the remaining with ^{99m}Tc-HMPAO. Furthermore, a total of 22 SISCOM-analyses were performed.

New clinical diagnostic tools implemented during 2010

Dopamine transporter (DAT) and [^{123}I]-PE2I described both visually and with semi-quantitative analysis correlated to age-matched healthy subjects database (see figure 1), implementation completed January 2010.

Research projects carried out in 2010

- ^{123}I-PE2I SPECT as a diagnostic tool in clinically uncertain parkinsonian syndromes
- European database of [^{123}I]-FP-CIT (DATSCAN) SPECT scans of healthy controls (ENC-DAT)
- Head-to-head comparison of the DAT tracers [^{123}I]-PE2I and [^{123}I]-FP-CIT in healthy subjects (see figure 2)
- [^{123}I]-PE2I SPECT in clinically uncertain parkinsonian syndromes and BDNF
- [^{123}I]-PE2I SPECT and NPH

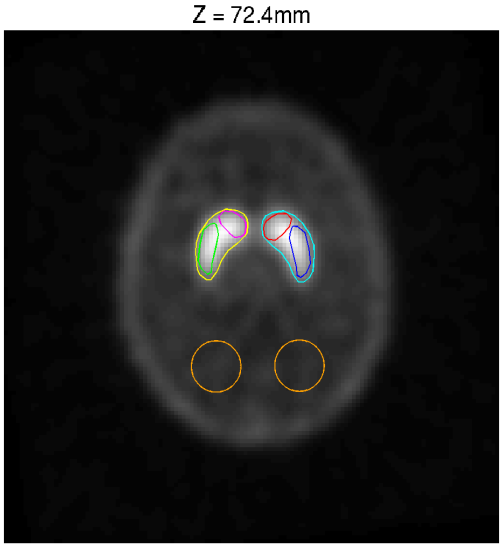

***Figure1**: Central slice of the PE2I template illustrating positionand configuration of the manually defined template ROIs*

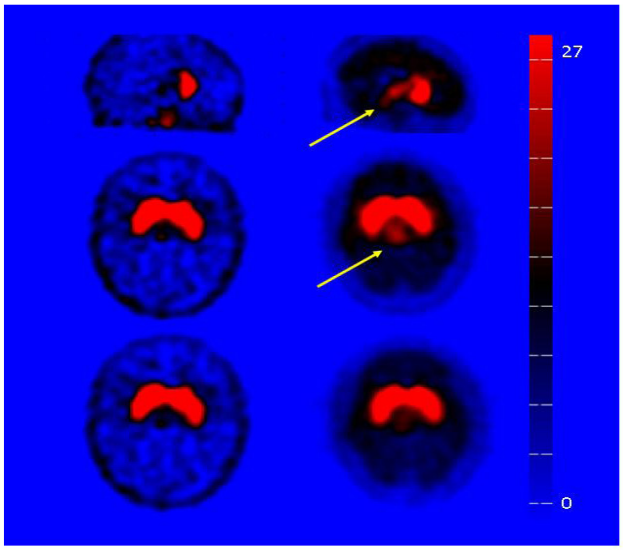

***Figure 2:** ^{123}I-PE2I image (left) and ^{123}I-FP-CIT image (right) of the same individual. In the upper and middle row (sagittal and horizontal slices) thalamus is clearly visualized on the ^{123}I-FP-CIT image (arrows). Bottom row shows images after acute SERT blocking with citalopram. From Ziebell et al, 2010.*

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