Word of welcome

On behalf of University of Zagreb School of Medicine, Croatian Institute for Brain research and GlowBrain team we are pleased to present the Abstract Book of the GlowBrain Workshop “Visualization of molecular markers in the brain”.

We have compiled a stimulting program of lectures, discussions, demonstrations and poster sessions.

Thank you for coming to Zagreb and hope that this Abstract Book will provide you with an important reference of the recent advances in molecular markers for brain research.

Organizing Committee

Venue:
Croatian Institute for Brain Research

Local Organizers from University of Zagreb School of Medicine, Croatian Institute for Brain Research:
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Dinko Mitrečić
Aleksandra Sinđić
Marija Ćurlin

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Ferhatović Hamzić Lejla, *Postdoctoral Researcher*
Lovrić Marija, *Senior Scientist*
Pavičić Josip, *Experienced Engineer*
Pochet Roland, *Research Manager*
Pongrac Igor, *Postdoctoral Researcher*
Radmilović Marin, *Researcher*
Renić Marija, *Senior Scientist*
Škokić Siniša, *Experienced Engineer*
Ulični Olja, *Administrative Officer*

WORKSHOP PROGRAM

THURSDAY, JANUARY 29

9:00 – 9:30 Workshop opening

OPEN SESSION
SESSION 1. BRAIN REPAIR AND NEUROINFLAMMATION
- 9:30 – 10:00 ***Mitrečić D. :*** *"Migration, differentiation and synaptogenic potential of neural stem cells transplanted into the mouse brain affected by stroke"*
- 10:00 – 10:30 ***Grazia De Simoni M. :*** *"Microglia: old axioms, novel concepts"*
- 10:30 – 11:00 ***Gadjanski I. :*** *"MRI and OCT (optical coherence tomography) in experimental optic neuritis and uveoretinis"*

11.00. – 11.30. Coffee break

SESSION 2. BIOMATERIALS AND NEUROREGENERATION
- 11:30 – 12:00 ***Casarosa S. :*** *"Alginate-based injectable hydrogels for brain tissue repair"*
- *12:00 – 12:30 Kubinová S. : "Biomaterials and stem cells in the spinal cord injury treatment"*
- 12:30 – 13:00 ***Klimaschewski L. :*** *"Sprouty reduction inhibits neurodegeneration and promotes axonal regeneration"*

13:00 – 14:00 Lunch time

SHORT LECTURES OF PARTICIPANTS / STUDENTS
- 14:00 – 14:10 ***Hammelrath L. :*** *"Longitudinal imaging studies in rodents: merits and challenges"*
- 14:10 – 14:20 ***Pongrac I. :*** *"In Vitro Evaluation of Poly(L-Lysine)-Coated Maghemite Nanoparticles For Neural Stem Cell Labeling"*
- 14:20 – 14:30 ***Tratnjek L. :*** *"Dopaminergic modulation of synaptotagmin IV expression in animal model of Parkinson disease"*
- 14:30 – 14:40 ***Hamzei Taj S. :*** *"Dynamic modulation between detrimental and beneficial polarization of microglia/macrophage by miR-124 after focal cerebral ischemia"*
- 14:40 – 14:50 ***Ivić V. :*** *"OBR in stem cells in rat adrenal gland"*
- 14:50 – 15:00 ***Stipčević T. :*** *"The Autoimmune Diseases Diabetes Type I and Rheumatoid Arthritis are Associated with Alterations in the Hippocampal Glycoconjugates as a Consequence of the Nervous and the Immune System Related Disease Activity"*

15:00 – 15:30 Coffee break

SESSION 3. STROKE AND ISCHEMIA STRATEGIES
- 15:30 – 16:00 ***Gajović S. :*** *"Bioluminescent imaging of TLR2, GAP43 and CASP3 activity to visualize molecular processes in the mouse brain after stroke"*
- 16:00 – 16:30 ***Jolkkonen J. :*** *"Intravascular cell transplantation in stroke - promises and challenges"*
- 16:30 – 17:00 ***McGuckin C. :*** *"Ischemic brain injury: a consortium analysis of key factors involved in mesenchymal stem cell-mediated inflammatory reduction."*
- 17:00 – 17:30 ***Kokaia Z. :*** *"Post-stroke neurogenesis from striatal astrocytes"*

17:30 – 19:00 Free Discussions and walk to the venue of the Public Event

19:00 Public Event (Hotel Dubrovnik, Zagreb)
Hoehn M. : "*Watching stem cells "live at work" in the brain – their role for therapy"*
Rosenzweig I. : *"Sleep Apnoea and the Brain"*

FRIDAY, JANUARY 30

Practical Demonstrations for participants/students:
9:00 – 13:00 Demonstration topics – 3 laboratory demonstrations

1. Bioluminescence in vivo imaging
2. Stereotaxic Injections of Neural Stem Cells into the Adult Mouse Brain / Cell Encapsulation in the Alginate Beads
3. Primary Microglia Isolation from Neonatal Mouse Brain Tissue

CLOSED SESSION
09:00 – 10:00 GlowBrain Steering Committee meeting

10:00 – 13:00 Multilateral discussions about the future projects
(coffee and finger food provided on site)

13:00 – 14:00 Lunch time

OPEN SESSION
SESSION 4. BRAIN DAMAGE AND REPAIR

- 14:00 – 14:30 ***Aigner L.*** *: "Reactive Neurogenesis and Neuroinflammation: What do we really mean?"*
- 14:30 – 15:00 ***Rosenzweig I.*** *: "Sleep Apnoea and the Brain: A Complex Relationship "*
- 15:00 – 15:30 ***Majdič G.*** *: "Neonatal and pubertal stress affects mice behavior in adult life"*
- 15:30 – 16:00 ***Lacza Z.*** *: "Regenerative medicine solutions in osteoarthrosis and bone ischemia"*

16:00 – 16:30 Coffee break

SESSION 5. MRI AND NANOPARTICLES

- 16:30 – 17:00 ***Hoehn M.*** *: "Labeling strategies to observe cell dynamics in vivo"*
- 17:00 – 17:30 ***Janowski M.*** *: "Real-time MRI for monitoring and prediction of engineered stem cell delivery to the CNS"*
- 17:30 – 18:00 ***Oliveira M.*** : *"Functionalized nanoparticles with natural-derived polymers for intracellular drug delivery and cell-tracking in Tissue Engineering"*
- 18:00 – 18:30 ***Sandor G.*** : *"Regional Cooperation for understanding of Common Mechanisms of Diseases "*

18:30 – 19:30 Poster session (coffee provided on site)

19:30 – Workshop Dinner

SATURDAY, JANUARY 31

OPEN SESSION
SESSION 6. NANOPARTICLES AND IMAGING

- 9:00 – 9:30 ***Horák D. :*** *"Use of magnetic core/polymer shell nanoparticles in biomedicine"*
- 9:30 – 10:00 ***Vinković Vrček I. :*** *"Cell viability protocols for evaluation of biocompatibility of metallic nanoparticles"*
- 10:00 – 10:30 ***Manescu A. :*** ***"****High resolution synchrotron radiation tomography for biomedical applications"*

10:30 – 11:00 Coffee break

SESSION 7. NEUROGENESIS

- 11:00 – 11:30 ***Couillard-Despres S. :*** *"Prenylflavonoids for the regeneration of the adult CNS"*
- 11:30 – 12:00 ***Bosnakovski D. :*** *"DUX4, a gene involved in Facioscapulohumeral muscular dystrophy (FSHD), most likely plays a role in early neurogenesis"*
- 12:00 – 12:30 ***Dinnyés A. :*** *"Neuronal differentiation of human patient specific induced pluripotent stem cells"*

12:30 – 13:00 Round table discussion on the Workshop and
closing of the Workshop

13:00 – 14:00 Lunch time

List of posters (in alphabetical order):

1. **Alić I.:** Expression of THY1 – YFP during in vitro differentionation of neural stem cells
2. **Babić M.**: I Phospho-tau proteins in cerebrospinal fluid as markers of therapeutic progress in Alzheimer's disease
3. **Bajrović F.**: Synaptotagmin 4 mRNA expression as an inducible indicator of dopaminergic hyperexcitation and of glutamatergic excitotoxicity
4. **Bogičević S.**: Characterization of antipsychotic and anti-addictive efficacy of LEK-8829 after the prolonged treatment
5. **Bozza A.**: Efficient neuronal differentiation of pluripotent cells in three-dimensional culture
6. **Dobrivojević M.**: The effects of natriuretic peptides on the bradykinin signaling pathway after ischemic brain injury
7. **Gorup D.**: GAP43-CASP3 increase after onset of stroke in mouse
8. **Hammelrath L.**: Longitudinal imaging studies in rodents: merits and challenges
9. **Hamzei Taj S.**: Dynamic modulation between detrimental and beneficial polarization of microglia/macrophage by miR-124 after focal cerebral ischemia
10. **Ivić V.**: OBR in stem cells in rat adrenal gland
11. **Kafka A.**: Changes of central mediators of Wnt signaling DVL1 and DVL3 in human glioblastoma
12. **Knezović A.**: Correaltion between astroglial changes, cognitive and cholinergic deficit in a rat model of sporadic Alzheimer's desease: Lond-term follow up
13. **Kosi N.**: Expression of proteins involved in synapse formation in embryonica neural stem cells transplanted into ischemically injured mouse brain
14. **Lovrić M.**: Interferences of Metal-based Nanoparticles with In Vitro Viability Assays
15. **Matak I.**: Immunofluorescent visualization of botulinum neurotoxin type A endopeptidase activity in the rat central sensory and motor regions

16. **Polšek D.**: Transplanted mesenchymal stem cells modulate TLR2 signal after stroke
17. **Pongrac I. M.**: In Vitro Evaluation of Poly(L-Lysine)-Coated Maghemite Nanoparticles For Neural Stem Cell Labeling
18. **Rajić J.**: Microglial activation after repetitive traumatic brain injury in the mouse
19. **Regul J.**: D-Mannose Coating of Superparamagnetic Iron Oxide Nanoparticles Enhances Labeling Of Neural Stem Cells
20. **Renić M.**: Toll-like receptor 2 influences adult hippocampal neurogenesis
21. **Sedlić F.**: High glucose accelerates mitochondrial energy metabolism and decreases resistance of cells to oxidative stress
22. **Skelin M.:** Neurotransmitters don't glow only in the brain
23. **Stipčević T.**: The Autoimmune Diseases Diabetes Type I and Rheumatoid Arthritis are Associated with Alterations in the Hippocampal Glycoconjugates as a Consequence of the Nervous and the Immune System Related Disease Activity
24. **Tratnjek L.**: Dopaminergic modulation of synaptotagmin IV expression in animal model of Parkinson disease
25. **Vukasović A.**: Biphasic collagen - hydroxyapatite scaffold for treatment of osteochondral lesions of the knee – preliminary results of the sheep study

TABLE OF CONTENTS

DUX4, a gene involved in Facioscapulohumeral muscular dystrophy (FSHD), most likely plays a role in early neurogenesis

Darko Bosnakovski

Faculty of Medical Sciences, University Goce Delcev, Stip 2000, R. Macedonia

Facioscapulohumeral muscular dystrophy (FSHD) is neuromuscular disorder connected with deletion of D4Z4 repeats in subtelomeric region on chromosome 4. Molecular mechanism of the disease is still unknown. However, misexpression of the double homeodomain protein DUX4 which is localized in each of D4Z4 repeats is believed to play a role in FSHD. DUX4 expressed in myoblasts at low levels blocks myotube formations and displays competitive interactions with both PAX3 and PAX7. This is most likely due to DUX4 homeodomains similarity in sequence to PAX3, PAX6, and PAX7. On the other hand, the normal function of DUX4 remains mysterious. The mouse has a homologue named Dux that is expressed in various tissues, but most prominently in neurogenic tissues. In addition, expression of DUX4 has been reported in human testis, human ES cells and pluripotent cells. To test the effect of DUX4 in early stage of development we generated DUX4 inducible system in murine embryonic stem cell. We found that expression of even low levels of DUX4 is incompatible with pluripotency. Transcriptional profiling revealed that rather than a germ lineage program, DUX4 induced a neurectodermal program. Embryoid bodies exposed to a pulse of DUX4 expression displayed severely inhibited mesodermal differentiation, but acquired neurogenic potential and formation of TuJ1+ neurons.