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The SFCNS Young Clinical Neuroscientists Network Cultivating ties across clinical neuroscience disciplines

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Abstract

Interdisciplinary cooperation and interaction have grown extremely important and will soon become indispensable in clinical neuroscience. The constantly increasing degree of specialization may further compartmentalize the different clinical neuroscience disciplines, potentially altering a unified identity in the field. In 2016, the Swiss Federation of Clinical Neuro-Societies (SFCNS) encouraged the creation of the Young Clinical Neuroscientists (YouCliN) Network bringing together juniors from all specialties united in the SFCNS – that is, biological psychiatry, neurology, neuropathology, neuropsychiatry, neuropsychology, neuroradiology and neurosurgery. The main YouCliN mission is to cultivate an interdisciplinary spirit among clinical neuroscience trainees – in order for them to be prepared to face future challenges in a shoulder-to-shoulder manner. Moreover, the YouCliN represents junior interests in current issues of Swiss clinical neuroscience and contributes to shaping interdisciplinary training and courses. Transversality, better integration between fundamental and clinical neuroscience as well as between psychiatry and clinical neuroscience, and equal gender opportunities are further important topics and fields of action. In this article, the YouCliN Steering Committee presents the Network, the disciplines' specific concerns and hopes, and positions itself with respect to future challenges for clinical neuroscience.

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Introduction

Collaboration between different disciplines and specialties has become pivotal in several areas of clinical care and research. In clinical neuroscience, interdisciplinarity is of particular value. The Swiss Federation of Clinical Neuro-Societies (SFCNS) was founded in 2009 in order to formalize and structure the joint political, educational and clinical research efforts within clinical neuroscience.¹ The SFCNS still remains the only national association in Europe officially promoting multidisciplinary in clinical neuroscience. The Young Clinical Neuroscientists (YouCliN) Network within the SFCNS brings together juniors across the clinical neuroscience specialties. The primary aim of YouCliN is to represent junior interests with respect to current and future opportunities and challenges in Swiss clinical neuroscience.² Even more importantly, the YouCliN Network sets out to promote a truly interdisciplinary mindset in clinical neuroscience trainees. Better accessibility and understanding of options for clinical and academic development, gender equality, transversality and closer interaction between neuroscience and psychiatry represent further missions and substantial efforts. Here, the current YouCliN Steering Committee sheds light on its most relevant activities and topics and outlines the junior perspective on clinical neuroscience from the seven disciplines reunited in the SFCNS and thus YouCliN as well as the different training schemes and backgrounds of the disciplines (Table 1).

YouCliN infrastructure

YouCliN was established at a kick-off meeting on 29 September 2016 during the third SFCNS Congress in Basel. In the YouCliN Network, every clinical neuroscience discipline united within the SFCNS is represented: biological psychiatry, neurology, neuropathology, neuropediatrics, neuropsychology, neuroradiology and neurosurgery. Each clinical neuroscience discipline delegates two junior representatives to the YouCliN Steering Committee for a regular 3-year term of service (the period between two SFCNS Congresses). Delegates should start their term prior to completion of 6 years after their (sub)specialization and are generally nominated by their discipline's junior societies (e.g. Swiss Association of Young Neurologists – SAYN; Swiss Young Neurosurgeons' Society – SYNS). In disciplines without junior associations, the departing delegate may nominate their successor. The 6-year rule ensures a sufficiently junior level of the delegates, yet offers YouCliN indispensable input from colleagues at an intermediate career level. On average, the current Steering

Committee members are at 1.5 years after their (sub)specialization (ranging from 2 years before to 6 years after specialization). The Steering Committee meets every 9 months and is coordinated by an Executive Committee composed by a Chair, Vice-Chair and Secretary, elected by the Steering Committee (Figure 1). The delegates work on different projects and closely interact with the juniors in their field. Delegates bring the particular needs of the juniors and of their discipline to the attention of the committee. They also regularly disseminate YouCliN development milestones and activities to their discipline's association, institutions and colleagues. YouCliN activities are also published online (<http://www.sfcns.ch/index.php/youclin.html>) and more recently on the SFCNS social media channels managed by YouCliN (Facebook: <https://www.facebook.com/youclin.sfcns.5>; Twitter: <https://twitter.com/SFCNSyouclin>). In order to keep the juniors in neuroscience informed and updated about these activities, YouCliN is currently implementing a mailing list.

Interdisciplinary training

A true spirit of interdisciplinarity will only develop through multidisciplinary exposure during clinical training and integrative courses, including professional and personal exchange. With this in mind, the SFCNS and YouCliN have begun to develop concepts for interdisciplinary training in clinical neuroscience. The SFCNS Summer School sheds light on relevant clinical problems from a broad range of different perspectives. A clear emphasis on interdisciplinarity becomes evident in the Summer School 2018 programme: for instance, the broad topic 'epilepsy' is covered with respect to most recent pharmacological recommendations, specific features of adult versus childhood epilepsy, relationship to gender, neuropsychological sequelae and video-based differential diagnoses. Moreover, neurological, neuroradiological and neurosurgical approaches are discussed. This 2-day symposium also covers pearls and pitfalls of other relevant central nervous system (CNS) disorders, ranging from the brain (e.g. intracranial haemorrhage, stroke, sleep disorders, movement disorders) down to the spinal cord (e.g. malignant spinal cord compression). Besides appreciating the professional content of these meetings, they offer sufficient time and space for mingling with mentors and peers. Further evolution of the concept is currently being discussed, with regard to the framework and inclusion of additional content (such as the SFCNS Imaging Course directed by the Swiss Society of Neuroradiology, in development) but also scientific mentoring and discussion of professional development options.

Table 1. Different training schemes and backgrounds of the disciplines represented in the YouCitiN Network.

| | Neurology | Neuropathology | Neuropediatrics | Neuropsychology | Neuroradiology | Neurosurgery | Psychiatry psychotherapy (adult) | Psychiatry psychotherapy (child and adolescents) |
|---|--|------------------|-------------------------|---------------------------------|----------------|--------------------------|---|--|
| Total amount of years (min) | 6 | 5 | 7 | 5 | 6 | 6 | 6 | 6 |
| Specialist title | Yes ^a | Yes ^b | No | Yes ^c | No | Yes ^a | Yes ^a | Yes ^a |
| Subspecialist title ^d | No | No | Yes | No | Yes | No | No | No |
| Special requirements | MD diploma 1 year internal medicine 2 × 6 months neurophysiology | MD diploma | FMH paediatrics | Master of Science in Psychology | FMH radiology | MD diploma | MD diploma 1 year internal medicine 6 months geriatric psychiatry | MD diploma 1 year adult psychiatry 1 year 'somatic' medicine |
| Society website for further information | www.swissneuro.ch | www.ssn.uzh.ch | www.neuro-paediatric.ch | www.neuropsy.ch | www.sgnr.ch | www.swissneurosurgery.ch | www.psychiatrie.ch | www.sgkipp.ch |

YouCitiN: Young Clinical Neuroscientists; FMH: Swiss Medical Association; FSP: Federation of Swiss Psychologists.

^aDenotes an own FMH title.

^bFMH title without recognition from the Swiss Federation (status 2018; Cave: Curriculum is in revision).

^cDenotes not an FMH title, but an FSP title.

^dDenotes not an own FMH title, requires a basic FMH title and builds on it.



Figure 1. The YouClin Steering Committee is composed of two junior representatives of each clinical neuroscience discipline and is coordinated by an elected Executive Committee composed by a Chair, Vice-Chair and Secretary. YouClin: Young Clinical Neuroscientists.

In addition, the three largest neuro-specialties (neurology, neuroradiology and neurosurgery) have discussed the implementation of interdisciplinary training: a ‘common trunk’. This will allow residents to rotate more easily between the different fields of clinical neuroscience in order to widen the professional horizon and find out which speciality suits them best. This enriching concept is already established on a local basis in some of the larger Swiss hospitals. The YouClin collaborates with the seniors from the SFCNS concerning a ‘common trunk’ on a national level, with the intention to provide an input from the trainees.

New ways of communication

In an increasingly connected society heavily relying on social media, professional associations have to consider new, more efficient, interactive and instant ways of communication. Social media can help to promote dialogue, collaborations and sharing of ideas in clinical neuroscience. Therefore, upon a YouClin initiative, the SFCNS is now

represented on Twitter (<https://twitter.com/SFCNSyouclin>). This is a very public social media platform targeting a large unrestricted audience and therefore offering immense potential outreach. For this reason, Twitter is considered a rather professional platform used to exchange cutting-edge ideas and information. Facebook, on the other hand, is based on creation of closed groups and allows for a more casual, informal interaction; members can exchange ideas within a group protected from the general Internet audience. More informal chats between individuals from different backgrounds often lead to innovation, one of the main missions of the SFCNS and YouClin. The SFCNS now also has a Facebook profile (<https://www.facebook.com/youclin.sfcns.5>) run by YouClin. This two-pronged approach, presence on Twitter and Facebook, is the way forward – messages will be broadcasted to a large audience on Twitter but will also reach those not using Twitter via Facebook. Those interested in the SFCNS and YouClin will be included into the fascinating, interdisciplinary discussions on the Facebook page and potentially topic-specific, protected groups. Despite justified concerns and

reservations towards social media, upon appropriate and cautious use, they offer promising tools for professional communication and contacts.

Neurology

In the new millennium, substantial progress in translational research and several successful clinical trials have provided new, efficient treatment options for previously devastating neurological disease. This development has strengthened the therapeutic side of neurological care but also promoted further diversification and sub(specialization) within neurology. At a smaller scale, the field of neurology faces the challenge of clinical neuroscience to integrate successfully across specialized areas of expertise, ranging from affections of the peripheral nervous system to neurodegeneration, stroke or epilepsy. Furthermore, only paralleled by neuropediatrics, neurological patient management solicits the highest degree of cooperation with other clinical neuroscience disciplines.

In order to address emerging and future challenges for neurologists by further tailoring the FMH (Swiss Medical Association) neurology curriculum, the SAYN (<https://www.swissneuro.ch/SAYN>) was founded in 2014.³ The SAYN also aims at connecting and representing young neurologists in Switzerland. Given the aforementioned, increasing intervention of all clinical neuroscience specialists in diagnosis and treatment of neurological patients, the future neurologist appears predisposed to serve as integrator and manager of interdisciplinary care and efforts. The exchange of ideas and experiences within the YouCliN Network may enable young neurologists to obtain the skills and different viewpoints, indispensable to fulfil this demanding role.

Neuropathology

Neuropathology has historically developed in parallel to general pathology as a distinct medical discipline. While mainly dealing with autoptic findings of CNS disease in its early days, the speciality has shifted its focus towards biopsy interpretation, in particular tumours, inflammation, infection, degeneration, malformation of the nervous system and neuromuscular disease. Neuropathology is highly attractive for young medical doctors with strong interest in basic and applied research. Continuous development and improvement of molecular methods are essential to better understand and treat nervous system diseases. Interaction with closely related medical specialities is vital, in particular, neurosurgery, oncology and neurology. A strong practical background in molecular biology is a prerequisite for any resident deciding to enter the field. Of note, there are unfortunately only very few resident positions available in Switzerland. YouCliN may facilitate finding vacant training positions or internships for colleagues specializing in one of the other clinical neuroscience disciplines. Brief

practical exposures to neuropathology may also be feasible, such as a possibility to join the Annual Sessions around the Microscope – the currently sole official meeting of Swiss neuropathologists. Such an option might be particularly interesting for those disciplines in close interaction with neuropathology, such as neuropediatrics, neurology or neurosurgery.

Neuropediatrics

The neuropediatric training has a long-standing tradition in Switzerland and encompasses a full curriculum in paediatrics as well as an additional education of 3–4 years in child neurology. Neuropediatricians mainly care for children and adolescents with epilepsy, headache, neuromuscular disease, cerebral palsy, developmental problems and neurocutaneous syndromes. Furthermore, the patients also suffer from diseases usually more prevalent in adults, such as multiple sclerosis or stroke. Therefore, a good collaborative network is required to pursue the daily work in the best interest of the patients and neuropediatricians are used to an interdisciplinary approach, mainly with colleagues from neuroradiology, neuropsychology, neurology and neurosurgery. One year of adult neurology is already a mandatory requirement in the neuropediatric curriculum, offering great insights and fruitful exchange between neuropediatricians and neurologists. However, neuropediatricians would also welcome the possibility of getting deeper insight into other clinical neuroscience disciplines. YouCliN offers the unique opportunity to foster this interdisciplinarity early in the career. Young neuropediatricians, especially while still in training, would benefit from a more structured and broader possibility for interactions on a national level. Regular meetings, for example, through courses such as the SFCNS Summer School, will enable scientific collaborations and personal career opportunities. A more detailed insight into the similarities and differences of the clinical neuroscience disciplines will enhance mutual understanding and ultimately strengthen the community.

Neuropsychology

Clinical neuropsychology aims at understanding the relationship between the brain and behaviour (i.e. cognitive functions, affective–emotional processing and social cognition). Therefore, neuropsychology has ever since significantly contributed to clinical neuroscience. Being a branch of psychology, neurology and neuroscience at the same time, neuropsychology is highly multidisciplinary in nature. Neuropsychologists closely interact and collaborate with neuroradiologists, neurologists, neurosurgeons, neuropediatricians and psychiatrists in the fields of diagnosis, rehabilitation, medico-legal expertise as well as in research. Thanks to this interdisciplinarity, but also to the rapid advancement of neuroimaging methods (e.g. functional MRI (fMRI), DTI, EEG, MEG), technology-based

neuropsychological interventions (e.g. virtual reality), and to the evolution of various neuroscientific models, neuropsychologists are increasingly able to provide integrative and state-of-the-art care.

Promoting interdisciplinarity early in the young neuropsychologists' training is crucial. Thus, YouCliN could satisfy this expectation by fostering interdisciplinary clinical training (e.g. SFCNS Summer Schools), exchanges and/or scientific collaborations already at the junior level (e.g. fMRI projects on cerebral plasticity after cognitive rehabilitation involving young neuropsychologists, neuroradiologists and neurologists).

Following interaction and discussion within the YouCliN Steering Committee, the neuropsychology delegates were inspired to create a project towards development of a 'junior section' of the Swiss Association of Neuropsychologists (ASNP/SVNP) that could represent, inform and integrate young neuropsychologists in training. More specifically, analogous to the SAYN,³ a well-structured and active association of young neuropsychologists across Switzerland could be established within the ASNP/SVNP. Furthermore, to reflect the dedication and contributions of the neuropsychology delegates, the YouCliN Steering Committee elected a neuropsychologist as the Network's the Vice-Chair in February 2018.

Neuroradiology

Imaging of the CNS is rapidly evolving and plays a central role in neuroscience. In particular, advances in MRI have proved an invaluable asset, both in the clinical diagnostic setting and in experimental contexts. Including interventional neuroradiology, nowadays, a neuroradiologist has career options ranging from fundamental research in MRI physics to performing minimally invasive neurovascular interventions. The versatile role of the neuroradiologist will be defined by the added value to and expectations from its clinical and research partners. Constant collaborative and interactive efforts are needed to ensure the clinical neuroscientists keep up with technological progress and opportunities as well as to allow neuroradiologists to further define them. Given this tremendous development of neuroradiology, a dedicated and specialized training and certification appear indispensable. Although YouCliN's greater role is to equip juniors with a common clinical neuroscience spirit, it may also have the potential to unite junior neuroradiologists within their own community – this community currently being quite heterogeneous. Early exposure to and collaboration with a neurosurgeon, neuropediatrician or neuropsychologist may well influence an aspiring neuroradiologist's career choice towards paediatric neuroradiology, fMRI research or interventional neuroradiology, respectively. The field of interventional neuroradiology will likely incorporate neurosurgeons and neurologists interested in interventional procedures, in close cooperation with interventional neuroradiologists. Sharing of

procedural techniques and clinical expertise offers the potential to further enrich the field. Besides, the clinical neuroscience disciplines can expand their knowledge and potential via input from their partners in neuroradiology. Without such collaborations, the field of neuroradiology risks getting lost in the dark.

Neurosurgery

Over the past decades, neurosurgery has undergone impressive development in terms of management of CNS and peripheral nervous system disorders. This surgical discipline also increasingly attracts trainees. Multidisciplinary collaborations represent one of the main developments and opportunities. Progress in minimally invasive techniques as well as advances in neurosurgical tools and intraoperative imaging will further transform daily practice and will necessitate an even closer interaction with the other disciplines. Fundamental and translational research as well as neuropathology have been increasingly integrated in neurosurgical care, offering early interdisciplinary exposure to the trainees. The SYNS (<http://www.syns.ch>), a society of junior neurosurgeons was founded in 2005 and offers several high-level hands-on courses and symposia every year.

YouCliN will play a role in collaboration between the disciplines with an early exposure to the ongoing and innovative concepts in neuroscience and will also bring together juniors across all clinical neuroscience disciplines. For example, concepts like brain–body interfaces are being nowadays explored and could lead to interdisciplinary collaboration between young neuroscientists in the future. Networking with peers is also one of the opportunities provided by the YouCliN.

Biological psychiatry

Biological psychiatry is founded on the firm belief that alleviating psychiatric disease burden requires a better understanding of their biological causes. The tradition of biological psychiatry is far from being new. In fact, research in psychiatry started with the idea that mental health was reliant on adequate brain function. Later during the 20th century, this way of thinking was somewhat obscured by the growing importance of psychotherapeutic approaches, some of them leaving literally no space for studying neural correlates. However, a strong research current has always remained, including psychiatrists, psychologists and biologists who try to produce and integrate clinical expertise with knowledge from genetics, epigenetics, molecular biology, neuroanatomy and, more recently, cognitive neuroscience and neuroimaging in order to better understand mental health and disorders. Although one may never be able to fully reduce all clinical manifestations to unique biological mechanisms due to the many parameters involved, research in psychiatric neuroscience has to aim for optimal incorporation and explanation of this

complexity. Therefore, the interplay between clinical neuroscience and psychiatry is particularly important and a network such as YouCliN may contribute to building interdisciplinary competences in assessing the healthy and dysfunctional brain. YouCliN offers junior Swiss psychiatrists who have benefitted from a unique training in both psychiatry and psychotherapy, a highly valuable opportunity to share with and learn from complementary specialties in clinical neuroscience. To this end, YouCliN is about to establish cooperations with the Swiss junior psychiatrists' associations.

Psychiatry and clinical neuroscience: Split-mind or integration?

It is an exciting and daunting time to be working in the field of translational psychiatry. Although the fields of neuroscience and psychiatry have never been so close, the real-world schedule of a clinician-scientist is very varied and gaps can be huge.⁴ The clinician-psychiatrist will offer patients medication and psychotherapy (both of which can change the brain in similar ways,⁵ advocate care reimbursement, accommodate a patient at risk in often full inpatient units and discuss the diagnosis and consequences of a mental disorder with the patient and his family). The scientist-psychiatrist will meet with neurobiologists to elaborate on brain circuits and models, perform experimental neuroimaging analysis and even discuss new computational approaches for neuroimaging or models to simulate behaviour with specialized engineers. Psychiatry is about building bridges to patients but also other disciplines, and recent advances in the field elicit some optimism. Translational psychiatry is the dialogue between fundamental neuroscience research (including animal models) and clinical psychiatry with the aim of discovering biomarkers and novel treatments to improve the lives of patients with psychiatric illness. The quest to understand brain circuits is an exemplary approach at the intersection of multiple disciplines,⁶ offering great translational opportunities between models and patients with the potential of advancing the field. The major challenge, however, will be to include these advances into a humanistic and personalized clinical approach centred on the patient and therapeutic relationship, where timing of the intervention is key. The field will also need to evolve towards integrated practice (i.e. where the neuroscience perspective is part of clinical practice) if we wish to preserve the psychiatrist's own brain circuits.

Equal gender opportunities

Around 60% of all medical students are women, and these numbers did not change substantially between 2008 and 2016⁷; Jahresbericht University of Zürich 2016: http://www.uzh.ch/dam/public/about/portrait/annualreport/2016/order/UZH_Jahresbericht_2016.pdf. Is it time to foster males' interest and careers in medicine? On the other hand,

in 2016, only 41% of medical doctors in Switzerland were female. On average, women obtain their first FMH title at the age of 36.1 years, male colleagues at 36.7 years. In terms of academic promotions as reflected by inaugural lectures (e.g. in 2017 at the University of Zurich: www.uzh.ch/de/outreach/events/av/archiv.html), only 27% were held by women. This is roughly the same proportion as in 2014 (31%).

What are the reasons for this 'dropout'? They are probably manifold and still poorly understood. A European survey in neurosurgery trainees⁸ found females to be less likely to pursue an academic career, to have officially protected research time half as likely as their male colleagues and to be worried about their career perspectives twice as often as males. Such factors, but also traditional gender roles and the lack of role models may influence career goals and promotion of female doctors.

Although these issues may apply to most domains in clinical medicine, YouCliN is determined to develop and cooperate on strategies promoting equal gender opportunities in Swiss clinical neuroscience. As a first step, the YouCliN Steering Committee has an equal gender ratio that enables differentiated discussion of challenges for clinical neuroscience. Furthermore, specific measures such as mentoring courses, promotion of part-time employment for both female and male clinical neuroscientists and introduction of specific funding opportunities will be discussed and advocated.

Summary

Interdisciplinary cooperation and interaction have grown extremely important and will soon become indispensable in clinical neuroscience. The founding fathers of the SFCNS have recognized the challenges associated with this development and created the only interdisciplinary clinical neuroscience association in Europe.^{1,2} More recently, they also encouraged establishment of a junior network within the SFCNS, the YouCliN Network.

YouCliN aims at bringing together junior clinical neuroscientists across Switzerland, exchanging ideas and experience and further developing interdisciplinary clinical and academic training in clinical neuroscience. Rapprochement of fundamental and clinical neuroscientists, as well as between psychiatry and clinical neuroscience, appears indispensable and requires continuous discussion and determined action. Promotion of equal gender opportunities will also be essential, not only for satisfaction and quality of life of healthcare professionals but also for the future of medicine. The highly interdisciplinary, connected yet diverse landscape in clinical neuroscience may serve an ideal blueprint on how to tackle these issues.

Furthermore, Switzerland has established itself at the forefront of biomedical and neurotechnological progress. Information and communication technology, robotics, regenerative cell therapy and genomics offer

unprecedented potential for progress in clinical neuroscience. Driving and implementing these advances will require highly specialized scientific, clinical and translational expertise. Whereas this may imply an even higher degree of compartmentalization in clinical neuroscience than nowadays, initiatives like the SFCNS and YouClin may contribute to maintain a sense of unity and common vision.

The creation of efficient and integrative pathways for interdisciplinary clinical neuroscience patient care, such as from the emergency room through neurointensive care to the neurorehabilitation unit represent an even more immediate and organizational challenge.⁹ Both clinical care pathways and cutting-edge biomedical research require transversal cooperation – that is, interaction between professionals from different backgrounds and equipped with complementary expertise. Such transversality will depend on mutual understanding and respect, flatter hierarchies and true shoulder-to-shoulder action. YouClin's most important and stimulating vocation is to cultivate these interdisciplinary values and ties from the trainee cradle on, ensuring that future generations of clinical neuroscientists will be optimally equipped to jointly drive progress in clinical research and deliver wholesome patient care at the highest standards.

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