



Swiss Society for Neuroscience (SSN)

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Editorial

On the occasion of its first meeting after the elections that took place in Zürich, the SSN council co-opted its 14th member. The SSN council is glad to welcome Dr. Erich Seifritz from the University of Bern. An important decision taken by the SSN council was to finalize an "old" idea of creating "subchapters" of the SSN. The SSN council was subdivided in small groups according to the scientific expertise of its members. This would allow the SSN members (or other visitors of our website) to contact the most closely related members of the SSN council to answer specific questions. The various "subchapters" of the SSN will tentatively organize activities within small groups of members interested in a specific topic of neuroscience (see the SSN website for more information on "subchapters").

Another important concern of the SSN council relates to the relatively low response from the young Swiss neuroscientists to our awards. As you can see on the next page, only a limited number of students applied for travel fellowships to attend, in 2005, three international meetings of broad interest, although many young Swiss neuroscientists attend such important meetings. Should we conclude that the corresponding laboratories seem to be rich enough to fully support the travel expenses of their young collaborators? Along the same line, it is our experience that very few young neuroscientists sent an application for the "SSN Best Publication Award", representing a substantial amount of Frs 2'000. Certainly, in the US for instance, an enormous amount of Ph.D students and young post-docs would apply, not only for the financial aspect, but mainly to improve their CV. Due maybe to cultural differences, competition is not (yet?) part of the Swiss mentality, thus explaining the modest interest for such award. We count on the senior members of the SSN to warmly encourage those of their young colleagues who have published an outstanding article between July 1st 2004 and June 30th 2005 to apply. The deadline for applications is September 9th 2005.

Eric M. Rouiller

SSN-IBRO Fellowship for young investigator 2005

The SSN council received five applications. As usual, the scientific value of the research project, as well as the past performance of the applicant, were evaluated independently by a sub-group of members of the SSN council (n=4) and by a member of the Council of Research of the Swiss National Science Foundation. The two evaluations were fully consistent and the fellowship was given to Dr. **Céline Costa**. The research project is entitled **“The role of mTOR interactors in synapse growth”** and will be conducted in the laboratory of Prof. M. Ruegg (UniBs).

The deadline for submitting applications to the SSN-IBRO Fellowship 2006 is January 15th, 2006 (see guidelines on the SSN website).

SSN travel fellowships 2005

Unfortunately, the SSN council did not receive any application for the 3 travel fellowships proposed by the SSN to attend the **“Annual meeting of the American Academy of Neurology”** in Miami Beach (USA), April 6-16, 2005.

On the other hand, the SSN was glad to award 3 travel fellowships (for an amount of Frs 1'000 each) to 3 young SSN members attending the Annual meeting of the **“Organization for Human Brain Mapping”** in Toronto (Canada), June 12-16, 2005. The awardees are:

JAEGGI Susanne, MAURER Urs, ZAEHLE Tino

The third offer this year consisted of 12 travel fellowships to attend the 2005 SfN meeting in Washington DC. At the deadline of June 30th, a total of 24 applications were received. During summer, the SSN council will select the 12 recipients based on scientific and motivational criteria. The list of the 12 awardees will be published on the SSN website towards the end of August.

SSN meeting 2006 in Basel

The SSN annual meeting in 2006 will take place in Basel, on January 28th, in collaboration with the **“Swiss Society of Neuro-Radiology”**. The local organizing committee is actively aiming to offer a scientifically high level meeting, as usual with

emphasis on the contribution of the young scientists in the form of **“Data Blitz”** and Posters presentation. A preliminary program of the SSN 2006 meeting is available on our website. We will experience on that occasion a new procedure of submission of abstracts on our website. This on-line submitting procedure is currently under development and evaluation. The SSN council looks forward to seeing you in Basel.

Continuous education on animal experimentation

Thanks to the high motivation in this field of our colleague of the SSN council Isabelle Mansuy, a course for continuous education on animal experimentation will take place in Zürich on September 23rd, 2005. Please be aware that each experimenter working on animal models has the obligation, according to the law, to follow a full day of continuous education every year. The general topic of the course in Zürich is **“Animal models of nervous system diseases”**. The detailed program is available on the SSN website, where you can also register (remember that SSN members have a preferential reduced registration fee).

Programme of European Neuroscience Schools

The Programme of European Neuroscience Schools (PENS) is a new joint collaboration between FENS and IBRO, aiming to train students and young investigators throughout Europe. PENS will provide funds to support high-quality Schools and Courses on a wide range of important topics in the Neuroscience. Find more information on that topic on the SSN web site.

Eric M. Rouiller

Meeting announcement

The European Brain and Behaviour
Society Meeting

Dublin, Ireland, September 24-28, 2005

www.EBBS2005.com



The “**SSN-IBRO fellowship for young investigator**” was attributed in 2004 to Dr. I. Lushnikova.

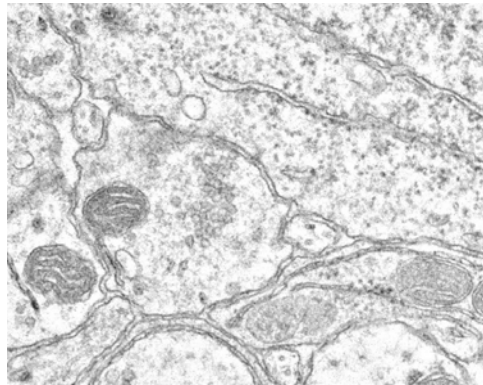
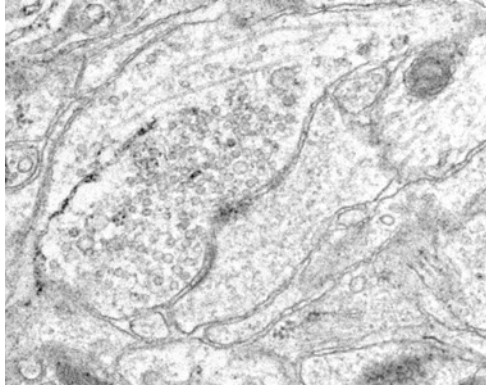
Below, Dr. Lushnikova reports on her scientific activities during the year covered by the SSN-IBRO fellowship in the laboratory of Prof. D. Müller (UniGe).

Transient ischemia is associated with modifications of synaptic properties and a morphological reorganisation of synaptic structures in spared tissue. To better understand these mechanisms, we proposed to investigate the morphological remodelling induced at excitatory and inhibitory synapses in hippocampal organotypic slice cultures following a short, transient anoxia/hypoglycaemia using electron microscopy and 3D reconstructions.

For this, slice cultures were fixed 30 and 60 min following 10 min anoxia/hypoglycaemia. The tissue was flat embedded and processed for electron microscopy using serial sectioning and symmetric (inhibitory) and asymmetric (excitatory) synapses and glia were analyzed quantitatively on 3D reconstructions. The identification of symmetric synapses was carried out with anti-GABA antibody using post-embedding immunogold labelling. Parameters such as spine type (simple or perforated), PSD area, spine volume, first nearest neighbour vesicle distance as a characteristic of vesicle density, nearest distance from synaptic vesicles to the active zone and the number of docked vesicles were systematically assessed. For glia, we measured the area of the glial contact with a synapse (pre- and postsynaptic part) and the volume of the glia per unit volume of tissue.

These analyses confirmed the occurrence of major modifications of synapse morphology following a transient anoxia/hypoglycaemia. We observed an increase of about 20% of the PSD area on dendritic spines at 30 min, which was correlated by an increase in the ratio of PSD area to postsynaptic spine volume. We also observed a 50% increase in the number of perforated synapses 30 and 60 minutes after treatment. Together these results suggest formation of more complex and larger PSDs after transient anoxia/hypoglycaemia, changes that could possibly correlate with the lasting increased synaptic strength reported under this condition. Interestingly, we also found a 25% increase in PSD area of inhibitory, symmetric synapses made on CA1 cell soma as well as an increased number of perforated inhibitory synapses. It might be therefore that synapse restructuring affects both excitatory and inhibitory synapses.

At the presynaptic level, we noticed that the vesicle density decreased by about 20% and 40% at 30 and 60 min, respectively. The number of docked vesicles also decreased by 30% and the distribution of distances from synaptic vesicles to active zone changed significantly. These alterations probably resulted from and reflected the increased release process taking place during anoxia/hypoglycaemia. Finally, we also detected a reorganisation of the glial covering of excitatory synapses. The area of the glial contact with a synapse and the volume of glia per unit volume of tissue increased by about 30%. Together these results indicate that transient ischemia markedly affects the organisation of excitatory and inhibitory synapses and they suggest that this morphological remodelling might underlie some of the changes in synaptic function detected under the same conditions. It will be interesting to understand what might be the reversibility of these changes and their time course.



Perforated asymmetric, excitatory (left) and symmetric, inhibitory (right) synapses

Iryna Lushnikova

BASIC NEUROSCIENCES AND PSYCHIATRY RESEARCH

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The time is ripe now for a close collaboration between clinical psychiatry and basic neurosciences, that should be to the benefit of the patients. Here are some considerations.

1. **Psychiatry** covers the field of human diseases affecting the higher cognitive and affective psychic functions. The major psychiatric diseases such as the schizophrenia, the anxieties and mood disorders, the neurodegenerative diseases, the toxico-dependences, all imply a dysfunction of the central nervous system.
2. The **basic neurosciences** comprehend all fields involved in the biology of the nervous system, from genetics to behaviour, from molecular and cellular biology to neurochemistry and physiology, from psychopharmacology to cognitive sciences and neuroinformatics.
3. Basic neuroscience has made major progress over the last century. This knowledge should contribute to a better understanding of neurological and psychiatric diseases in order develop appropriate therapies. While the transfer of basic knowledge to neurology is well under way, that of neuroscience to psychiatry should be encouraged.
4. The **lack of contacts** between psychiatry and neurosciences has various origins. The development of basic neurosciences has been rather slow, because of the complexity of the nervous system, and, for a long time, has not been of much benefit to those concerned with complex psychiatric diseases. The psychiatrists tended to develop their own conceptual framework, often based more on philosophical and psychoanalytical contributions than on biological considerations. In addition, the field of basic neuroscience is so large that it is illusory to acquire this knowledge in a short time; it is so extensive that it is impossible today for one individual to cover it all in depth.
5. A close **collaboration** between psychiatrists and neuroscientists is thus suitable for the progress of biological research. As each field is complex, it is unlikely that one individual alone will be able to master deeply both in order to integrate them and lead a high quality research. In the past, these attempts had limited success, coming either from clinicians with little knowledge of neurobiology or from neurobiologists with a superficial knowledge of psychiatry. One should favour an interaction between specialist neurobiologists on one hand, having had experience in basic experimental research over years and therefore familiar with its concepts and methods, and on the other hand highly trained clinicians, who are acquainted with psychopathology. It is essential that these two partners have a respect of the competences of each other, are motivated for sometimes frustrating collaboration, and are willing to acquire, in the field of the other, the notions necessary for a creative dialogue. For instance, they should be free of the standard

prejudices such as, for the neurobiologist that "the psy is just capable of talking and has limited sense for biology" and for the psychiatrist that "the neurobiologist is a reductionist still dominated by a positivism way of thinking, who dreams of explaining with neurones and molecules the subtleties of human subjectivity!" Most importantly, both should agree that one distinguishes between a necessary methodological reduction and a questionable ontological reduction of the mental phenomena to a biological substrate.

6. The basic assumption is that **functional and/or structural anomalies of the brain** play a role in the development of the psychoses. The goals of that research are to identify these anomalies and to discover their causes, which most likely rest in the interaction of genetic factors and environmental influences (of various nature, physical, chemical, biological, psychological, social, and so on). One is not attempting here, as some claim, to explain "the thought" with a "gene", but to explore if a dysfunction of the nervous system could express itself in the form of a dysfunction of the psyche.
7. Role of the **psychopharmacology**: Psychotropic drugs contributed significantly to the treatment of patients and to improving their quality of life. Some psychiatrists tend to believe that knowledge of the psychoactive drugs is enough to cover their needs in biological sciences. However, often, the drugs presently in use have an effect on the symptoms rather than influencing the causes of a disease.
8. The present approach concentrates on the **search for the biological factors** that represent a risk if not a cause for psychiatric diseases. One should attempt to do in psychiatry what pathophysiology does for the somatic diseases since over a century. It is now time to analyse, in the patients, the pathological processes potentially leading to a disease, and to identify biological markers for these diseases. For various reasons, such an approach meets more difficulties in psychiatry, than in the field of somatic pathology.
 - a. Some reasons for this are **ethical** in nature: the fact that the patients affected by mental diseases are sometimes unable to give their informed consent to an investigation imposes serious reservations. Abuses in nazi and soviet systems have rightly reinforced our caution. It should not be forgotten, however, that ethical considerations, when pushed to the extreme, delay research that would be beneficial to the patients. One could speculate if it is more unethical to make respectful research on patients or to prevent scientific progress that could improve them.
 - b. The occidental **philosophy**, particularly its dualistic tradition, also plays a role. The strict separation of "mind" and "brain" gave to the psyche a prominent attribute as uniquely responsible for all human superior activities such as religion, art or moral standards. That leads to statements such as: "Science will never understand consciousness, because the mind is irreducible to biological functions".
 - c. Finally, some reasons are **methodological** in nature: access to living human brain is very restricted to scientific investigation: biopsies are impossible! Only relatively recently imaging methodologies have been developed which allow a non-invasive approach to the brain morphology, function and to some extent, biochemistry. Also genetics has made very significant progress. Neuropsychology became a rigorous science. Integrating these various methods will allow us to investigate the pathophysiology of diseases without interfering with the physical or psychic integrity of patients.
9. **Experimental models**. Based on findings made on patients, and in the light of basic knowledge, it will then be possible to study the detailed mechanisms experimentally, in cell cultures or in animal models. It is obvious that such models will never mimic the complexity of the human psychopathology. They can, however, reproduce some morphological, physiological or behavioural characteristics of a given disease. As such, they are essential in order to test mechanistic hypotheses and to develop new drugs. The results will lead to new, more specific, questions, which can be explored in patients. This constant interaction between clinical and experimental research should be fruitful and also contribute to maintain a science of a high quality.
10. As a consequence, it would be ideal to **establish "neuroscience and psychiatry research units"** composed of psychiatrists and psychologists highly qualified and relieved of routine clinical work on one hand, and of experienced neurobiologists coming from various sub-disciplines on the other. They should be provided with well-equipped laboratories. The costs for personal, equipment and running expenses should be supported to a large extent by the State in order to avoid the conflicts of interest with private funding. These Units should not restrict their activity to basic research, but should be directly involved in the investigation of patients. In other words, psychiatry should not be used as an alibi to do exclusively basic neurobiology. Indeed, all basic knowledge in neurosciences can potentially contribute to our understanding of mental diseases. The "neuroscience and psychiatry research units" should be entirely devoted to the interaction between both fields and to the search for the aetio-pathology of psychiatric diseases in order to develop causal therapies, to identify biological markers and to open the way to preventive measures.

MRC, Lausanne, 15 June 2005