

Final Conference Report
10th International Conference on Brain Energy Metabolism
"Bioenergetics of Neurological Disease and Aging"
Monterey, California, USA April 17-20, 2012

The 10th International Conference on Brain Energy Metabolism was hosted by Raymond Swanson. The venue of the conference was the Asilomar Conference grounds. A website for the meeting remains is posted at <http://www.ncire.org/ICBEM2012/>

Program Committee: The program committee established the overall theme of the conference and the topics for the sessions, and selected the invited speakers and session chairs; they also selected applicants for travel awards based on review and ranking of submitted abstracts. Members of the program committee are listed here:

Bruce Ransom (chair)	USA
Arne Schousboe	Denmark
Caroline Rae	Australia
Vera Adam-Vizi	Hungary
Carole Escartin	France
Gerry Dienel	USA
Diogo Souza	Brazil
Albert CHY Yu	China
Mary McKenna	USA
Anne Murphy	USA
Dale Bredesen	USA
Rolf Gruetter	Switzerland

Of these 12, 5 were women and 2 were junior investigators. They represented 8 countries and 5 continents.

Funding: The funding sources were as follows (currency is U.S. dollars)

1) U.S. NIH (grant R13 NS59367)	\$20,000
2) ISN	10,000
3) NICRE*	4,000
4) John Wiley & Sons	3,000
5) Seahorse Biosciences	2,500
6) Registration Fees	18,900

* NCIRE = Northern California Institute for Research and Education. This is the grant administering institution for Raymond Swanson, the local conference organizer.

Funds from the ISN were used to fund travel awards for students and post-doctoral fellows (\$6,500) and for facilities rental (3,500)

Travel Awards for Students and Postdoctoral Fellows:

The attendance of 13 junior investigators was supported by travel awards provided by the ISN, supplemented by funds supplied by the NIH. Recipients were selected from 22 applicants on the basis of the scientific merit of the abstracts submitted to the conference. These were judged by a subcommittee of the program committee; with Dr. Carolyn Ray (Australia) serving as chair of the subcommittee. The four most highly ranked of these recipients gave 15 –minute oral presentations, which were superb. The other nine presented posters. All 13 were recognized during the meeting as recipients of travel awards. The awardees and abstract titles were as follows:

WITTE, Maarten	Netherlands	Reduced expression of PGC-1a underlies mitochondrial changes in multiple sclerosis cortex
CHATELAIN, Etienne	France	Mitochondrial CB1 receptor impacts neuronal bioenergetics through protein kinase A mediated phosphorylation of the complex I subunit NDUFS2.
MARGULIS, Julia	USA (CA)	A novel image-based assay of mitochondrial autophagy in live neurons
KISS, Gergely	Hungary	Functional importance of mitochondrial diaphorases in maintaining phosphorylation potential during inhibition of electron transport chain
WANG, Xinglong	USA (OH)	Parkinson-related LRRK2 mutations impaired mitochondrial dynamics and function In Neurons
YAO, Jia	USA (CA)	Shift in Brain Mitochondrial Bioenergetics in Aging and Alzheimer's Disease Implications for Disease Prevention and Treatment
WALLS, Anne	Denmark	A sub-convulsive dose of kainate compromises astrocytic but not neuronal metabolism in mouse cerebral cortex in vivo
CARROLL, Jeffrey	USA (MA)	Objective metabolic phenotyping of knock-in mice reveals novel dysfunctional pathways in Huntington's disease
SAEZ, Isabel	Spain	Glycogen is crucial for astrocytes and neurons in brain function
QUAEGEBEUR, Annelies	Belgium	Oxygen sensors, metabolism and neuroprotection: unexpected liaisons with therapeutic opportunities for neurodegeneration?
D'AVILA, Joana	Brazil	Brain metabolic dysfunction in response to systemic inflammation and sepsis
VIEGAS, Carolina	Brazil	Impairment of Brain Redox and Bioenergetics Homeostasis Caused by the Major metabolites accumulating in HHH Syndrome
BUSANELLO, EN	Brazil	Disruption of bioenergetics by phytanic acid in cerebellum of young rats

Geographic origin and gender were not selection criteria for the Junior Investigator Awards; however the awardees were from 8 countries and were 62% female. Awardees traveling from within the USA were awarded lodging meals and registration expenses (\$765). Awardees from outside the USA were in addition provided with \$500 toward travel expenses. The total amount awarded for Junior Investigators was \$9,505.

Meeting content: A copy of the program is attached. All of the invited speakers attended with the exception of Pierre Magistretti. The conference keynote speaker was Dr. Mark Mattson, Chief, Laboratory of Neurosciences and Chief, Cellular and Molecular Neurosciences Section, U.S. National Institutes of Aging. The Plenary Speaker was Dr. Brian McVicar, of Canada. In addition to these talks there were seven slide session of 4-5 speakers each, two poster sessions, a young investigator presentation session, and two very successful "point-counterpoint" debate-style sessions in which senior members of the field took opposing positions on salient unresolved issues in the area of bioenergetics and neuroscience. All posters were on display for the entire meeting, which enabled discussions among conferees throughout the meeting. Conferees received an abstract book with participant contact information. Informal interactions were encouraged during coffee breaks, lunches, breakfasts, and dinners, all of which were held on the conference grounds.

Conferee demographics: The conference had a total of 109 attendees from 18 countries. Attendees conferees included 38 women and 71 men. Women accounted for 40% of the chair positions, 21% of the invited speakers, and 62% of the travel awards (see Tables 1 and 2, below).

Journal special issue publication: The invited speakers, session chairs, and members of the program committee are invited to submit papers (research papers, short reviews, full reviews) for

publication in a special issue of *Journal of Neuroscience Research*. All manuscripts are peer-reviewed, and PDF files of the papers will be outside the journal firewall so they will be available to the general public. This feature of the conference disseminates information to the neuroscience community. The special issue is expected to have 23-25 manuscripts from the meeting. Most papers for the special issue are either accepted or under final revision.

Conference evaluation by participants: The conference evaluation questionnaire was completed by 55% of the attendees. The conference was evaluated in terms of science, discussion, management, atmosphere, and overall suitability. Overall, the conferees rated the conference very highly (Table 4), and most verbal comments throughout the conference were extremely positive. The majority of the respondents judged the conference to be “the best they have attended in the last year.”.

Table 1. Categories of conference participants

Participant category	Total	Female	Male
Registered	109	38	71
Chair	15	6	9
Invited speaker	33	7	26
Poster presenter	39	17	22
Travel award recipient	13	8	5

Table 2. Countries represented at the conference


Country	Number of Participants
Australia	1
Belgium	1
Brazil	10
Canada	3
Chile	1
China	3
Denmark	8
France	6
Germany	1
Greece	2
Hungary	5
Netherlands	2
Norway	1
Portugal	1
Spain	2
Switzerland	7
United Kingdom	2
USA	53
Total	109

Table 3

CONFERENCE EVALUATIONS (1 = agree completely, 5 = disagree completely, 3 = neutral)					
Science/Ideas	n	mean	median	1st qrtile	3rd qrtile
presentation defined and analyzed the most important ideas & opportunities	39	1.31	1.0	1.0	1.5
presentations included a substantial amount of unpublished data	38	1.53	1.0	1.0	2.0
presentations were at the frontier of the field	39	1.13	1.0	1.0	1.0
conference was thought-provoking, stimulating, exciting	39	1.18	1.0	1.0	1.0
posters sessions contributed unpublished research at frontier of field	38	1.39	1.0	1.0	2.0
Discussion					
adequate discussion time was allowed	39	2.00	2.0	1.0	2.5
one person or group did not overly dominate discussion	39	1.46	1.0	1.0	2.0
discussions evoked and explored new research directions	39	1.46	1.0	1.0	2.0
young scientists participated in discussions	39	2.33	2.0	1.0	3.0
Management and organization					
good selection of topics	39	1.15	1.0	1.0	1.0
good selection of speakers	39	1.05	1.0	1.0	1.0
speakers were present and available for discussion after their presentation	39	1.10	1.0	1.0	1.0
attendees were diverse and reflected the composition of this field	39	1.10	1.0	1.0	1.0
pool of speakers was diverse and reflected the composition of the field	39	1.08	1.0	1.0	1.0
Atmosphere					
conference was more than just meeting, workshop, or collection of papers	38	1.11	1.0	1.0	1.0
opportunities were available for networking with colleagues	36	1.06	1.0	1.0	1.0
the overall conference atmosphere was friendly, not cliquish	38	1.16	1.0	1.0	1.0
social activities contributed strongly to the quality of the meeting	38	1.45	1.0	1.0	1.8
conference business was conducted in an open and democratic fashion	36	1.22	1.0	1.0	1.0
Overall suitability					
the conference met my expectations	38	1.08	1.0	1.0	1.0
I expect to attend this conference again	38	1.05	1.0	1.0	1.0
this was the best conference in the field I attended this year	37	1.27	1.0	1.0	1.0

Table 4. Comments from conferees

Respondent	Additional comments by respondents
1	Great meeting, I'll come again
5	Very open and stimulating discussion. I would love to see more point/counterpoint sessions. It would also be nice if each could be summarized by the moderator & the findings put in perspective.
6	First time attending. Fantastic conference. Thank you.
9	Liked the 15 minutes-maybe better choice of free radical versus bioenergetics discussed. Metabolisms?
11	1 st time attendee-hope to become a regular attendee!
13	Excellent conference. Highly informative.
14	Great meeting
18	Too much mitochondria oxidative stress in the program. The presentation during the dinner was not appropriate-this was a great opportunity to network; but this was absent due to the talk. More time for poster session.
25	Great location. Intelligent discussions.
26	Alltogether very good. Two suggestions: Talks may be a bit longer, i.e. Gordon format with more time for discussion (a longer conference?). Why not follow the GRC policy on unpublished data? Congratulations!
28	A little more space (physically) for posters would be good. Excellent conference for meeting/networking with others in the field.
29	More poster time would be good. More student presentations-the 4 were first rate! Add ½ day to meeting to "decompress" sessions.
30	Suggestion: The "dinner-speech" was unnecessary. This meeting provide a very consistent program, no need a lecture during the dinner. Most people were totally embarrassed, it was an appropriate moment to "get together", not to a long speech. All the conference was amazing! ☺
31	Really nice job I appreciate the wide range of topics and a good balance between presentations and discussion. The 15 min-15 min time slot worked well. One of the best conferences I have been to.
32	It was not a good idea to have a plenary lecture during dinner. The lecture was too good to be missed!
35	The poster space could be a little bigger and the coffee break should not be prepared during a lecture (people get distracted). The place of the conference was very well chosen, the food was very tasteful, people were very kind most of times. It should exist some free period in the middle of the conference (during day period), and the lecture at night should not be concomitant with dinner and alcoholic beverage. One solution could be the lecture to be realized at the moment of dessert. The aquarium was awesome indeed. I liked very much to be here. The organization deserves congratulations!
36	This was a great conference and very intellectually stimulating.
39	Great meeting, my compliments to the organizers and the administrative staff.



10th International Conference
on Brain Energy Metabolism

Bioenergetics of Neurological Disease and Aging

Program

April 17-20, 2012

Asilomar Conference Grounds
Monterey, California

Sponsors:

National Institutes of Health (NINDS and NIA)
International Society for Neurochemistry
NCIRE – The Veterans Health Research Institute
Wiley-Blackwell
Seahorse Bioscience

Tuesday, April 17

2012

6:00 pm – 7:00 pm

Dinner

7:30 pm – 8:30 pm

Keynote Address and Discussion

Session Chair: Ray Swanson **Speaker:** Mark Mattson - Disrupted energy metabolism and neuronal circuit dysfunction in cognitive aging

8:30 pm

Welcome Reception

Wednesday, April 18

2012

7:30 am – 8:15 am

Breakfast

8:15 am – 10:00 am

Slide Session One: Intercellular trafficking of brain energy metabolites
Session Chairs: Arne Schousboe and Bruce Ransom

8:20 am

Christian Giaume - Regulation of connexin-mediated trafficking of metabolites through astroglial networks

8:40 am

Gerald A. Dienel - Metabolite trafficking and release during brain activation

9:00 am

Pierre Magistretti - Astrocyte-derived lactate and brain cognitive function

9:20 am

Kevin L. Behar - Glucose versus monocarboxylates in neuronal energetics: Requisite or interchangeable?

9:40 am

Silvia Mangia - Lactate shuttle from neurons to astrocytes

10:00 am – 10:30 am

Summary Discussion and Break

10:30 am – 11:50 am

Slide Session Two: Normal mitochondrial functions in brain
Session Chairs: Vera Adam-Vizi and Conrad Alano

10:30 am

Akos A. Gerencser - Measures of in situ mitochondrial function.

10:50 am

Eric Verdin - Sirtuin regulation of mitochondria: energy production, apoptosis, and signaling

11:10 am

Anatoly Starkov - Metabolism-dependent free radical scavenging by mitochondria

11:30 am

Martin D. Brand - Native rates and sites of mitochondrial ROS production

11:50 am – 1:30 pm

Summary Discussion and Lunch

1:30 pm – 3:00 pm

Poster Session One (Presenters A-M)

3:00 pm – 4:35 pm

Slide Session Three: Disordered mitochondrial function
Session Chairs: Anne Murphy and Angela Brennan-Minnella

3:00 pm

Vera Adam-Vizi - Enhanced reactive oxygen species generation due to mutations of the E3 subunit of α -ketoglutarate dehydrogenase

3:20 pm

Michael R. Duchen - Lysosomal dysfunction caused by glucocerebrosidase loss causes mitochondrial dysfunction as a consequence of impaired autophagy

- 3:40 pm **Alicia J. Kowaltowski** - Calorie restriction increases cerebral mitochondrial respiratory capacity by a NO^{*}-mediated mechanism: Impact on neuronal survival
- 4:00 pm **Jorge M. A. Oliveira** - Mitochondrial and striatal vulnerability in Huntington's disease
- 4:20 pm – 4:35 pm **Summary Discussion**
- 6:00 pm – 7:00 pm **Dinner**
- 7:30 pm – 8:45 pm **Point / Counterpoint Forum One:** Is it all about the Power in the Powerhouse? The relative roles of oxidative stress, mitochondrial dynamics and trafficking and energy crisis in chronic neurodegeneration
Moderator: Anne Murphy **Presenters:** David Nicholls and Flint Beal

Thursday, April 19

2012

- 7:30 am – 8:15 am **Breakfast**
- 8:15 am – 10:00 am **Slide Session Four:** Imaging brain energy metabolism: From subcellular domains to cortical networks
Session Chairs: Albert Yu and Gerald Dienel
- 8:20 am **L. Felipe Barros** - Single-cell-real-time energy metabolism observed with FRET biosensors
- 8:40 am **Ken Nakamura** - Measuring bioenergetic function at the nerve terminal
- 9:00 am **Bruno Weber** - Multimodal in vivo investigations of brain energetics
- 9:20 am **Timothy H. Murphy** - Voltage sensitive dyes in combination with optogenetics - Tools for Imaging cortical circuit function following stroke in mouse
- 9:40 am **Rolf Gruetter** - MRS measures glycogen and glucose metabolism in vivo
- Summary Discussion and Break**
- 10:30 am – 11:50 am **Slide Session Five:** Interactions between brain and energetics and disease processes
Session Chairs: Mary McKenna and Carole Escartin
- 10:30 am **Bill Shuttleworth** - Effects of astrocyte glycogen on cortical spreading depression
- 10:50 am **Martin Lauritzen** - Incidence and metabolic effects of spontaneous and evoked glial calcium waves in mouse cerebellar cortex in vivo
- 11:10 am **Helle S. Waagepetersen** - Role of glutamate dehydrogenase in astrocyte energy and glutamate metabolism
- 11:30 am **Andreas Plaitakis** - Deregulation of glutamate dehydrogenase in Parkinson's disease and other human neurological disorders
- 11:50 am – 1:30 pm **Summary Discussion and Lunch**

- 1:30 pm – 3:00 pm **Poster Session Two** (Presenters N- Z)
- 3:00 pm – 4:00 pm **Slide Session Six:** Junior Investigator Presentations
Session Chairs: Caroline Rae and Diogo Souza
- 3:00 pm **Julia Margulis** - A novel image-based assay of mitochondrial autophagy in live neurons
- 3:15 pm **Maarten E. Witte** - Reduced expression of PGC-1 α underlies mitochondrial changes in multiple sclerosis cortex
- 3:30 pm **Etienne Hebert-Chatelain** - Mitochondrial CB1 receptor impacts neuronal bioenergetics through protein kinase A mediated phosphorylation of the complex I subunit NDUF52
- 3:45 pm **Gergely Kiss** - Functional importance of mitochondrial diaphorases in maintaining phosphorylation potential during inhibition of electron transport chain
- 7:00 pm – 9:45 pm **Dinner and Plenary Lecture at the Monterey Bay Aquarium**
Chair: Bruce Ransom
Speaker: Brian Mac Vicar - Dynamic interplay between local cerebral blood flow, energy metabolism, and neural function, and the consequences of its disruption

Friday, April 20

2012

- 7:30 am – 8:15 am **Breakfast**
- 8:15 am - 10:00 am **Slide Session Seven:** Brain energy metabolism in disease and aging
Session Chairs: Rolf Gruetter and Dale Bredesen
- 8:20 am **Avtar Roopra** - The energy sensor AMPK modulates neuronal plasticity: Therapeutic possibilities
- 8:40 am **Louise McCullough** - The emerging role of AMPK in cerebral ischemia
- 9:00 am **Fernando Bozza** - Effects of systemic inflammation on brain energetics
- 9:20 am **Rajiv R. Ratan** - HIF prolyl hydroxylase domain enzymes: master switches for converting changes in oxygen tension into adaptive responses to oxidative stress and ischemia
- 9:40 am **Susanna Scafidi** - Delayed glucose metabolism and increased utilization of β -hydroxybutyrate following traumatic brain injury in immature rats
- 10:00 am – 10:30 am **Summary Discussion and Break**
- 10:30 am – 11:45 am **Point / Counterpoint Forum Two:** Disturbances in blood flow and brain energetics: Are they cause or effect in Alzheimer's disease?
Chair: Dale Bredesen
Speakers: Costantino Iadecola and Roberta Brinton
- 11:45 am – 1:30 pm **Adjournment and Lunch**