

Ernest Gutmann – an Example and a Friend

2007 Ernest Gutmann Heritage - Padova, April 12, 2007

Dirk Pette

Department of Biology, University of Konstanz, Universitätsstrasse 10, D-78457 Konstanz, Germany. E-mail: dirk.pette@uni-konstanz.de

Basic Applied Myology 17 (3&4): 101-104, 2007

The Denervated Muscle, a book written by Ernest Gutmann and collaborators, was published 1962 and at that time, represented an excellent summary of the existing knowledge on nerve-muscle interactions [9]. In addition, the book contained a large amount of novel results identifying Gutmann's laboratory as a major research center for work on muscle denervation, atrophy, and neurotrophic effects. For those not familiar with this book, it is still worthwhile to scan the table of contents. As reflected by the titles of the twelve chapters and their authors, the book illustrates the vast scope of a group of morphologists, muscle physiologists, neurophysiologists, and biochemists working together under the guiding spirit of an extraordinary personality, Ernest Gutmann.

My earliest memories of Ernest Gutmann date back to 1964 when I was driving together with my mentor, Professor Theodor Bücher, from Munich to Prague. Ernest Gutmann had invited us to visit the Institute of Physiology of the Czechoslovak Academy of Sciences. After having experienced some unpleasant circumstances during our passage through the “iron curtain”, we felt that we had entered a foreign world and especially a country where Germans were received with great reservations. We were relieved, however, when we reached our destination in Prague and were received so friendly by our host. Ernest Gutmann, who had survived the German occupation and Nazi terror, as he had fled to England in 1939, greeted us as if we were old friends.

We spent an exciting day together with him and his extraordinary team of young scientists. The time passed quickly with demonstrations and lively discussions focusing on various aspects of muscle, its functional and metabolic specialization, and the trophic influence of innervation. Ernest Gutmann and his co-workers were curious to learn about our studies of enzyme patterns and metabolic differentiation of white and red muscles [18] and, because in Munich we had started similar experiments on rabbit, we were curious to learn about their methods and findings on cross-innervated rat muscles. The work of Zdenek Drahota and Gutmann on *Long-term Regulatory Influence of the Nervous System on some Metabolic Differences in Muscles of Different Function* [4] had just appeared, confirming and extending the observations of Buller, Eccles and Eccles who had published their observations on the effects of foreign innervation on fast and slow muscles three years prior [3].

It is, perhaps, noteworthy that John Eccles had used the term *plasticity* already in 1959 when he first reported on the effects of cross-reinnervation as “Plasticity at the Simplest Levels of the Nervous System” [5]. This term, however, appears to have originated from Albrecht Bethe in his 1933 article entitled “Die Plastizität (Anpassungsfähigkeit) des Nervensystems” [2].

Professor Gutmann took me to his lab, showed me how to perform cross-innervation on the rat and how to glue the proximal and distal nerve endings together instead of suturing them. With his warm and soft voice he carefully explained, step-by-step, as his skillful hands performed the surgery. It was evident that he was the master in the lab. One could feel the respect, and the friendly, considerate spirit of his colleagues and co-workers who surrounded us. The discussion continued during lunch. Our conversation was so vivid that he almost forgot to eat. I still keep a paper napkin in my files on which he put down some arguments explaining why complete slow-to-fast and fast-to-slow transitions could not be expected to be achieved by cross-innervation.

Ernest Gutmann – an Example and a Friend

Basic Applied Myology 17(3&4): 101-104



Ernest Gutmann, Szeged 1977 (Photo by D. Pette)

We had many common interests, not only with regard to muscle biochemistry and, therefore, decided to collaborate in the future. Ernest suggested that one of his collaborators should spend some time in Munich to get familiar with the methods in enzyme biochemistry. Upon our return home, an application was submitted to the Alexander von Humboldt foundation for a stipend to help support one of Ernest's collaborators. This is how Arnost Bass came to Munich in October 1964 where he spent a year in my lab. After his return to Prague, he performed several enzymological studies together with Ernest and coworkers. A recording photometer, a present from the Humboldt foundation, was of great help in these studies. In addition, precious bio-chemicals were regularly smuggled across the iron curtain whenever I travelled to Prague during the subsequent years. The studies, Arnost and I had started together in Munich, were continued in Konstanz when Arnost got permission to visit my laboratory in 1968 [1]. My collaboration with the group in Prague extended later to several other members of Ernest's group - Gerta Vrbová, Olga Hudlická and Radek Zak. Ernest Gutmann's spirit has lived on in them.

I am grateful to have met Ernest Gutmann when I was young and still at the beginning of my scientific career. As everyone who had the chance to meet him, I was immediately taken with the warmth of his personality, his stimulating and artistic intellect, his wit and charm. I keep him in my memory as an example – *als ein Vorbild*.

Ernest Gutmann was a pioneer in his country. His ability to infuse enthusiasm made him so successful in forming a team and founding an internationally renowned school, similarly to what was created by Massimiliano Aloisi in Padova. Ernest Gutmann attracted and furthered young scientists and he respected them as independent specialists in their fields. Ahead of others, he recognized relevant problems and thus has opened new chapters, e.g., the role of sex hormones in maintenance of specific muscles [14] or changes of the motor unit with age [15]. His leadership was also founded on the ability to formulate precise questions which could be addressed by simple experiments, especially with the use of methods that were available to him under restricted conditions.

In der Beschränkung zeigt sich der Meister – Restriction is a sign of mastership – a quotation from Goethe.

Sidney Hilton and Pavel Hnik stated in their obituary: Professor Gutmann was one of those whose work has inspired many laboratories throughout the world to turn their attention to these non-impulse aspects of cell-to-cell relations [16]. This holds true for me and others, and certainly also for some of my colleagues in the audience. Early studies on denervation and

Ernest Gutmann – an Example and a Friend

Basic Applied Myology 17(3&4): 101-104

nerve regeneration [8] had directed Ernest Gutmann's interest towards non-impulse neural effects on muscle development, functional specialization, and the maintenance of phenotypic properties, e.g., [9-13]. Although research performed over the past thirty years has elucidated the determining effect specific impulse patterns exert on muscle fibers, the work of Ernest Gutmann must be regarded as an important chapter in the investigation of nerve-muscle interactions. However, Ernest was open to new developments and he immediately recognized the significance of the work that Gerta Vrbová, his former student, had performed on the tenotomized soleus muscle of rabbit. At a symposium held in Prague in January 1970, he told me about her work in Birmingham and her evidence that neural impulse activity is of primary significance in maintaining and transforming muscle phenotypes [19, 20]. He then turned home and said: "Talk to Gerta, you should really meet her"! This is how Ernest brought us together and initiated a fertile cooperation which has lasted until today.

In his obituary, Paul Glees described Ernest Gutmann as a scientific ambassador for Czech neuroscience and as a scientist who was truly international, but loved his country profoundly [6]. Indeed, the love for his country was so strong that he felt unable to accept a guest professorship at the University of Konstanz after the Soviet army had invaded Czechoslovakia in 1968. Shortly after the invasion, Ernest and his wife Malka managed to travel to Germany. They spent a few days with us in Konstanz. The offer of a guest professorship would have allowed Ernest and Malka to stay for some time in Konstanz, and would have given them a chance to see how things would turn out in their country. We spent a day and a long night discussing and pressuring him to accept the offer. Ernest, however, declined because he felt responsible to his institute and would never have abandoned his colleagues and co-workers. The consequence of his loyalty was humiliation and punishment. He had been a supporter of Dubcek and he had signed the famous *Manifest of 2000 words*.

Ernest immediately lost his position as director of the institute had hardly any funds, no technical assistance and, in addition, he was forbidden to visit western countries. He was banished to a tiny little room in the institute which he had once built up and directed so successfully. When I visited him there some time later, I was depressed to meet him under such humiliating conditions.

The last time I met him was 1977 in Szeged where he was allowed to attend a UPS workshop organized by Wilfried Mommaerts. Ernest seemed to have somehow come to terms with his situation, and was once again alive and full of ideas. The photo which I took of him in Szeged, shows him in all his charm, warmth and vividness – unforgettable.

Ernest Gutmann was a modest man and he would not have liked to hear what I have said about him today. He did not want to be exceptional, but he was exceptional - as a person and as a scientist: *Ernest Gutmann wollte nichts sein, er war etwas*. He would have understood as his mother tongue was German.

When I finished editing the proceedings of the symposium "Plasticity of Muscle" held in Konstanz 1979, I decided to dedicate the book to the memory of Ernest Gutmann. I closed the foreword of the book with the following sentence: "It is my personal desire to keep alive the memory of my unforgettable friend Ernest Gutmann whose scientific life has contributed so much to our understanding of muscle plasticity" [17].

Gerta Vrbová and Ugo Carraro, who have organized the *2007 Ernest Gutmann Heritage Symposium*, have renewed and revived this idea. I wish to express my gratitude to them.

References

- [1] Bass A, Brdiczka D, Eyer P, Hofer S, Pette D: Metabolic differentiation of distinct muscle types at the level of enzymatic organization. *Eur J Biochem* 1969; 10: 198-206.
- [2] Bethe A: Die Plastizität (Anpassungsfähigkeit) des Nervensystems. *Naturwissenschaften* 1933; 11: 214-221.
- [3] Buller AJ, Eccles JC, Eccles R: Interactions between motoneurons and muscles in respect of the characteristic speeds of their responses. *J Physiol (London)* 1960; 150, 417-439.
- [4] Drahota Z, Gutmann E: Long-term regulatory influence of the nervous system on some metabolic differences in muscles of different function. *Physiol bohemoslov* 1963; 12: 339-348.

Ernest Gutmann – an Example and a Friend

Basic Applied Myology 17(3&4): 101-104

- [5] Eccles JC: Plasticity at the simplest levels of the nervous system, in Culbertson JT (ed): The Centennial Lectures – Commemorating the one hundredth Anniversary of ER Squibb & Sons. GP Putnam's Sons, New York, 1959; 217-244.
- [6] Glees P: Obituary Ernest Gutmann. J Neurocytol 1978; 7: 393.
- [7] Golisch G, Pette D, Pichlmair H: Metabolic differentiation of rabbit skeletal muscle as induced by specific innervation. Eur J Biochem 1970; 16: 110-116.
- [8] Gutmann E: Die funktionelle Regeneration der peripheren Nerven. Akademie-Verlag, Berlin, 1958.
- [9] Gutmann E (ed): The Denervated Muscle. Publishing House of the Czechoslovak Academy of Sciences, 1962; pp. 1-485.
- [10] Gutmann E.: Development and maintenance of neurotrophic relations between nerve and muscle, in Wolstenholme GEW, O'Connor M. (eds): Ciba Foundation Symposium on Growth of the Nervous System. J & A Churchill, London 1968; pp. 233-243.
- [11] Gutmann E: The trophic function of the nerve cell. Scientia (Milano) 1969; 68: 1-20.
- [12] Gutmann E: Nervous and hormonal regulation of metabolism in striated muscle. Excerpta Medica Int Congr Ser 1969; 199: 697-703.
- [13] Gutmann E: The multiple regulation of muscle fibre pattern in cross striated muscle. Nova Acta Leopoldina 1973; 38: 193-218.
- [14] Gutmann E, Hanzlíková V: Effect of androgens on histochemical fibre type. Differentiation in the temporal muscle of the guinea pig. Histochemistry 1970; 24: 287-291.
- [15] Gutmann E, Hanzlíková V: Fast and slow motor units in ageing. Gerontology 1976; 22: 280-300.
- [16] Hilton SM, Hnik P: Professor Ernest Gutmann, M.D., D.Sc. – An Obituary. Pflügers Arch 1978; 374: 1-2.
- [17] Pette D (ed): Plasticity of Muscle. de Gruyter Berlin New York, 1980, 1-625.
- [18] Pette D, Bücher T : Proportionskonstante Gruppen in Beziehung zur Differenzierung der Enzymaktivitätsmuster von Skelett-Muskeln des Kaninchens. Hoppe-Seyler's Z Physiol Chem 1963; 331: 180-195.
- [19] Salmons S, Vrbová G: The influence of activity on some contractile characteristics of mammalian fast and slow muscles. J Physiol (London) 1969; 201: 535-549.
- [20] Vrbová G: The effect of motoneurone activity on the speed of contraction of striated muscle. J Physiol (London) 1963; 169: 513-526.