

The following Table of Contents of the Special Issue “Neuromyology” to be printed as the March Issue of the Journal NEUROLOGICAL RESEARCH vol. 30 (2), 2008 contains a collection of papers from the 2007PaduaMuscleDays, conferences held in Spring and Autumn 2007 in Padua & Terme Euganee (Italy).

The 2008Spring PaduaMuscleDays was held to honour 30 years after his premature death Ernest Gutmann, a seminal figure of muscle research. Born July 16, 1910 in Czechoslovakia, he died August 6, 1977 during a visit in England on his way to Cambridge. After obtaining his M.D. in 1936 at the Charles University in Prague, he emigrated to England in 1939 and worked with J.Z. Young in Oxford, where he obtained his PhD publishing some fundamental papers on nerve regeneration. In 1945 he returned to Czechoslovakia, where he worked first as a physician looking after people returning from concentration camps, later he continued his research on nerve regeneration in the Institute for Brain Research of the Charles University in Prague. In 1954 when the Institute of Physiology of the Czechoslovak Academy of Sciences was established, Ernest Gutmann became head of one of the divisions. The main research topic was the study of nerve-muscle interactions, and that of course included the study of denervated muscle. Gutmann was in favour of a multidisciplinary approach that was very fruitful, and leads to the publication in 1962 of the book: *The denervated muscle*. In spite of the relative isolation from the rest of the scientific community due to the cold war, Ernest Gutmann and his colleagues managed to establish many international contacts. After 1968, when the Russians invaded Czechoslovakia, Gutmann signed a proclamation condemning his invasion (so called “2000 words”) and was persecuted by the official communist establishment. He nearly lost his job, but miraculously still continued to produce high quality experimental work with many international colleagues, some of which contributed papers for this Special Section on Myology. Unfortunately he did not live long enough to see the liberation of Czechoslovakia. The two papers of Vrbova, Pette and Koffer-Gutmann and of Bruce Carlson describe the personality of Ernest Gutmann and underline his continuing impact on Myology.

On the issue of nerve influence on muscle, Gutmann favoured the hypothesis of neurochemical regulation. In spite of the difficulties to identify and chemically purified them, and the evidences that “muscle activity” induced by quantal liberation of acetylcholine at the neuron-muscle synapse has a major effect on muscle size and fiber-type regulation, some biological features of the nerve-muscle relations continue to suggest their existence, as illustrated in the article of Grumbles, Almeida and Thomas. When embryonic neurons are transplanted into the peripheral stump of a severed tibial nerve, their growing axons reinnervate the denervated gastrocnemius muscle. Groups of reinnervated muscle fibers recover to normal size, in spite of the fact that the motoneurons are disconnected from the spinal cord, and then electrically quiescent.

With his last studies on muscle autotransplant and regeneration with Bruce Carlson, Gutmann highly contributed to the recognition of the potential of muscle to regenerate and to reach final differentiation only if the regenerated fibers are reinnervated. On the other hand, the same studies, replicated in vitro, give the final evidence that the myogenic potential of myoblasts (cells committed to proliferation and fusion to generate/regenerate muscle fibers during development and regeneration) is independent from direct contact with nerve endings, while it remains to be established whether molecules released, beside by macrophages, by neurons contribute to myoblast proliferation and differentiation. The paper of Lapalombella et al. shows that denervated muscle maintains long term their regeneration potential. Atrophy-resistant muscle fibers in long term peripheral denervation of human skeletal muscle are demonstrated and their mechanisms discussed by Biral et al. Furthermore, the paper of Squecco et al. shows that the long term denervated rat soleus muscle fibers maintains long term mechano-sensitivity. Influence of locomotor training on the structure and myosin heavy chains of the denervated rat soleus muscle by Jakubiec-Puka et al. shows that passive movement seems to attenuate some of the pathological processes within the denervated muscle. All these evidence support the results of long-term progression of muscle atrophy/degeneration in patients suffering from complete lesion of lower motor neuron (Cauda Equina Syndrome) showing that: i) human skeletal muscles survive longer (years) than generally accepted, and ii) they recover to clinically significant muscle size and function after Spinal Cord Injury (SCI) by Functional Electrical Stimulation (FES). Indeed, low atrophy progression of human denervated muscle fibers, regenerative myogenesis and the persistence of “big fibers” prolong the period during which denervated tissue may be recovered by neurotization and/or FES, opening new

options to clinical managements of denervated or enervated human muscle, as described in the book "The Denervated Muscle" edited by Ernest Gutmann in 1962, and in this Issue in the article of Graupe et al. "Walking performance, medical outcomes and patient training in FES of innervated muscles for ambulation by thoracic-level complete paraplegics".

The richness of the Heritage of Ernest Gutmann is documented by other papers in this Special Section: "mIGF-1 modulates Caspase and CDK5 expression in skeletal muscle of a mouse model of ALS" by Dobrowolny G. et al., "Skeletal muscle is enriched in hematopoietic stem cells and not inflammatory cells in cachectic mice" by Berardi E, et al., "Expression of myositis specific autoantigens during postnatal myogenesis" by Zampieri S, et al., "New 3D hyaluronan-based scaffold for in vitro reconstruction of the rat sciatic nerve" by Zavan B, et al., and "Hypoxia: the third wheel between nerve and muscle" by Cacciani N, et al.; and many others.

Among the papers that will be presented in the 2008Spring PaduaMuscleDays I hope that many will have the high standards needed to be selected for a second Special Issue on "Neuromyology" of the Journal NEUROLOGICAL RESEARCH.

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Ernest Gutmann (1910 – 1977)

Gerta Vrbová, Anna Koffer-Gutmann and Dirk Pette

The Denervated Muscle: 45 years later

Bruce M. Carlson

Walking performance, medical outcomes and patient training in FES of innervated muscles for ambulation by thoracic-level complete paraplegics

Daniel Graupe, Humberto Cerrel-Bazo, Helmut Kern and Ugo Carraro

Local expression of mlgf-1 modulates ubiquitin, caspase and CDK5 expression in skeletal muscle of an ALS mouse model

Gabriella Dobrowolny, Michella Aucello, Mario Molinaro and Antonio Musarò

Atrophy-resistant fibers in permanent peripheral denervation of human skeletal muscle

Donatella Biral, Helmut Kern, Nicoletta Adami, Simona Boncompagni, Feliciano Protasi and Ugo Carraro

Expression of myositis specific autoantigens during post-natal myogenesis

Sandra Zampieri, Donatella Biral, Nicoletta Adami, Anna Ghirardello, M. Elisa Rampudda, Marta Tonello and Andrea Doria

Hypoxia: the third wheel between nerve and muscle

N. Cacciani, A. Paoli, C. Reggiani and M. Patruno

Mechano-sensitivity of normal and long term denervated soleus muscle of the rat

Roberta Squecco, Helmut Kern, Donatella Biral, Katia Rossini and Fabio Francini

Skeletal muscle is enriched in hematopoietic stem cells and not inflammatory cells in cachectic mice

Emanuele Berardi, Paola Aulino, Ivana Murfuni, Angelica Toschi, Fabrizio Padula, Bianca M. Scicchitano, Dario Coletti and Sergio Adamo

Influence of locomotor training on the structure and myosin heavy chains of the denervated rat soleus muscle

Anna Jakubiec-Puka, Urszula Sławińska, Maria J. Rędowicz, Donatella Biral, Irena Łapińska, Hanna Chomontowska, Emilia Karczewska, Kazimierz Krawczyk, Henryk Bilski and Barbara Pliszka

Embryonic chick cocultures of neuronal and muscle cells

Tiziana Martinello and Marco Patruno

Embryonic neurons transplanted into the tibial nerve reinnervate muscle and reduce atrophy but NCAM expression persists

Robert M. Grumbles, Vania W. Almeida and Christine K. Thomas

New 3D hyaluronan-based scaffold for *in vitro* reconstruction of the rat sciatic nerve

Barbara Zavan, Giovanni Abatangelo, Francesco Mazzoleni, Franco Bassetto, Roberta Cortivo and Vincenzo Vindigni

Persistence of regenerative myogenesis in spite of down-regulation of activity-dependent genes in long-term denervated rat muscle

Rosa Lapalombella, Helmut Kern, Nicoletta Adami, Donatella Biral, Sandra Zampieri, Alessandra Scordari, Simona di Tullio and Marina Marini

Electrophysiologic stimulation improves myogenic potential of muscle precursor cells grown in a 3D collagen scaffold

Elena Serena, Marina Flaibani, Silvia Carnio, Luisa Boldrin, Libero Vitiello, Paolo De Coppi and Nicola Elvassore

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