Grass Traveling Scientist Program Chapter Report:
Riverside/Inland Empire Chapter

Philip G. Haydon, PhD
Department of Neuroscience
University of Pennsylvania School of Medicine, Philadelphia, PA
“The Tripartite Synapse: Physiological and Pathological Roles for Gliotransmission”
Friday, December 1, 2006

Attendance: The Riverside/Inland Empire Chapter of the Society for Neuroscience in conjunction with the Center for Glial↔Neuronal Interactions hosted Dr. Philip G. Haydon as part of the Grass Traveling Scientist Program. Dr. Haydon’s lecture was delivered on December 1, 2006 at 4:10 pm in Engineering II 205 at the University of California, Riverside (UCR). Approximately 60 people attended the talk, of which 25 were graduate students. This is an excellent attendance for our campus and neuroscience community.

Publicity: The lecture was advertised in four ways: Through mass e-mails to members of the Riverside/Inland Empire Chapter and to the broader neuroscience, biomedical sciences and cell, molecular developmental biology (CMDB) communities; by posting flyers on the campus and delivering electronic copies (attached) to students, staff and faculty members of three graduate programs: Neuroscience, Biomedical Sciences and CMDB, and to the members of the Center for Glial↔Neuronal Interactions; and by posting announcements on Neuroscience Graduate Program and College of Natural and Agricultural Sciences websites (attached).

Reaction: Dr. Haydon’s lecture focused on newly identified functions for astrocytes in the control of neuronal circuits and pointed to the potential for alterations in astrocyte function to cause neurological disorders and psychiatric states. The introduction portion of Dr. Haydon’s lecture covered the past 20 years of research in this field. Clearly, our understanding of the functions of astrocytes has changed dramatically during this period of time. For example, the demonstration that astrocytes respond to neurotransmitters with oscillations in their internal calcium ion levels stimulated renewed research into the functions of these cells. The main body of the talk covered Dr. Haydon’s recent research progress, most of it unpublished. His style of presentation was very engaging and it encouraged interruptions for questions during the lecture. He presented data from a variety of experimental approaches, including electrophysiology, fluorescence microscopy, photolysis, genetic manipulations including transgenic mice, and confocal microscopy in anesthetized animals, just to mention a few. We learned that astrocytes release chemical transmitters, which influence neuronal synaptic transmission and synaptic plasticity. Toward the end of the talk, Dr. Haydon presented recent work that focuses on potential roles of these transmitters in disorders of the nervous system. Even though the lecture contained many technically complex experiments, he made the topic understandable for the diverse audience, consisting of chemists, entomologists, psychologists, physicists, cell and molecular biologists and neuroscientists. On the other hand, the lecture was specific enough to appeal to experts in the glial-neuronal interactions field. His lecture was followed by a lengthy and stimulating discussion with many questions. The discussion continued during the post-talk reception. The staff, faculty and student impressions were overwhelmingly positive. Students (2 undergraduate and 10 graduate) had a lunch with Dr. Haydon hosted by the Neuroscience
Graduate Student Organization. Dr. Haydon also met individually with a subset of students, post-docs and staff to discuss their research in more detail.

**Departments represented:** Faculty, staff and students from Biology, Biomedical Sciences, Cell Biology & Neuroscience, Chemistry, Entomology, Physics, and Psychology Departments attended the talk and reception.

**Adequate time for informal exchange:** Dr. Haydon’s visit was a hit in all aspects including this one (his schedule is attached). He arrived on November 29th, in the late afternoon two days before his talk. On the day before his lecture, he had an informal lunch and discussion with our Neuroscience and CMDB graduate students, who were very impressed with him. He also met with many of our faculty on November 30 and December 1. This included Dr. Haydon’s visit to the imaging facility within the Institute for Integrative Genome Biology and Center for Plant Cell Biology. Interactions with faculty included discussions related to the recently formed Center for Glial⇔Neuronal Interactions and efforts to continue building in this research area and the neurosciences in general at UCR. Dr. Haydon, who is Director of both the Silvio Conte Center for Integration at the Tripartite Synapse and the Center for Dynamic Imaging of Nervous System Function, provided valuable input to our faculty on these issues. Everyone was very satisfied with the generous time that Dr. Haydon spent with us, and with his outgoing personality.

**Comments to the Grass Foundation**: This is an outstanding program. It allowed us to bring in a high profile speaker, who co-mingled with students and faculty both formally and informally. The bursaries provided were used to cover part of the cost of Dr. Haydon’s travel and lodging. The speaker’s honorarium was provided based on SFN guidelines.

**Impressions of the value of the speaker’s visit.** The visit by Dr. Haydon was very effective in introducing new experimental approaches and technologies to the study of astrocyte-neuronal signaling, thereby boosting the intellectual atmosphere and spirit of students and faculty in the Neuroscience Graduate Program.

Report prepared by:
Vladimir Parpura
Representative
Riverside/Inland Empire Chapter
The Riverside/Inland Empire Chapter of the Society for Neuroscience
The Grass Foundation Traveling Scientist Program

University of California, Riverside
4:10 pm, Friday, December 1, 2006
Engineering II 205

Philip G. Haydon, Ph.D.
University of Pennsylvania School of Medicine

“The Tripartite Synapse: Physiological and Pathological Roles for Gliotransmission”

A new view of brain function is emerging in which astrocytes interact with neurons to regulate circuit function. We have learned that astrocytes release chemical transmitters that include glutamate, ATP and D-serine, and that these gliotransmitters regulate neuronal synaptic transmission and synaptic plasticity. Our more recent studies have focused to potential roles of these transmitters in disorders of the nervous system. Although the release of glutamate is not required for the induction or maintenance of chemically-induced epileptiform activity, we do find that enhanced Ca$^{2+}$ excitability of astrocytes following status epilepticus is necessary for the NMDA receptor-mediated delayed neuronal death that is known to follow this prolonged seizure. These results demonstrate newly identified functions for astrocytes in the control of neuronal circuits and point to the potential for alterations in astrocyte function to cause neurological disorders and psychiatric states.

Followed by the post-seminar reception
Riverside/Inland Empire Chapter of the Society for Neuroscience in conjunction with the Center for Glial-Neuronal Interactions present a Grass Traveling Scientist Lecture

Friday, December 1, 2006
4:00 p.m. -5:00 p.m.

Location: Engineering II 205

Dr. Philip G. Haydon
Department of Neuroscience
University of Pennsylvania School of Medicine
Philadelphia, PA

Dr. Philip Haydon from University of Pennsylvania School of Medicine will be visiting UCR as a Grass Traveling Scientist. This event will be hosted by the Riverside/Inland Empire Chapter of the Society for Neuroscience in conjunction with the Center for Glial-Neuronal Interactions. He will be a speaker in our Center for Glial-Neuronal Interactions. Friday December 1st, 2006 at 4:10 pm in Engineering II 205 entitled:

"The Tripartite Synapse: Physiological and Pathological Roles for Gliotransmission".

Description of Prof. Haydon's talk:
Though we have appreciated that glial cells exist within the brain our thinking about their roles has been dominated by our original view that they are supportive cells. A new view of brain function is emerging in which the non-neuronal cells of the nervous system interact with neurons to regulate circuit function.

In the brain there are three types of glial cell: astrocytes, oligodendrocytes and microglia with each cell serving very different functions. During the past 20 years our understanding of the functions of astrocytes has changed dramatically. Much of our early thinking about astrocytes was dominated by the results of electrical recordings which showed that astrocytes are electrically inexcitable. However, the demonstration that astrocytes respond to neurotransmitters with oscillations in their internal Ca2+ levels stimulated renewed research into the functions of these cells.

Since that time we have learned that astrocytes release chemical transmitters that include glutamate, ATP and D-serine, and that these gliotransmitters regulate neuronal synaptic transmission and synaptic plasticity. For example, the release of glutamate can cause the synchronized excitation of groups of pyramidal neurons, while the release of ATP, and subsequent hydrolysis to adenosine, is a critical gliotransmitter that is required for heterosynaptic depression in the hippocampus.

Our more recent studies have focused to potential roles of these transmitters in disorders of the nervous system. Although the release of glutamate is not required for the induction or maintenance of chemically-induced epileptiform activity, we do find that enhanced Ca2+ excitability of astrocytes following status epilepticus is necessary for the NMDA receptor-mediated delayed neuronal death that is known to follow this prolonged seizure.

These results demonstrate newly identified functions for astrocytes in the control of neuronal circuits and point to the potential for alterations in astrocyte function to cause neurological disorders and psychiatric states.

Related links:
Lab: http://mail.med.upenn.edu/~pghaydon/
Conte Center: http://www.med.upenn.edu/synapse/
Imaging Center: http://www.med.upenn.edu/twopcenter/

The talk will be followed by a post-talk reception.

Local host contact:
Vladimir Parpura
vladimir.parpura@ucr.edu
951-827-2074
A Grass Traveling Scientist lecture

Friday, December 1, 2006
4:00 p.m. - 5:00 p.m.

Location: Bourns, Marlan & Rosemary Hall Engineering 205
Parking Information

Category: Lecture

Description: Center for Glial <-> Neuronal Interactions in conjunction with the Riverside/Inland Empire Chapter of the Society for Neuroscience presents a Grass Traveling Scientist lecture

Dr. Philip G. Haydon
Department of Neuroscience
University of Pennsylvania School of Medicine
Philadelphia, PA

Description of Prof. Haydon’s talk:

Though we have appreciated that glial cells exist within the brain our thinking about their roles has been dominated by our original view that they are supportive cells. A new view of brain function is emerging in which the non-neuronal cells of the nervous system interact with neurons to regulate circuit function.

In the brain there are three types of glial cell: astrocytes, oligodendrocytes and microglia with each cell serving very different functions. During the past 20 years our understanding of the functions of astrocytes has changed dramatically. Much of our early thinking about astrocytes was dominated by the results of electrical recordings which showed that astrocytes are electrically inexcitable. However, the demonstration that astrocytes respond to neurotransmitters with oscillations in their internal Ca2 levels stimulated renewed research into the functions of these cells. Since that time we have learned that astrocytes release chemical transmitters that include glutamate, ATP and D-serine, and that these gliotransmitters regulate neuronal synaptic transmission and synaptic plasticity. For example, the release of glutamate can cause the synchronized excitation of groups of pyramidal neurons, while the release of ATP, and subsequent hydrolysis to adenosine, is a critical gliotransmitter that is required for heterosynaptic depression in the hippocampus.

Our more recent studies have focused to potential roles of these transmitters in disorders of the nervous system. Although the release of glutamate is not required for the induction or maintenance of chemically-induced epileptiform activity, we do find that enhanced Ca2 excitability of astrocytes following status epilepticus is necessary for the NMDA receptor-mediated delayed neuronal death that is known to follow this prolonged seizure. These results demonstrate newly identified functions for astrocytes in the control of neuronal circuits and point to the potential for alterations in astrocyte function to cause neurological disorders and psychiatric states.

Related links:
Lab http://mail.med.upenn.edu/~pghaydon/
Conte Center: http://www.med.upenn.edu/synapse/
Imaging Center http://www.med.upenn.edu/twopcenter/

Open to: Public
Admission: Free
Sponsor: College of Natural & Agricultural Sciences

Contact Information:
Prof. Vladimir Parpura
827-2074
vlad@ucr.edu

Produced by the Office of Strategic Communications.
Copyright 2006, Regents UC.
This page is dynamically generated.
Maintained by: Webmaster
Dr. Philip G. Haydon
University of Pennsylvania School of Medicine
Philadelphia, PA

Campus Host: Vlad Parpura (CBNS, Spieth 1308, x 2-2074; cell 951-288-4970)

November 29, 2006

Arrive from Philadelphia at Ontario Airport at 4:17pm; Vlad Parpura to pick him up.

Staying at Mission Inn, 3649 Mission Inn Avenue, Riverside
(Confirmation No. 398637; toll free number 800-344-4225)

6:00 pm   Dinner at Sevilla (Phil Haydon and Vlad Parpura)
reservation taken by Samantha; 778 0611

Please escort the speaker to the next appointment.

November 30, 2006

8:10- 9:10 am:   Breakfast at Mission Inn (Mike Adams)

9:15-9:55 am:   Meet with Mike Adams (Boyce 5483; x2-4746)

10:00am-10:45 am: Meet with Iryna Ethell (Webber 2269; x2-2186)

10:50am –11:30am: Meet with Doug Ethell (Webber 1248; x2-2224)
Reno Reyes will pick up the speaker and take him for lunch

11:40am–1:40pm: lunch with (under)graduate students and post-docs
(NGSA; Reno Reyes, x2-2076)

1:50-2:30pm:   Meet with Glenn Stanley (Olmsetad 1388; x2-5244)

2:35-3:15pm:   Meet with Peter Hickmott (Olmsted 1113; x2-7308)

3:20-3:55pm:   Meet with David Carter (Center for Plant Cell Biology;
Keen Hall 1020; x2-2694)
Chang Man Ha will pick up the speaker

Meeting with post-doc/graduate students

4:00-4:30 pm   Meet with Chang Man Ha (CBNS Post-doc; Spieth 2308)

4:30-5:00 pm   Meet with Kyle Osborne (NRSC Grad Student; Spieth 2308)

5:00-5:30 pm   Meet with William Lee (NRSC Grad Student; Spieth 1310)

5:30-6:00 pm   Meet with Crystal Pontrello (NRSC Grad Student; Spieth 2308)
6:00-6:30 pm  Meet with Randy Stout (CMDB Grad Student; Spieth 2308)

7:30 pm  Dinner at Mario’s (Phil Haydon, Vedrana Montana and Vlad Parpura); reservation taken by Sabrina (684-7755)

December 1, 2006

8:45 am: Vlad Parpura to pick him up at Mission Inn

9:15-9:55 am: Tour of the UCR campus (Vlad Parpura)

10:00-10:45 am: Meet with Vlad Parpura, 1308 Spieth (x2-2074)

10:50-11:30 pm: Meet with Glenn Hatton (Spieth 2358; x2-4419)

11:30 am-12:50 pm: Lunch with Glenn Hatton (Fugu’s)

Meeting with staff/post-doc/graduate students

1:00– 1:30 pm: Meet with Erik Malarkey (CMDB Grad student, Spieth 1312)

1:30– 2:00 pm: Meet with Loly Rubio (NRSC Grad student, Spieth 2308)

2:00-2:30 pm: Meet with Reno Reyes (NRSC Grad student, Spieth 1310)

2:30-3:00 pm: Meet with Vedrana Montana (CHEM SRA, Spieth 2308)

3:00-3:30 pm: Meet with Yingchun Ni (CBNS Post-doc), Spieth 1310

Get ready for the seminar

4:10-5:00 pm: Seminar (Engineering II 205) entitled: “The Tripartite Synapse: Physiological and Pathological Roles for Gliotransmission”

5:00-6:15 pm: Post-seminar reception (foyer Engineering II 205)

7:00 pm: Dinner at Montana/Parpura residence

December 2, 2006

8:00 am: Check out; Allure Sedan will pick up Dr. Haydon from the Orange St. Mission Inn entrance (this is closest to the bar area), contact person: Dan Shelley at 1-877-530-7783.; Depart to San Diego (Marriott, 333 West Harbor Drive)