



FEPS

Federation of European Physiological Societies

**FEPS
NEWSLETTER**
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<u>Letter of the Secretary General</u> of FEPS	1
Information about <u>important physiological events and awards</u>	2
<u>Report of the Teaching workshop</u> on "Implications of the Bologna Declaration for teaching Physiology in medical education"	3
Famous European Physiologists, <u>Part 5 : Arthur Robertson Cushny</u>	6
Content of the <u>June issue of Acta Physiologica</u>	9
Content of the <u>July issue of Acta Physiologica</u>	10

Letter of the Secretary General of FEPS

Dear colleagues,

In this FEPS Newsletter you will find an interesting report of the FEPS Educational Task Force on the latest FEPS Teaching Symposium organized at the Annual meeting of the German Physiological Society in Cologne. Topic of this symposium was the implication of the Bologna Declaration for teaching Physiology in medical educations; a subject of utmost importance of all Physiological departments in Medical Schools in the European Union.

FEPS is also pleased to post the fifth report on Famous European Physiologists. This time you will find a short biography of Dr. Arthur Robertson Cushny, a famous Scottish scientist in the field of Physiology.

I wish you all a pleasant summer holiday and good weather.

Ger van der Vusse
Secretary General of FEPS



Information about important physiological events and awards

- **Invitation to the 88th Annual Meeting of the German Physiological Society in Giessen, from Sunday, March 22, to Wednesday, March 25, 2009**

The annual meetings of the DPG are among the largest for the physiological sciences in Europe, with a program entirely **in English**. We invite all our international colleagues to participate!

The 2009 congress will offer a broad overview of physiological research, from molecular biology to human integrative physiology. Young researchers are particularly welcome to submit abstracts for the numerous topic-oriented oral and poster sessions. Visit our website for further information: <http://www.uni-giessen.de/dpg2009>. Note that the deadline for abstract submissions will be **November 30, 2008**.

Attending the meeting will be cheap, as the Department of Physiology of the Justus Liebig University in Giessen is organizing the congress entirely on a non-profit basis. Admission fee is only 170 Euro (student 30 Euro). Accommodation is inexpensive (see website). Giessen is easy to reach by air (close to Frankfurt/Main airport), train, or car.

Meet your friends in Giessen in 2009 !

Hans Michael Piper, Giessen
President of the 88th Annual Meeting of the German Physiological Society

- **The American Physiological Society**
The John F. Perkins, Jr. Memorial Award for International Physiologists
promotes cultural exchange and scientific collaborations by providing supplementary aid to families of foreign scientists working for a minimum of 3 months in the U.S. In this way, young scientists are able to bring their families and thus make full use of the cultural exchange as well as the scientific benefits associated with an international collaboration.

The program presupposes that the visiting scientist and his/her host already have made arrangements for scientific collaboration and have sufficient funds to cover the needs of the visiting scientist.

Several awards are granted each year. Applications for the Perkins Award must be made jointly by the host, who must be an APS member, and the visiting scientist. The recipient receives funds generally not exceeding \$5,000. The size of the award depends on the estimated needs over and above the amount already available to the visiting scientist.

Deadlines: For scientific visits beginning between January 1 and June 30, the application is due on October 15 the year before with notification by December 15. For scientific visits beginning between July 1 and December 31, the application is due on April 15 of the same year with notification by June 15.

Applications will now only be accepted via online submission.

Please go to <http://www.the-aps.org/awardapps> to apply.

The American Physiological Society
9650 Rockville Pike, Bethesda, Maryland 20814 (USA)
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Teaching workshop on “*Implications of the Bologna Declaration for teaching Physiology in medical education*”

at the Joint meeting of
The German Physiological Society and FEPS
Cologne, March 2-5, 2008

The national meeting of the German Physiological Society in Cologne on March 2, 2008 started with a FEPS workshop on the *Implications of the Bologna declaration for teaching Physiology in medical education*. The organizers felt that this topic is important for European medical faculties because the European Community wishes the European countries to have a more or less uniform framework for higher education. As such students can move and study freely throughout the European Union without adverse effects on the length of their study and appreciation of their credit points and diploma's. Aside from that, it can be expected that – if the Bologna rules are also generally applied in medical curricula - Physiology curricula need to be consequently adapted. The workshop was attended by about 40 participants, mostly from German medical faculties. European keynote speakers were invited to highlight the actual Physiology curricula in their country and to point out inasmuch the Bologna rules had been implicated in the medical schools of their country.

The workshop was opened by Dr. Luc Snoeckx from the Department of Physiology of the Maastricht University, the Netherlands and chairman of the Education Task Force of FEPS. In his introductory lecture, he illustrated the highlights of the Bologna declaration (1) and the implications for a typical medical curriculum. Crucial elements in the declaration are the adoption of a system of easily readable, comparable, quality assured degrees and of a system essentially based on undergraduate (bachelor) and graduate (master) cycles to which a system of uniform credit points (ECTS; European Credit Transfer System) is coupled. In order to ensure foreign student to participate in such curricula, free mobility should be promoted by providing funding and necessary infrastructural support. In 2005 the AMEE (Association for Medical Education in Europe) published her advice regarding implementation of the Bologna rules in European medical schools (2). For various reasons, it was felt that – for the time being – the schools should not be obliged to immediately adopt the two cycle-structure and to be allowed to continue having one long, integrated, 1-tier structure. Although especially in the last decade most European medical schools have been actively engaged in reforming their programs focusing on somewhat different aspects such as social responsibility, content/outcome/ competencies or performance, teaching/learning methods (PBL), early contacts with patients, etc., it was advised to consider the implementation of the Bologna rules seriously. However, it was also recognized that the diversity in the European region has to be taken into account as well, especially in medical education. Taking this into account, it was concluded that a transnational harmonization of end-terms in medical Physiology curricula could be very helpful to ascertain a smooth transition into new curricula, adapted according to the Bologna rules.

Ulrich Decking from the Department of Cardiovascular Physiology of the University of Düsseldorf, Germany, illustrated the state of the art in the German medical schools. Generally spoken, German schools are free to organize the curricula as they wish, as long as students are well prepared to successfully take the national preclinical (after two years) and clinical (after 6 years) exams. General medical end-terms for both examinations (“Approbationsordnung”) are described. More specifically, for medical Physiology, which is learned in the preclinical phase, a uniform subject catalogue (“Gegenstandskatalog”) is used in several schools, the content of which is based on standard Physiology textbooks (3-5).

Regarding the national attitude regarding the Bologna declaration, it is felt that the implementation is desirable, necessary but at present very difficult to realize. Since within Germany the recognition of credit points is governed by law, an easy transfer between universities within Germany exists, certainly within the preclinical phase. However, for

international students, very limited places are available. Aside from that the ECTS system is not yet an integral part of the system.

Dr. Tamás Ivanics from the Department of Experimental Physiology of the Semmelweis University of Budapest, Hungary, explained the situation in the Hungarian medical schools, which is particular in the field. Indeed, Hungarian medical schools have a long tradition in medical curricula with a high international reputation, the consequence of which is that the four large medical schools (Budapest, Debrecen, Szeged and Pecs) are solicited by many international students, especially from US, UK and German nationality. As such the curriculum is multilingual, and has Hungarian, German and English spoken components, referring to textbooks in parallel languages (4, 6, 7). It thus can be stated that medical schools in Hungary have developed highly attractive curricula without any former European stimulus, and that the implementation of an ECTS system could help in overcoming the last obstacles for intense transfer of an international student population. Especially in the preclinical phase (bachelor) this seems to offer major opportunities.

Dr. Liisa M. Peltonen from the Department of Biomedicine/Physiology of the University of Helsinki and the Finnish Physiological Society explained how the Finnish universities deal with this problem. In Finland five medical faculties are operational, i.e., in Helsinki, Turku, Tampere, Kuopio, and Oulu. The varying organizations of medical curricula within Finland nicely illustrate the difficulties to implement the Bologna rules. Although there seems to exist a national consensus of what should be taught (general medical end-terms do exist and are examined), the "when, how and who" to teach vary largely between the medical schools.

Finnish medical faculties experiment intensively with varying educational methods, which is nicely illustrated by the Physiology teaching program. Very traditionally, the university of Oulu teaches Physiology, like other disciplines, as stand-alone course. On the other hand, the Tampere medical faculty, which is widely known for its integrated educational approach, teaches Physiology from a multidisciplinary point of view and in a problem-based manner. Finally, mixed forms, in which system-based physiology is taught as a stand-alone course are used, among others, in the university of Helsinki. This scattered landscape of teaching formulas hamper a smooth exchange of students, both nationally and internationally. As a consequence free moving of medical students in Finland is rather limited.

Finally, Dr. Jan-Hindrik Ravesloot from the Physiology Department of the Academic Medical Center of the University of Amsterdam illustrated the situation in the Netherlands. Eight medical schools are operational at the various national universities. By 2009 these medical schools will all have adopted the bachelor-master model. For each degree the study consists of three years. Nationally, there exists a revised "Blueprint of Objectives", which was published in 2001 (8). Although not completely in phase, lately all medical schools shifted from a traditional H-shaped curriculum, in which the preclinical and clinical phase are clearly separated (not only in content but also in the educational approach) to a Z-shaped curriculum in which teacher-dependent, theoretical learning is progressively replaced by teacher-independent, responsible and practical learning (9). For the first three years, most medical schools apply integrated curricula in which basic sciences, like Physiology are learned in a multidisciplinary approach, using problem based learning methodologies. For Physiology, standard textbooks, like (a) Guyton and Hall (7) and Boron and Boulpaep (10) are recommended.

Although the Dutch medical schools seem to be well equipped to provide foreign students with knowledge and accounted ECTS points, at present the number of students from other European countries studying at Dutch medical schools seems to be limited. It has to be seen how this will develop in the near future when the bachelor-master structure will be fully deployed and operational.

In conclusion, there seems to be a general agreement about a European-wide recognition of a general physician license. At present, it is too early to recognize the opportunities on the job market for bachelors in medicine. Aside from that, the intense experiments with new forms of education, implying the presentation of basic sciences like Physiology in an integrated way, seem to hamper the clear definition of ECTS accounts. Furthermore, due to the specificity of the medical discipline, involving an intense communication between student and patient in the clinical

phase, free movement of European students throughout the European landscape requires the knowledge of specific languages. Otherwise, this experiment – at least for the medical study – seems to offer opportunities in the bachelor phase only.

Luc H.E.H. Snoeckx, Tamas Ivanics, Liisa Peltonen, Ulrich Decking, Jan Hindrik Ravesloot*

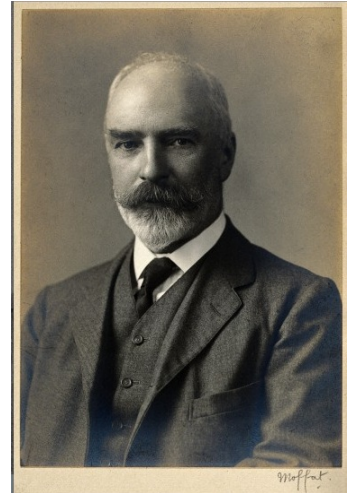
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8. www.nfu.nl/fileadmin/documents/BLUEPRINT-Training-of-doctors.pdf
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10. Medical Physiology, Boron, Boulpaep, 2007

Arthur Robertson Cushny**1866-1926**

It is intriguing that like many gifted Scots, Arthur Robertson Cushny came from a family of ministers (he was a great grand-son). Sadly his father died when he was nine years old, and left his mother with seven young children. His mother returned to her family home near Fochabers (Speymouth). When asked as a small boy what he was going to be, he replied "A professor, (a pause) because they have very long holidays." He won a bursary to King's College Aberdeen, and began his studies in humanities, graduating in 1886. He had begun his medical studies during his last year, and in 1889 he graduated with the highest honours, and was the George Thompson Fellow for Pathology, Physiology and Gynaecology. It was noted that he was a lively student taking part in debates, playing golf.



The Professor of Materia medica in Aberdeen was JT Cash, and he so inspired Cushny that he wished to study pharmacology, but his first appointment was to work in the laboratory of Hugo Kronecker (Bern). Following this in 1891 he went to Strasbourg to work under Prof. Schmiedeberg, as in 1892, at the age of 26, he was appointed as Schmiedeberg's assistant. During this year he returned to Aberdeen to receive his MD, and by then has already published several papers in English and German journals. Schmiedeberg was a trained physiologist, and he showed the importance of studying the effects of drugs on living tissues under laboratory conditions. Thus Materia medica became allied with physiology and developed into the science of pharmacology. JJ Abel (founder of the department of Pharmacology, University of Michigan, Ann Arbor, USA) was touring Europe before taking up his new post at Johns Hopkins Medical School, and he asked Cushny if he would consider becoming his successor at Ann Arbor. On Schmiedeberg's advice he took the post, becoming professor at the age of 27 (younger than some of his students). His days were filled with teaching and research; the evenings by writing.

More papers followed in 1891, and concomitantly he worked on his *Textbook of Pharmacology and Therapeutics*, the first edition appearing in 1899. The *British Medical Journal* quoted in an article after his death in 1926, "Pharmacology originated in Germany and the replacement of the old Materia medica by the science of the mode of action of drugs has been a slow process....but Cushny did more than any other person to bring about this change. His textbook... is recognised as the most trustworthy guide to the subject. His knowledge and exceptional powers of judgment made him one of the select persons who can write a great textbook. The first edition was a pioneer piece of work for it was the first general textbook of Pharmacology in the English speaking world. Cushny treated the mode of action of drugs as an exact science, and his book contains only those facts that have been established by carefully controlled observations on animals or man. Naturally his attitude appeared to some to be unduly sceptical, for he had no hesitation in rejecting cherished traditions as unproven when they lack the definite objective evidence for their support." (A lesson for us all!).

In 1905 he was offered the post of the new Chair of Pharmacology at University College London (UCL). In spite of dismay from his American colleagues, he accepted the post. However, before he left, he wrote up fully all the notes for his laboratory course and published *A Laboratory Guide to Experimental Pharmacology*. It was a struggle to set up the department at UCL, he started with one ill-lit and badly furnished room. His labour and subsequent achievements were greatly admired by Bayliss and Starling. Cushny was greatly assisted by his 'lab-boys' whom he trained. One of these, Condon, built apparatus and was gifted at laboratory work. He followed Cushny when he was appointed to Edinburgh, and worked for the two next Professors there, totalling over 50 years as the 'lab-boy'.

Whilst at UCL, Cushny and his family lived in a tall Victorian house in Upper Park Road, Haverstock Hill in Hampstead. During the conferences of the Physiological Society, he would entertain widely, holding many dinner parties. He worked hard, retiring to his study every evening at 10pm to work until about 1am with his books and pipes. No-one was allowed to touch any of the papers, books strewn across the desk and filling the book shelves.

The only person allowed in was the housemaid to light the fire. But, once a year, his wife insisted that a spring-clean and tidy-up should take place, usually when he was away examining. As a result of this Cushny wrote a poem:

I hear the steady thumping on the carpet on the line,
 There are careless people dumping books and papers that are mine,
 They are tossing them and mixing them, so I shall never more
 Get them back in disorder as I had them fixed before.
 They have gone in force and taken firm possession of my den,
 They have swiped my scattered pamphlets and have burned them. Ne'er again
 Shall I find the tracts containing thins I'd marked to read sometime,
 They are smoking in the alley, and the law permits the crime.
 They have robbed me of the cushion that was matted in my chair,
 They have put my pipe and ashtrays, well, I can't explain just where,
 They are rubbing, they are scrubbing there with all their might and main,
 And they shake their heads, assuming looks of sympathy and pain
 Showing that they think I'm crazy for presuming to complain.

(Familiar to anyone?)

Inevitably his work entailed a lot of travelling. His wife was one who was always early at the station, whereas he tended to be 'last minute'. On one occasion, when taking the train from Euston (which is near UCL), they were so early that he went off to the Department, and only reappeared as the guard was waving his flag for the train to depart. When changing trains in the Scottish Highlands, and checking whether the luggage had been transferred correctly, he could be seen loping along the platform in tweeds and knickerbockers, again as the train departed; once delaying so long that his family departed without any tickets, which were in his pocket.

In the summer of 1918, Cushny left London to return to his native Scotland to the new Chair of Therapeutics in Edinburgh. Again he had to create a department from the old *Materia medica*, full of dry and dusty specimens of leaves, and no research facilities. His lectures were well attended, though he had a weak voice that did not reach to the back of the hall, but full of pithy humour (and totally non-pc). He had no qualms about talking about 'the practice of hocus pocus', 'the cockles of the heart', that osmotic pressure was a Mesopotamian word, the Borgias, patenting of other men's discoveries etc. By the 1920s Cushny knew that he had high blood pressure, but this did not stop his work, lecturing, research and writing. He died of a cerebral haemorrhage a few days before his 60th birthday.

Research Activities

Today, Cushny would be classed as a "boffin". A glance at the subjects outlined below (and the references quoted) shows how he was able to turn his talent to subjects which interested him, without becoming a 'specialist'.

The work that he had begun on the action of digitalis on the heart in Bern was continued in the USA, and published in *Transactions of the Michigan Medical Society* in 1894. 1897 saw the publication of three more papers on the rhythm of the mammalian heart.

Between 1902-1904 Cushny turned his attention to the kidney, and using a simple experiment, that of two excretion curves, one for sodium chloride, and one for sodium sulphate, he supported Ludwig's view of re-absorption theory, rather than the Bowman-Heidenhiem view of 'vital-secretion', and proposed physical forces and glomerular filtration). His opinion was proven correct after his death. Later work was on the action of diuretics.

An important aspect of the work in Ann Arbour was the biological assay of drugs. Cushny was the first to suggest making use of animals to test the relative activity of different preparations of the same drug (particularly digitalis). Cushny accepted that experimentation on animals was not acceptable to all. In London, with the support of the Medical Research Club (later the Medical Research Society), public meeting with anti-vivisectionists were organised. This was to explain that unnecessary suffering was voided. Indeed, animals themselves were saved as Cushny's research on rats showed that the eating of senecio (ragwort) weed (by cattle in Africa) was the cause of the "cattle-madness". Before this, many herds were slaughtered as it was thought to be an infectious disease.

During the 1914-1918 war Cushny was able to help by advising on the effects of poison gases; in 1916 his

presidential address to the British Association was on the analysis of living matter through its reactions to poisons. When in Edinburgh he took up again his early work (1904) on optical isomers, turning his attention to adrenaline and the cocaine series. Here a quotation from his address to the inaugural session of the North British Pharmaceutical Society in 1919 would be appropriate. "...when we find an optically active substance on earth we may know that it arose through the agency of life. The petroleum we burn for example, must have arisen from living tissues as it is optically active.....more factors are involved than generally recognized and that very slight changes in chemical structure may alter enormously the reaction between them"

Papers (numbers in brackets refer to the number of publications on that subject)

Journal of Physiology, 1897-1921: fibrillation and action of digitalis in heart (2), diuresis (6), optical isomers (4), movements of the uterus (1), exhalation of drugs by the lungs (1), action of atropine (1),
 American Journal of Medical Sciences 1891: electrical stimulation of heart etc., (3),
 Journal of Experimental Medicine 1897: action of digitalis
 Pflügers Archiv, 1899: contraction of the mammalian heart (3)
 Journal of the American Medical Association 1903: pharmacological action of drugs
 J Pharmacol Experimental Therapeutics 1911: senecio alkaloids; 1920 optical isomers v. the thropeines.
 Philosophical Transactions of the Royal Society of London, 1916: cobra venom
 Proc Royal Society of Medicine 1908: nutmeg poisoning; 1909 tissue antisepsis with reference to animal infections

Books

Textbook of Pharmacology & Therapeutics, 1899 (8 editions by 1926)
 On the Pharmacology of the Respiratory Centre, 1915
 The Secretion of Urine, 1917
 The therapeutics of Digitalis and its Allies, 1910

Degrees & Awards

1886 Master of Arts Aberdeen, 1889 Bachelor of Medicine and Master of Surgery Aberdeen, 1896 elected to the Association of American Physicians, 1904 elected member of Society for Experimental Biology & Medicine of New York, 1906 member of the Pharmacy Committee of the British Medical Association and member of the Medical Research Club, 1907 elected Fellow of the Royal Society, 1908 member of the Royal Commission on Whisky and other Potable Spirits, 1909 President of the Therapeutic Section of the Royal Society of Medicine, Vice-President of the International Congress of Applied Chemistry, member of the Physiology Section of the British Medical Association, 1910 President of Pharmacology & Therapeutics of the British Medical Association, 1911 Honorary LL.D (Doctor of Laws) Aberdeen, 1914 nomination for Fellowship of the Royal College of Physicians (which he declined), 1915 War Physiological Committee, Poison Gas Committee at the War Office.

Chairs

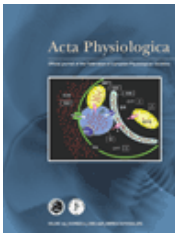
1893-1905 Pharmacology, University of Michigan, Ann Arbor, USA
 1905-1918 Materia Medica & Pharmacology, University College, London
 1918-1926 Therapeutics, University of Edinburgh, Scotland

Acknowledgments

For this article I am indebted to several articles including;
 Helen MacGillivray "A Personal Biography of Arthur Robertson Cushny, 1886-1926" Ann Rev Pharmacol 1968:8;1-24
 JJ Abel "Arthur Robertson Cushny and Pharmacology" Science 63:507-515

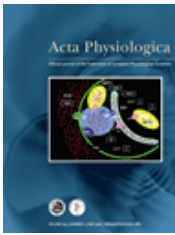
By

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List of contents of Acta Physiologica
June 2008, Vol. 193 Issue 2 Pages 99-202

Recovery of mCPT1 activity index by training in hypoxia Renée Ventura-Clapier	99
A new non-invasive technique for the assessment of skeletal muscle metabolism Sergio Lavandero	99
REVIEW Spinal and supraspinal adaptations associated with balance training and their functional relevance W. Taube, M. Gruber, A. Gollhofer	101
CARDIOVASCULAR Near-infrared spectroscopy provides an index of blood flow and vasoconstriction in calf skeletal muscle during lower body negative pressure T. Hachiya, A.P. Blaber, M. Saito	117
Ventricular repolarization patten under heart cooling in the rabbit J.E. Azarov, D.N. Shmakov, V.A. Vityazev, I.M. Roshchevskaya, N.V. Artyeva, S.N. Kharin, M.P. Roshchevsky	129
Flow-mediated dilation and exercise-induced hyperaemia in highly trained athletes: comparison of the upper and lower limb vasculature G. Walther, S. Nottin, L. Karpoff, A. Pérez-Martin, M. Dauzat, P. Obert	139
CELL BIOLOGY Characterization of ryanodine receptors in rat colonic epithelium G. Prinz, M. Diener	151
ENDOCRINOLOGY AND METABOLISM Combined effects of hypoxia and endurance training on lipid metabolism in rat skeletal muscle O. Galbès, L. Goret, C. Caillaud, J. Mercier, P. Obert, R. Candau, G. Py	163
Effect of aerobic training on ^{99m}Tc-methoxy isobutyl isonitrile (^{99m}Tc-sestamibià) uptake by myocardium and skeletal muscle: implication for noninvasive assessment of muscle metabolic profile D. Kyparos, G. Arsos, A. Kyparos, S. Georga, A. Petridou, S. Sotiriadou, V. Mougios, C. Matziari	175
GASTRO-INTESTINAL Angiotensin II-induced contractions in human jejunal wall musculature <i>in vitro</i> E. Spak, A. Casselbrant, T. Olbers, H. Lönroth, L. Fändriks	181
RENAL Hormonal regulation of renomedullary hyaluronan L. Rügheimer, C. Johnsson, C. Maric, P. Hansell	191
Erratum	199
Corrigendum	201



List of contents of Acta Physiologica July 2008, Vol. 193 Issue 3 Pages 203-308

- Beta 3-adrenoceptors modulate left ventricular relaxation in the rat heart via the NO-cGMP-PKG pathway** 203
Barbara Casadei
- Heart and brain circulation in healthy men are differently affected by CO₂** 203
Olaf B. Paulson
- CARDIOVASCULAR
- Mathematical modelling of the calcium-left ventricular pressure relationship in the intact diabetic rat heart** 205
J. Op Den Buijs, L. Ligeti, T. Ivanics, Z. Miklòs, G.J. van der Vusse, N.A.W. van Riel
- Effect of luminal Ca²⁺ on the stability of coupled gating between ryanodine receptors from the rat heart** 219
J. Gaburjakova, M. Gaburjakova
- β₃-Adrenoceptors modulate left ventricular relaxation in the rat heart via the NO-cGMP-PKG pathway** 229
T. Angelone, E. Filice, A.M. Quintieri, S. Imbrogno, A. Recchia, E. Pulerà, C. Mannarino, D. Pellegrino, M.C. Cerra
- GASTRO-INTESTINAL
- Duodenal phytohaemagglutinin (red kidney bean lectin) stimulates gallbladder contraction in humans** 241
A.K. Purhonen, K.H. Herzig, H.J. Gabius, S. André, S. Ketterer, D. Matzinger, C. Beglinger, P. Hildebrand
- MUSCLE
- Green fluorescent protein incorporation by mouse myoblasts may yield false evidence of myogenic differentiation of human haematopoietic stem cells** 249
A. Di Castro, D. Bonci, M. Musumeci, F. Grassi
- Noninvasive measures of blood volume and oxygen saturation of human Achilles tendon by red laser lights** 257
K. Kubo, T. Ikebukuro, N. Tsunoda, H. Kanehisa
- Early structural adaptations to unloading in the human calf muscles** 265
O.R. Seynnes, C.N. Maganaris, M.D. de Boer, P.E. di Prampero, M.V. Narici
- Effects of combined strength and sprint training on regulation of muscle contraction at the whole-muscle and single-fibre levels in elite master sprinters** 275
A. Cristea, M.T. Korhonen, K. Häkkinen, A. Mero, M. Alén, S. Sipilä, J.T. Viitasalo, M.J. Koljonen, H. Suominen, L. Larsson
- RESPIRATORY
- Osteopontin expression in normal and hypobaric hypoxia-exposed rats** 291
M. Uenoyama, S. Ogata, K. Nakanishi, F. Kanazawa, S. Hiroi, S. Tominaga, Y. Kanatani, A. Seo, T. Matsui, S. Suzuki
- Heart and brain circulation and CO₂ in healthy men** 303
I. Yokoyama, Y. Inoue, T. Kinoshita, H. Itoh, I. Kanno, H. Iida