

## LETTER OF RECOMMENDATION

of a scientific consultant, M.D., Ph.D., Professor Haruhiro Higashida,  
to the applicant for a scientific degree of Doctor of Biological Sciences Olga L. Lopatina

With a great pleasure I am writing this letter to strongly support Olga L. Lopatina's application to defense of her doctoral thesis in title "Oxytocin-mediated pathways in social behavior regulation and development and anxiety-related behavior".

I know Olga L. Lopatina very well since 2005, when she worked as Assistant Professor at the Dept. of Biochemistry, Medical, Pharmaceutical and Toxicological Chemistry (Head - Alla B. Salmina) of Krasnoyarsk State Medical University. She was actively working as a teacher and also was motivated to get practice in experimental research. In 2005 she have got a position as a staff scientist in a program of Kanazawa University 21<sup>st</sup> Century Center of Excellence Program on Innovative Brain Research on Development, Learning and Memory (the Department of Biophysical Genetics, Kanazawa University Graduate School of Medical Science and School of Medicine). She started her experiments in neuroscience field on measuring a unique enzyme, ADP-ribosyl cyclase, activity converted from NAD in the hypothalamus and pituitary. These works were extended to the *Nature* article and *Neuroscience Letters* papers on CD38 knockout mice and their abnormal social behavior (*Nature*, 446: 41-45, 2007; *Neuroscience Letters*, 448: 67-70, 2008). She worked on the paternal care and the mechanism of male's oxytocin release in the hypothalamus and posterior pituitary. Based on those results she successfully defended her thesis and has got Ph.D. in medical science in 2010. Her scientific work passed the procedure of nostrification in the Russian Federation in 2014 and she was awarded the scientific degree of candidate of biological sciences.

Olga L. Lopatina has never stopped in her research activity and continued her experiments on regulation on social behavior, oxytocin release, ADP-ribosyl cyclase activity, CD38 and CD157, involment of TRPM2 in oxytocin release at the Department of Basic Research on Social Recognition and Memory, Research Centre for Child Mental Development of Kanazawa University as a part of our long-term collaboration between Kanazawa University and Krasnoyarsk State Medical University.

She performed experiment on adult CD157 knockout mice and show anxiety-related behavior in this phenotype. Youngers one with same gene deletion demonstrated vocalization delay that could be recover with oxytocin application. She actively works on TRPM2, ADP-

ribosyl cyclase activity and  $[Ca^{2+}]_i$  oscillations in oxytocin release. These results were published in scientific journals (*Nature Communication*, 2013; 4:1346.; *Frontiers in Behavior Neuroscience*, 2014, 8:133.; *Frontiers in Neuroscience* 2016, 10:304.; 2017, 11:266. and etc.).

Olga L. Lopatina knows well different experimental technics: behavioral phenotyping of mice (all behavioral tests), immunohistochemistry, the enzyme-linked immunosorbent assay,  $Ca^{2+}$  measurement, western-blot, cell culture, ultrasonic vocalization measurement, oxytocin release in vitro and etc.

From 2013 she regularly spends several weeks per year to do experiments at our Department. During her stay in Kanazawa also she works on preparing manuscripts and supervises young postgraduate students. She successfully presents her results at the different scientific meeting and publishes them in different scientific journals.

From 2015 Olga L. Lopatina is Collaborative Professor of Kanazawa University.

In 2017 Olga L. Lopatina prepared her doctoral thesis in title "Oxytocin-mediated pathways in social behavior regulation and development and anxiety-related behavior". The main scientific results on the research topic were obtained personally by the author. All goals, objectives, scope of research, its stages and directions, and the results described and the conclusions drawn were discussed by us. I agree with her view on graphical presentation of results and summery of the work. Together with her we have looked through our joint research projects, plan next development of our collaboration and go ahead in achievement of our research goals.

In summary, Olga L. Lopatina is young researcher with strong potential and very much interested in scientific aspects of Neuroscience. In this sense I strongly recommend her theses to take to the defense.

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