FEPS

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Letter of the President of FEPS

Dear Colleagues,

in a recent editorial in the Science magazine (Science 324:1241, 2009) Sharon Long and Robert Alpern, who chaired a committee of U.S. undergraduate and medical school faculty, comment on a report by this committee on *Scientific Foundations for Future Physicians* released by the Association of American Medical Colleges (AAMC) and the Howard Hughes Medical Institute. They state that "the new report emphasizes that physicians must have a firm grounding in the biomedical sciences and understand their relation to the physical sciences and mathematics. For physicians to be prepared for inquisitive, critical thinking and lifelong learning, they should also be able to incorporate the methods of science into their practice, including sceptical and critical analysis." The committee has to be congratulated for its careful and inspiring work which will have no doubt major impact. The full report which can be downloaded from *www.aamc.org/scientificfoundations* defines as one of the competencies that students by the completion of medical school should to be able to "*apply knowledge of molecular, biochemical, cellular, and systems-level mechanisms that maintain homeostasis, and of the dysregulation of these mechanisms, to the prevention, diagnosis, and management of disease.* I think this is exactly what modern physiology education should achieve! In my view, this vision clearly underpins the indispensable role for Physiology in Medical education. As you may know, FEPS has also started efforts on analysing the role of Physiology in teaching in European Medical schools. By reviewing Physiology teaching at European universities, ongoing organisation of teaching symposia at the annual FEPS-supported meetings and the installation of a FEPS Task Force on Physiology Teaching (chaired by Prof. Luc Snoeckx) we aim to form a network of European teachers. The task force assists FEPS in defining focuses of Physiological teaching which should help to provide a useful platform for those who need to (re-) establish Physiology, e.g. in the revisions of teaching enforced by the Bologna process. The definition of modern principles and contents of teaching Physiology is clearly a bottom up process which requires broad discussion and we invite all of you to contribute. At the end a FEPS paper will hopefully support physiologists at the European medical schools to emphasize the important impact of Physiology whenever it comes to revisions of medical teaching.

Ulrich Pohl
President of FEPS

Joint meeting of FEPS and the Slovenian and Austrian Physiological Societies in 2009

Dear friends,

Little more than one week remains for Abstract submission for the FEPS 2009 meeting. July 1 is the deadline for Abstract submission and Early registration for the FEPS meeting to be held in Ljubljana, Slovenia, November 12-15, 2009. The meeting is organized by the Slovenian and Austrian Physiological Societies.
Detailed information about registration, abstract submission and scientific programme can be find on the website of the meeting : http://lnmcp.mf.uni-lj.si.
The meeting is aiming to present a scientific platform for all other members of the Federation of European Physiological Societies and our colleagues from other continents.
The meeting is arranged around Scientific Symposia covering the whole field of Physiology and comprises also the annual FEPS Teaching Symposium and the annual EYPS (European Young Physiologists Symposium).

A draft of the scientific programme is shown below:

Thursday, 12th Nov.

10.00-17.00 **Session I**: European Young Physiologist Symposium
14.00-17.00 Symposium on Teaching Physiology (organised by FEPS)
17.00-18.00 Opening Ceremony of the FEPS 2009
18.00-19.00 Keynote Lecture
19.00- Welcome and get-together party

Friday, 13th Nov.

09.00-11.00 **Session II** (5 parallel symposia):

#	Symp. organizer	Title of the symposum	Topic
IIa	Pekny Milos, Sweden	Astrocyte dynamics in health and disease	Glia Physiology
IIb	Prinzen Frits, Netherlands	Assessment and consequences of asynchronous activation of the ventricles.	Cardiovascular Physiology
IIc	Rupnik Marjan, Slovenia	The physiology of endocrine pancreas	Neuroendocrinology
IId	Geiger Margarethe, Austria	Serpins: a family of proteins regulating a variety of physiological processes	Systemic Phys.
IIe	Pangrsic Tina, Germany	Molecular Physiology of Hearing	Neurophysiology

Break
11.30-13.00 **Session III** Oral Presentations
Break-lunch
14.00-16.00 **Session IV** Poster Session and Exhibition
16.00-17.00 Keynote Lecture - **Philip Haydon,** Boston, USA

17.00-19.00 **Session V** (5 parallel symposia):

Va	Rodríguez A. José Julio, UK	Glia in neurodegenerative processes	Glia Physiology
Vb	Petersen Ole H., Verkhratsky Alexei, UK	Calcium signals in cell death and disease	Signaling
Vc	Smith Stephen, USA	Regulation of synaptic transmission	Neurophysiology
Vd	Kržan Mojca, Slovenia	Histamine and CNS	Neurophysiology
Ve	Suleiman M.-Saadeh, UK	Obesity and cardiac cellular physiology	Metabolic & Cardiovasc. Physiol.

20.30- Students' party

Saturday 14th Nov.

09.00-11.00 **Session VI** (5 parallel symposia):

VIa	Evans A. Mark, UK	AMP-activated protein kinase: Regulation of energy supply at cellular and whole body level	Metabolic
VIb	Ritter Markus, Austria	Osmoregulation, Osmosensing and Mechanotransduction	Cell Volume & Osmoregulation
VIc	Aigner Ludwig, Austria	The physiology of neural stem cells in the healthy and diseased brain	Stem Cell Physiology
VId	Mekjavic Igor, Slovenia	Physiology of deconditioning	Thermoregulation & Environmental Phy.
VIe	Darchen Francois, France	Exocytosis and fusion pore physiology	Cell Physiology

Break
11.30-13.00 Session VII Oral Presentations
Break-lunch
14.00-16.00 Session VIII Poster Session and Exhibition
16.00-17.00 Keynote Lecture
17.00-19.00 **Session IX** (5 parallel symposia):

IXa	Lenasi Helena, Slovenia	Investigating the human cutaneous microcirculation	Microcirculation
IXb	Nistri Andrea, Italy	Rhythmic oscillations of spinal networks in health and disease models	Neurophysiology
IXc	Dayanithi Govindan, Czech Republic	Vasopressin and Oxytocin receptors: looking for new tools, pharmacology, physiology and therapeutic agents.	Neuroendocrinology
IXd	Jensen Jorgen, Norway	Muscle and fat: Molecular mechanisms of signaling and crosstalk	Metabolic
IXe	Graier Wolfgang, Austria	Ca2+, a miraculous messenger; an update	Signaling

20.30- Special Event

Sunday, 15th Nov.

09.00-10.30 **Session X** Oral Presentations
Break
11.00-13.00 **Session XI** (4 parallel symposia):

XIa	Hinghofer-Szalkay Helmut, Goswami Nandu, Austria	Modulation of orthostatic responses by additional stressors	Environmental Phy.
XIb	Ritter Markus, Austria	Ion Transporters in Cell Migration and Apoptosis	Cell Physiology
XIc	Fabbretti Elsa, Slovenia	ATP receptors in health and disease	Signaling
XId	Motta Marcella, Magnaghi Valerio, Italy	Pain: role of glutamate and GABA metabotropic receptors	Neurophysiology

Break-lunch
14.00-16.00 **Session XII** Oral and Poster Presentations

Break-lunch
16.00- Best Poster and Best Lecture Award

You are cordially invited to attend this exciting meeting in Ljubljana and to meet old friends and make new ones.

I'm looking forward to meeting you in Ljubljana.

Ger J. van der Vusse,
Secretary General of the Federation of European Physiological Societies.

Professor Jóhann Axelsson
Founder of physiological research in Iceland

Prof. Johann Axelsson is the founder of the Department of Physiology at the University of Iceland, and despite his retirement as professor is still actively involved in research at the department. Most if not all Icelandic physiologists have studied physiology under his guidance at some point in their career, and/or worked under his leadership as mentor or department head. No Icelandic physiologist has been more frequently cited in peer-reviewed journals than prof. Jóhann Axelsson. His research areas have been varied, and include topics in neurophysiology, muscle physiology and pioneering work in research and teaching of physiology in Iceland.

Prof. Axelsson was born in Iceland in 1930, and received his MSc from the Pharmacological Institute, University of Oslo, in 1956. His work in Oslo involved studies on cholinergic mechanisms of neuromuscular transmission in skeletal muscles in a variety of species, with particular focus on the effect of cholinesterase inhibitors on tetanic contractions, and the effect of d-tubocurarine thereon (Axelsson, Gjone & Naess, 1957).
In 1957 he spent a year working on the neurophysiology of cat cerebral cortex at the Centre Etude de Physiologie nerveuse et Electrophysiologie in Paris.

In 1960 Axelsson completed his Fil lic. degree from the Zoofysiologiska Institutionen, University of Lund, and then subsequently his Fil. Dr. degree from the same institution, working on the physiology of smooth and skeletal muscle with prof. Stephen Thesleff. Their collaboration led to a number of fundamental discoveries of muscle physiology. At that time it was assumed that the contractile state of muscle cells was dependent primarily on electrical phenomena, related to the membrane potential of these cells. In a paper published in Acta Physiologica Scandinavica in 1958, however, Axelsson and Thesleff showed that contracture can be induced chemically (by caffeine) in frog striate muscle cells, without any change in membrane potential; the same effect of caffeine on tension was observed when muscle was immersed in isotonic KCl solution. Thus a change in membrane potential of muscle cells is not "necessary or in themselves sufficient causes of contraction", as he put it in his thesis (Axelsson, 1962). The paper by Axelsson and Thesleff in Acta in 1958 had great influence on thinking in muscle physiology and is still being cited in the literature, both in relation to cellular mechanisms in muscle cells, and related areas as caffeine use in sports and pharmacokinetics in man. To this day the paper has been cited over 250 times.

Another paper by Axelsson and Thesleff, published in the Journal of Physiology, London, in 1959, has had even greater impact not only in the field of muscle physiology, but also in areas such as plasticity in the nervous system, up-regulation of receptors, supersensitivity and neuronal development (Axelsson & Thesleff, 1959). At that time it was known that denervation of organs of motor nerves increase sensitivity to neurotransmitters, and was referred to as "denervation supersensitivity", but the underlying mechanisms were largely unknown. Axelsson and Thesleff recorded the membrane potential of a single fibre of mammalian skeletal muscle with an intracellular microelectrode, whilst applying iontophoretically acetylcholine locally on the membrane. They found that before denervation only acetylcholine application on the end-plate evoked membrane depolarisation of the muscle fibre. But after about 14 days of denervation the entire membrane of the muscle fibre will be as sensitive to acetylcholine application locally (by iontophoresis) as the end-plate of the muscle. This suggested

that there was a fairly fast increase in the area on the membrane containing Ach receptors after denervation, and thus supersensitivity involves an increase in the distribution and number of acetylcholine receptors on the muscle membrane. So far this paper has been cited over 660 times.

In 1959 prof. Axelsson was offered the Riker Fellowship for Europe, and to work with prof. Edith Bülbring in Oxford, England, as Riker Research Fellow in Pharmacology. In 1964 he received his DPhil degree in pharmacology from the University of Oxford. In Oxford Axelsson´s work with prof. Bülbring focused, among others, on the contractile mechanisms of spontaneously active smooth muscle, and the role of calcium ions therein.. They showed that in smooth muscle cells extracellular calcium ions are essential for contraction. The method used in these studies to measure the membrane potential was the sucrose gap method introduced by Stampfli in 1955, as modified for muscle cells by Burnstock and Straub in 1958. Axelsson and his collaborators at Oxford found that with the removal of glucose from the bathing medium the electrical activity in the muscle cells persisted whilst the muscle tension was abolished; metabolic inhibitors had a similar effect of dissociating electrical and mechanical activity in muscle under these experimental conditions (Axelsson, & Bülbring, 1961). Further experiments showed that by removing calcium ions from the bathing medium (and thus from the extracellular compartment) the contractile force in the muscle was totally abolished, whilst action potentials remained (Axelsson, 1961). Axelsson´s work at Oxford thus shed important light on the processes involved in "electro-mechanical coupling" in muscle, and played a critical role in establishing that contraction in vascular smooth muscle can be activated by either chemical or electrical events.

In 1962 prof. Axelsson was called to be professor of Physiology at Gothenburg University in Sweden for one year, and subsequently served as associate professor and research associate professor in Physiology at the same institute until 1965. At Gothenburg Axelsson´s research interests were centred on functions in vascular and intestinal smooth muscle, in particular the role of ions, ATP, glucose and catecholamines (e.g. Åberg, & Axelsson, 1965; Axelsson et. Al., 1965ab).

In 1965 prof. Axelsson was appointed professor of Physiology at the Faculty of Medicine of the University of Iceland, and served in that capacity until retirement in 2000. In Reykjavik from the very start his working hours were divided between a variety of tasks, most of them centred on the founding of the Department of Physiology and build-up of the needed facilities there. At his arrival at the medical faculty, he soon discovered that he was in fact the first (and the only, at the beginning) full-time faculty member in Physiology. So everything had to be done from scratch; the development of lectures and practica, acquisition of laboratory facilities and equipment for teaching and research, administrative duties, and the recruitment of additional faculty in Physiology. All this required considerable time and effort, aside from his scientific work. In addition, he served as dean of the faculty of medicine between 1974-78, at a time of great expansion of the faculty and planning of the construction of a new building for the entire faculty. At the time of writing there are 8 full time academic faculty members at the Physiology department in addition to other staff and graduate students, which demonstrates the expansion that has occurred since Axelsson´s return to Iceland.

Still, several research projects were initiated and carried out under prof. Axelsson´s leadership and initiative in Reykjavik at this time. Work on muscle physiology continued, but in addition Axelsson moved into other areas of research, based on the opportunities that presented themselves in Iceland. One of the earlier ones, and which still continues, was the issue of genetic and environmental factors in cardiovascular physiology. To this end, prof. Axelsson initiated a research project in collaboration with colleagues in Reykjavik and Manitoba, Canada, which compared two separate but genetically comparable populations, in Iceland and descendants of Icelandic immigrants

in Manitoba. This work demonstrated that environmental factors play a vital role. For instance it was found that residents of Manitoba of purely Icelandic descent had a significantly higher mortality rates for ischemic heart disease than a rural population from Northeastern Iceland (Axelsson et al, 1981). Furthermore, the native Icelanders exhibited significantly higher levels of total cholesterol, low-density lipoprotein cholesterol, and high-density lipoprotein cholesterol, but lower triglyceride levels. Their plasma phospholipids contained significantly lower levels of saturated fatty acids (SFA), monounsaturated fatty acids, and n-6 polyunsaturated fatty acids (PUFA). In contrast, their n-3 PUFA levels were three times as high as those of the Canadians of Icelandic descent (Skúladóttir et al., 1995). This and other evidence obtained in his studies performed in Canada and Iceland suggested that dietary factors are of critical importance in risk of cardiovascular diseases. It was found in a study of cross-sectional samples of Canadians of Icelandic descent and Icelanders in rural areas that these genetically comparable but geographically separate populations showed marked differences in cardiovascular physiology. The Canadians of 'pure' Icelandic descent had a higher prevalence of exaggerated exercise systolic blood pressure (ESBP), left atrial enlargement (LAE) and left ventricular hypertrophy (LVH) than native Icelanders, presumably due to environmental factors (Naimark et al., 1992). Axelsson and his collaborators therefore examined in particular the cardiovascular physiology of a cross-sectional sample of Canadians of Icelandic descent in Manitoba, living in rural or urban areas (e.g. Naimark et al., 1991, 1996; Bartfay et al, 1995). There were differences between these groups, but not in LVH or ESBP, suggesting a complex relationship between factors like exercise activity and work environment, and diet and cardiovascular physiology (Naimark et al., 1996).

At this time it was found that the prevalence of seasonal affective disorder (SAD) was surprisingly low in Iceland (Magnusson & Stefansson, 1993), given the "latitude hypothesis" which assumes that the prevalence of SAD is related to higher latitudes. It assumes further that there is a aetiological element, i.e. there is less ambient light with higher latitudes and that this may be a causal factor. In fact the prevalence in Iceland was found to be significantly lower than previously found in the southern parts of the United States. Axelsson therefore instigated a research project to address this issue, first by examining the prevalence of SAD among Canadians of Icelandic descent in the Interlake district of Manitoba. It was found to be very low, and in fact about the same as among Floridians, which contradicts the "latitude hypothesis" (Magnusson & Axelsson, 1993). This suggests that there may be a genetic factor in the aetiology of SAD, and to address this issue a study of Canadians of Icelandic and non-Icelandic descent was carried out in Manitoba. It was found that the prevalence of SAD was markedly lower in those of Icelandic descent (Axelsson et al., 2002). The reasons for this may be either genetic factors and/or unknown environmental factors unrelated to ambient light levels in the environment.

In addition to the projects that have been discussed here Axelsson has been engaged in a variety of other research projects that will be mentioned only briefly. He has always had a keen interest in exercise and cold physiology, and the treatment of hypothermia (e.g. Axelsson et al, 1985; Keatinge et al., 1986; Naimark et al., 1991). All his research work has been characterized by intellectual rigor and burning curiosity, which still remains after retirement. Jóhann Axelsson retired as head of the Physiology department of the University of Iceland in 2000, but as professor emeritus (and thus free from the burden of administration) is still actively involved in research at the department, and is likely to remain so for many years to come.

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