

Swiss neurology: a leading force in Europe

■ C. E. Reilly

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Riehen

Introduction

Why does one country excel in the sciences, but another does not? Or, why is a particular geographical area unique in the quest for objective knowledge? Perhaps this observation has something to do with the sheer size of a nation's population? The so-called 'critical mass' of talented scientists has often been noted to play a crucial role in the process of obtaining scientific evidence, but does this decisive factor have anything to do with population statistics? Whatever the case may be, it is generally recognised that where the expansion of knowledge takes place, and in particular scientific knowledge, an encompassing infrastructure is essential, an infrastructure which is able to provide the foundation for accomplishing the improbable goal of expanding the scope of human understanding.

An example of such an on-going process to acquire scientific knowledge is Switzerland. This country leads Europe in several areas of research, such as in applied physics, protein chemistry, pharmaceutical development, and in certain fields of neuroscience, although it only has a population of approximately 7 million people. Many of these investigations are carried out by scientists at the Swiss Institute of Technology (ETH) located in Zurich and Lausanne, as well as in the research facilities of the pharmaceutical industry in Basel. But what is the situation in the medical sciences, in particular as it concerns clinical and experimental neurology?

The role of academic societies

An academic organisation, such as the European Neurological Society (ENS), provides the platform by which clinical and experimental neurologists of various subspecialties can interact in the exchange of knowledge and expertise. Participation in this organisation mirrors the degree to which individual clinicians and medical researchers function within a geographical area, such as in Europe. Thus a closer look at what takes place at the annual meetings – and in the scientific board – of the ENS indicates the influence

members of this society from a particular country exert within such an area, e.g. the force of Swiss neurology within Europe.

The European Neurological Society

This medical society was founded in 1986, as based on the initiative of Gérard Said, Anita Harding and P. K. Thomas. The ENS is modelled after the American Academy of Neurology, in which teaching courses at its annual meeting play a prominent role. Moreover, the ENS represents an effort to break away from national representation to membership on an individual basis. This emphasis on individuality underlines the importance of expertise in the various fields of neurology, as well as the singular expression of enthusiasm for clinical and experimental neurology. The ENS has now become the most prominent society of neurologists on the European Continent, and its members – a total of 2300 from 60 countries worldwide – excel in the practice and teaching of neurology, including research in which neuroscience plays an important role. This society leads Europe in its aims to provide continuous education in all fields of neurology; to create a scientific forum for the presentation of original research work for all neurologists; to guarantee a high level of scientific standard; and to support the younger generation by continuing promotions such as Travel Grants, Fellowship Stipends and the new Neurologists in Training Offer. The official scientific journal of the ENS is the *Journal of Neurology*, one of the leading publications in this medical discipline. It is interesting to note that four members of the Editorial Board are from Switzerland, namely A. Aguzzi, Zurich; V. Dietz, Zurich; Th. Kuntzer, Lausanne; and A. Steck, Basel.

Moreover, Swiss neurologists have significantly influenced the steady growth of the ENS since its inception in 1986. While the First Meeting took place in Nice, France, June, 1988; the Third Meeting convened, with approx. 1,000 participants, in June of 1992 in Lausanne, Switzerland, where Andreas Steck, at that time professionally active in Lausanne, served as congress president. For this gathering of the Society, the Teaching Courses – following their success at the two previous meetings – were reorganised and expanded by the Swiss Organising Committee. The Society's meetings have come a long way since then. For example, the 11th ENS Meeting 2001 in Paris saw 2,400 participants from

66 countries; the 12th ENS Meeting 2002 showed 3,400 participants from 77 countries, while the 14th ENS Meeting 2004 in Barcelona registered 2,700 delegates from 77 countries.

In all of these gatherings of the ENS, starting with the First Meeting in Nice, Swiss neurologists have acted as a major factor in the success of these meetings with their scientific, organisational and congress technical contributions. This was especially seen at the 16th ENS Meeting held again in Lausanne, Switzerland, May 27–31, 2006, in which 2247 delegates from 76 countries convened. It is interesting to note that the number of Swiss participants at the Lausanne meeting was 299, i.e. the second highest; while the highest number was contributed by Germany, namely 307. Thus the Swiss delegation represents an extraordinarily high rate of participation when compared to Switzerland's total population of approx. 7 million. Moreover, with the election of Ludwig Kappos of Basel to the Executive Committee of the ENS during the Society's Business Meeting in Lausanne, three members of this Committee are now from Switzerland, the other two being Claudio Bassetti and Andreas Steck. A relatively high proportion from one country when considering that the 16 members of the Executive Committee are from 12 countries.

Innovations at the Sixteenth ENS Meeting in Lausanne, Switzerland

Moreover, this recent meeting of the Society carries especially the signature of Swiss organisational capabilities and scientific expertise. For example, a special offer was made to young European neurologists in training to attend this Meeting in Lausanne by offering them free housing, as well as free registration and admission to the Teaching Courses. The programme was such a success – e.g. 342 applicants from 36 countries received grants – that the offer has been extended to the 17th ENS Meeting scheduled to take place in Rhodes, Greece.

In addition, changes were made in the Scientific Programme of the Lausanne Meeting, such as the vertical integration of the Teaching Courses with the Scientific Communications of selected topics. In order to emphasise the importance of certain topics in neurology, a vertically integrated programme was designed to cluster – on the same day of an ENS meeting – the activities surrounding

Correspondence:

Dr. rer. nat. Clay E. Reilly
Gstaltenrainweg 73
CH-4125 Riehen

the communication of scientific papers during the Scientific Programme with the exchange of information concerning Teaching Courses. In this way, transmission of up-to-date research results is optimally coupled with presentation of the state-of-the-art clinical situation displayed in a Teaching Course.

Another example of congress innovation is the 'Best of Free Communications' session which took place on Wednesday, May 31, in Room Lausanne of the Palais Beaulieu in Lausanne, Switzerland, 12:30–13:30, at the close of the 16th ENS meeting. The session was scheduled in order to honour the top 5% of abstracts accepted and presented as high-quality oral or poster communications. Andreas Steck of Basel co-chaired this session. Authors were invited to give a presentation highlighting the essential aspects of their communications during this session. Each speaker had 3–4 minutes to deliver his/her presentation. Speakers giving these presentations were awarded free registration to attend the 17th ENS Meeting in Rhodes, Greece, June 16–20, 2007.

New to ENS meetings is the introduction of the so-called 'Poster Walk' during the Poster Sessions. Each session had a moderator who is an expert in the field to be presented. The moderator literally piloted his/her audience to selected posters located in the area of discussion, thereby facilitating interest and discussions concerning individual posters. Swiss moderators also played a prominent role in this procedure, such as: F. Vingerhoets, Lausanne (Extrapyramidal disorders); Th. Kuntzer, Lausanne (Clinical neurophysiology); A. Steck, Basel (Immunology); P. Fuhr, Basel (Sleep disorders) and C. Bassetti, Zurich (Sleep disorders).

Thus a significant contribution to the success of the 16th ENS Meeting in Lausanne can be directly attributed to extraordinary accomplishments of the Swiss Local Organisation Committee. These innovations in congress performance are especially the result of the work carried out, for example, by C. Bassetti, Th. Kuntzer, A. Steck and F. Vingerhoets.

Scientific contributions from Switzerland at the Lausanne Meeting

Organisational expertise and congress technical innovations are certainly determining factors for the success of a meeting; but in the end, the weight of scientific contributions is what counts. The 16th ENS Meeting in Lausanne offers an excellent overview of how members of a particular country – such as Switzerland – act to advance knowledge in clinical and experimental neurology. Thus, the impact of Swiss neurology in Europe can be monitored by observing the scope of contributions made by authors from that country. This Swiss contribution was outstanding on the scientific level, with a major impact on the Teaching Courses, Symposia, as well as the oral and poster sessions. For example, the work of M. Schwab, Zurich; P. Michel, Lausanne; P. Fuhr, Basel; and F. Vingerhoets, Lausanne; were especially notable.

In order to characterise the impact Switzerland has within the European scene, the following contributions at the 16th ENS Meeting in Lausanne made by outstanding Swiss neurologists are summarised below, e.g. C. Bassetti, L. Kappos, Th. Kuntzer and A. Steck.

Professor Claudio Bassetti

Claudio Bassetti is professor and chief of the neurological outpatient clinic, emergency service and sleep laboratory at the University Hospital in Zurich, where he also acts as vice-chairman of the Department of Neurology. Professor Bassetti was highly active at the 16th ENS Meeting in Lausanne where he co-chaired the Symposium on the Neurology of Sleep. In his lecture, entitled *Narcolepsy*, he gave a broad overview of this disease, such as frequency of occurrence within the population, genetic factors involved, studies in rodent and canine models, the success of current treatment, as well as research plans for the future designed to clarify narcolepsy as an autoimmune disease and the value of new treatment strategies. He also co-authored the paper on *Central sleep apnoea and central periodic breathing during sleep in acute ischaemic stroke* in the session on Cerebrovascular Disorders 3. The objective of the study is to better characterise Central Periodic Breathing (CPB) in sleep and its relevance in acute ischaemic stroke. CPB is present in 20–40% of these patients. Moreover, Professor Bassetti co-authored 7 poster presentations concerned with sleep disorders; for example: on REM sleep regulation in narcoleptics and normal controls; a presentation of three cases of strictly unilateral restless legs syndrome; a study identifying decreased levels of the enzyme lipocalin-type prostaglandin D synthase (L-PDGS) in excessive daytime sleepiness, and that L-PDGS is the first neurochemical marker for this disorder. Another poster presentation was concerned with the use of magnetic resonance spectroscopy in a study on narcolepsy, which was carried out in collaboration with the Swiss Federal Institute (ETH) Zurich. Two additional posters were concerned with human narcolepsy-cataplexy and the processing of humour in narcoleptic patients using functional magnetic resonance imaging, a study carried out in co-operation with the University of Geneva and the ETH Zurich. The final poster outlined a study on the prevalence and characteristics of post-traumatic sleep-wake disorders and the identification of predictors for the development of post-traumatic sleep-wake disorders. Professor Bassetti also acted as moderator during a Poster Walk on Sleep Disorders.

Moreover, Professor Bassetti was active in the 16th Meeting's Teaching Course on 'Current Treatments in Neurology', where he gave a lecture entitled *Sleep disorders: diagnosis and treatment*.

Professor Ludwig Kappos

Professor Ludwig Kappos is head of the Outpatient Clinic Neurology-Neurosurgery, Department of Neurology, University Hospital in Basel. He is a renowned clinician and researcher in the area of multiple sclerosis and respected throughout Europe for his knowledge and expertise. For example, Professor Kappos played a key role at the 22nd Congress of ECTRIMS, which took place on September 27–30, 2006, in Madrid, Spain. At the 16th ENS Meeting in Lausanne, he contributed significantly in both the oral and poster sessions, as well as in a Teaching Course entitled *Future direction in MS treatment*, an area in which he is directly involved. Professor Kappos was chairman of the Biogen Idec/Elan Satellite Symposium, which was concerned with scientific updates. He gave two lectures at this symposium. In his report entitled *Natalizumab data*, Professor Kappos provided an overview of the data on the novel drug natalizumab, a monoclonal antibody which binds to the adhesion molecule $\alpha 4\beta 1$ integrin, expressed on the surface of lymphocytes. In this way, $\alpha 4\beta 1$ integrin does not interact with the vascular adhesion molecule VCAM-1, thereby preventing the migration of lymphocytes to the site of inflammation, i.e. the CNS. This results in an approx. 68% drop in the rate of relapse, however, future studies need to be carried out in connection with side effects.

Professor Kappos also co-chaired the oral session on Multiple Sclerosis 4 and co-authored two oral communications. The oral communication entitled *Efficacy of a novel oral single-agent fumarate, BG00012, in patients with relapsing-remitting multiple sclerosis: results of a phase 2 study*, dealt with the efficacy of three dose levels of BG00012 on the brain lesion activity in patients with relapsing-remitting multiple sclerosis (RRMS) as measured by magnetic resonance imaging. The study was carried out by a multi-centre international study group. The results showed that BG00012 significantly reduces brain lesion activity in patients with RRMS in over 24 weeks of treatment. The other oral communication co-authored by Professor Kappos was concerned with the so-called BENEFIT Study, an international study entitled *Betaferon® in Newly Emerging Multiple Sclerosis for Initial Treatment (BENEFIT): clinical outcomes*. The interferon beta 1b (Betaferon®) was investigated by the BENEFIT study group as to safety, tolerability and efficacy. The results showed that 250 mcg of Betaferon® significantly delays progression in MS patients with a first clinical demyelinating event and in MRI findings suggestive of MS.

Professor Kappos also co-authored poster presentations concerning the results of the BEYOND study and BENEFIT study. Moreover, he was involved in the poster presentation describing the investigation on the role of fingolimod, an oral sphingosine-1-phosphate receptor modulator, as an oral treatment option for RRMS. Results of this international study are expected in the year 2009.

Professor Thierry Kuntzer

Thierry Kuntzer is professor at the Centre Hospitalier Universitaire Vaudois (CHUV), and a specialist in neuromuscular diseases. He played an important role in the success of the 16th ENS Meeting in Lausanne as a member of the Local Organising Committee. Moreover, Professor Kuntzer was the moderator of the Poster Walk on the session concerning *Clinical Neurophysiology*. In addition, he co-chaired the *CHUV Satellite Symposium: Multifocal Neuropathy: and then, 20 years later*. He also gave a presentation on the clinical background of multifocal neuropathy at this Satellite Symposium.

Concerning his scientific contributions at the 16th ENS Meeting, Professor Kuntzer co-authored an oral presentation entitled: *Mirtazapine decreases the pain feeling in healthy subjects*, which was given at Session 6 on *Headache and Pain*. The study was carried out by the Clinique Romande de Réadaptation (CRR) in Sion, Switzerland, and the CHUV in Lausanne, in order to determine whether mirtazapine can reduce pain induced by a standard stimulus in healthy subjects. Since treatment of neuropathic pain is mainly based on antiepileptics, tricyclic antidepressants (TCA) and opiates – all of which have important side effects on the patient's life quality –, it is necessary to investigate an alternative treatment, such as mirtazapine. Mirtazapine is a new, well-tolerated TCA-antidepressant with both monoaminergic and opioid properties which might favourably influence the feeling of pain. The results showed that mirtazapine increases the pain threshold in healthy subjects and that it should be investigated more thoroughly in chronic neuropathic pain patients.

Professor Kuntzer co-authored a poster presentation in the session *Muscle disorders* entitled: *From mountain-racing to implantable cardioverter-defibrillator in a new laminopathy phenotype*, which aimed to describe a new phenotype in a family with limb girdle muscular dystrophy and to point out the importance of screening potential carriers of this disorder. The other poster was concerned with a study of 41 patients with myasthenia gravis in order to uncover the reasons for unsatisfactory outcome. The results showed that more than 50% of these patients had unsatisfactory outcome, although this part could be decreased by 60% when adequately treated.

Professor Andreas Steck

Andreas Steck is professor of neurology and head of the Department of Neurology, University Hospital, Basel, Switzerland. Professor Steck's contributions to the 16th ENS Meeting in Lausanne are wide ranging, extending from his pivotal work in the Local

Organising Committee, to chairmanships in several sessions and a teaching course, as well as contributions to the oral and poster sessions. Moreover, this is not the first time Lausanne has seen his abilities to facilitate the design of an international congress on neurology. The third ENS Meeting, which took place in Lausanne in June, 1992, saw his capacity to achieve a successful meeting of a fledgling society. Professor Steck has been a major factor in the steady growth of the ENS, from its foundation in 1986, to his role as President of the Society (1992–1993), to his role in the ENS Executive Committee. The success of the second Lausanne Meeting in June of 2006, i.e. the 16th, is another example of his extraordinary ability to achieve excellence, whether it be in scientific investigations or in the development of an academic society. He accomplished this advancement, for example, by assuming the responsibility of guiding the Society's financial success in his capacity as Treasurer. Furthermore, he steers the ENS Fellowship Stipend Programme, a scholarship totally financed by the Society, to become a most important means of supporting young neurologists in training to design and carry out their own research project in the facilities of another country in Europe. This Programme has thus drawn many young neurologists to the meetings and activities of the ENS.

In line with his concern for the continuous education of neurologists in Europe, Professor Steck has deeply been involved in the Teaching Courses of the ENS Meetings. For example, he co-chaired the Teaching Course on *Current treatments in neurology* and also gave a lecture on *Chronic immune mediated neuropathies*. His support of excellent research in clinical and experimental neurology is shown in his acting as co-chairman, and initiator, of the closing session of the 16th ENS Meeting, entitled *Best of free communications*, in which 22 excellent oral and free communications were selected for highlighted presentation. Professor Steck was also a moderator for the 'Poster Walk' on *Immunology*, where he guided his audience through the complexities involved in neuroimmunology and peripheral neuropathies.

Professor Steck's research work neuroimmunology was seen, for example, in his co-authorship of the oral presentation entitled: *Allograft inflammatory factor 1 in chronic inflammatory demyelinating polyneuropathy and vasculitic neuropathy*, which took place at the Oral session 4: *Peripheral neuropathies 2*. The aim of this study was to identify the cellular expression factor Allograft Inflammatory Factor-1 (AIF-1) – which is a modulator of the immune response during macrophage activation – in sural nerve biopsies from patients with different types of peripheral neuropathies. Immunohistochemistry on paraffin sections of the human nerve biopsies was carried out. The results showed

that there is a small constitutive expression of AIF-1 in the normal human nerve, however, in chronic inflammatory demyelinating polyneuropathy (CIDP) and vasculitic neuropathy (VAS) nerves the expression of AIF-1 was much higher when compared to the normal nerve non-inflammatory axonal neuropathy.

Andreas Steck's research interests and performance is mirrored again in his co-authorship of numerous poster presentations at the 16th ENS Meeting, all of which centred around peripheral neuropathy, cerebrovascular disorders, motor neuron disease and neurorehabilitation. This research – in which the neurobiology of neuropathologies is studied – was carried out in order to cast light on the pathological mechanisms involved, thereby opening the door for the development of future therapies.

Conclusions

The excellence of Switzerland in the sciences in general, and in neurology in particular, cannot be easily elucidated. Nevertheless, Switzerland offers an ideal opportunity to explore the reasons behind the success of a medical discipline – such as neurology – and its influence upon Europe. In this country it appears that numerous favourable factors convene to prepare the ground for outstanding research in clinical and experimental neurology. In general, the factors involved are an excellent system of education, the realisation that the prosperity of a country lies in the acquisition of scientific knowledge, as well as the availability of financial support needed to accomplish research goals. Switzerland's outstanding health care system, combined with its world-leading pharmaceutical industry, provide the underlying basis for the advancement of neurology in that country.

These decisive factors attract neurologists from other countries, thereby producing the 'critical mass' required for the accomplishment of extraordinary research. The interaction of these personalities within this environment acts again to draw additional talented neurologists to participate in the endeavour of experimental investigation in that country; the centripetal force necessary for the achievement of breakthrough scientific accomplishments. In addition, the awareness Swiss neurologists have of the importance of exquisite academic organisations, such as the European Neurological Society, for the advancement of their medical discipline, accelerates the impact of Swiss influence on the neurology of Europe. The 21st century has often been referred to as the 'Age of the Brain', an age in which Swiss neurology will increasingly play a dominant role as a leading force in Europe.