DEPARTMENT OF HEALTH & HUMAN SERVICES

National Institutes of Health
National Institute of Neurological Disorders and Stroke

Lab. of Neural Control
Bldg 49, Room 3A50
Bethesda, Maryland 20892-2540
Office: (301) 496-8892
Fax: (301) 402-4836
EMail: odonovan@codon.nih.gov

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Biocomplexity Faculty Search
c/o Ms. Yana Teterina
Department of Physics
Indiana University
Swain West 117
727 East 3rd street
Bloomington, IN 47405-7105

Dear Committee Memebers:

I am delighted to write this letter of recommendation for Dr. Joel Tabak. Joel joined my lab in November 1997 to do post-doctoral experimental and theoretical work on spinal networks. His graduate work, with Dr. Lee Moore, was concerned with modeling simple rhythmic behaviors in the frog and chick embryos. According to Lee, Joel was an extremely talented and original modeler. I can attest to this, and have been extraordinarily impressed with his intuition and critical thinking and with how quickly he has learned experimental work in my lab. He is a very bright individual. Before coming to my lab, he had done no experimental work in neurobiology. In a very short time, he taught himself the chick spinal cord preparation and very quickly obtained usable data.

His postdoctoral training in computational neuroscience is being performed in conjunction with Dr. John Rinzel who was at the Mathematical Research Branch at NIH and is now at the Courant Institute in New York. Joel has been extraordinarily successful developing a comprehensive model of the spontaneous activity in the developing spinal cord that incorporates just three variables: neural activity and two different types of activity dependent depression. This work has been published in excellent journals and promises to be an important inspiration for experimental design in the future (Tabak et al., 1999, Neurocomputing. 26-27:551; Tabak et al., 2000, J. Neuroscience 20:3041). Furthermore, the mechanisms proposed in this work have now been found to underlie spontaneous activity in other parts of the nervous system.

Joel's modeling work also allowed us to account for a puzzling observation that my group had obtained several years ago. Specifically we found that when excitatory amino acid blockers were applied to the isolated chick spinal cord, the spontaneous activity stopped (as might be expected) but after a variable delay - up to 40 minutes – it started again in the presence of the drugs (which was not expected). Joel's modeling provided the critical insight into this behavior by showing that it was a property of excitatory

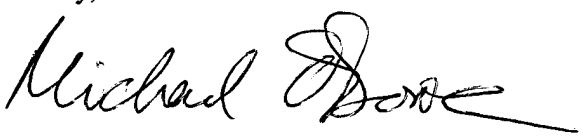
networks subject to slow synaptic depression. These ideas were further developed in a subsequent publication which showed that the spontaneous periodic activity generated by developing spinal networks is self-regulating and is very resistant to external perturbations (Tabak et al, 2001, J. Neurosci. 21: 8966 – 8978).

Joel has also collaborated on another project in my lab with his old mentor Dr.Lee Moore. This work was concerned with the ability of neurons to generate oscillatory behavior in the presence of the glutamate agonist, NMDA. The work showed that neurons whose somas were voltage-clamped, were able to generate dendritic oscillations in the presence of the drug. This result, which has been published in the Journal of Neuroscience (Moore et al, 1999, J. Neuroscience. 19:8271) suggests that dendrites may act as local amplifiers of their synaptic input under appropriate conditions.

During the last year, Joel published (together Peter Latham) a paper describing application of his modeling methods to cortical cultures. Their work showed how these methods can be used to distinguish between different classes of burst generating mechanism (Tabak and Latham, 2003, Neuroreport. 14:1445-9).

On a personal level, Joel is a delightful individual who gets on with everyone in the lab. His command of English, both verbal and written, is superb so that he will have no difficulty lecturing. Indeed, whenever he has given talks they have been models of clarity. In summary, Joel is an unusually talented and self-motivated individual. He is one of the brightest people to have come through my lab and his insights continue to impress me greatly. I recommend him to you with my highest level of enthusiasm.

Sincerely,



Michael O'Donovan, MB.Ch.B., Ph.D.
Chief, Section on Developmental Neurobiology
Lab. Of Neural Control, NINDS, NIH
Tel: 301 496-8892
Email odonovan@codon.nih.gov