



“The legacy of Jerzy Popinigis – on the 80th anniversary of his birthday”

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On the 8th of March 2016 professor Jerzy Popinigis would be 80 years old, but unfortunately he has passed away prematurely at the age of 67 and today this birthday anniversary is considered as the occasion for his remembrance.

The memory of Jerzy Popinigis is very much alive among biochemists and molecular biologists, since Professor Popinigis is deemed by his students as the true master of his discipline, a brilliant teacher and even a visionary of biochemistry.

The Popinigis family came from the Vilnius region and hence this characteristic surname. Jerzy Popinigis was born on the 8th of March 1936 in Braslaw and had spent the war period in Vilnius and Nova Vileyka. As early as 1946 he has settled down in Sopot and then had moved to Gdańsk Oliva to Polanki Street. He felt deeply connected with Oliva because there he had first attended the Primary School No. 24, then lower secondary school in Gdańsk and finally Oliva Upper Comprehensive School No. 5. He had studied medicine at the Gdańsk Medical University from 1945 to 1963 and served his postgraduate apprenticeship from 1962 to 1963 in the 8th Navy Hospital in Gdańsk Oliva. Jerzy Popinigis received his doctor's diploma on the 20th of March 1963. Earlier, during his medical studies, he was a very active member of a students' research circle formed as a part of the Physiological Chemistry Institute which he entered in September of 1958. As early as 1959, docent Mariusz Żydowo, who was the head of the Physiological Chemistry Institute, appointed him as an assistant. Jerzy Popinigis supplemented his chemistry education from 1960 to 1961 at the Technical University of Gdańsk, and also continued his medical training during postgraduate apprenticeship in Provincial Hospital in Gdańsk from 1964 to 1965. In 1968, when he received his medical sciences doctor's degree under supervision of professor Włodzimierz Mozolowski for his thesis: “The influence of basic proteins and other substances taking part in the transport of electrons on reactions of formation and wearing of high-energy bonds”, it was clear that biochemistry will be the essence of his scientific work. His thesis advisor, professor Włodzimierz Mozolowski, made a great and unforgettable impact on scientific and inner life of Jerzy Popinigis who confirmed this himself on the 100th anniversary of professor Mozolowski's birthday. As early as the 1st of January of 1973, J. Popinigis established strong professional bonds with another university, that is the Higher College of Physical Education (whose name was consequently changed to the Physical Education Academy).

In this way, professor Jerzy Popinigis had left profound traces at the Gdańsk Medical University and the Physical Education Academy which became his final place of work.. Until today, his students, namely prof. Michał Woźniak who was his assistant at the Medical University and prof. Jędrzej Antosiewicz—his assistant at the Physical Education Academy and present-day lecturer at the Gdańsk Medical University, bear and express the testimony of his excellent work.

At the time when J. Popinigis was an assistant, he took part in “7” research project teams managed by prof. Stefan Angielski who influenced Popinigis's scientific choices. On his way, Popinigis met prof. Takashi Wakabayashi, a molecular biology specialist from the Nagoya University. This resulted in long years of cooperation and friendship – a special and valuable phenomenon in the scientific community. The international academic contacts of Jerzy Popinigis began at a scientific training at the Enzymes Institute at the University of Wisconsin, in Madison, USA. In 1979 he received his habilitation degree as a result of the following work: “The permeability of a membrane as a limiting factor for breathing activity of mitochondria.” This academic title was awarded to him by the M. Nencki Scientific Council of Experimental Biology Institute PAS in Warsaw. His next scientific training took place in 1984-1985 at the Pathology Institute at the University of Nagoya-City in Japan and then at the University of Bologna in Italy (1987), at the University of Ancona also in Italy (1989), at the Biochemistry Institute at the Wayne State University in Detroit, USA (1991-1992), and at the Konstanz University in Germany (1995).

By the application of free radical scavengers, Jerzy Popinigis experimentally managed to indicate that lesions in the liver arise as a result of chronic consumption of ethyl alcohol (in collaboration with prof. T. Wakabayashi from the Molecular Pathology Institute at the Medical Academy of University in Nagoya, Japan and prof. M. Woźniak from the Faculty of Biochemistry at the Gdańsk Medical Academy), stop changes triggered in the liver by hydrazine (with prof. T. Wakabayashi and prof. M. Woźniak), prevent experimental pancreatitis (with prof. Z. Śledziński, prof. Z. Wajda, prof. M. Woźniak from the Gdańsk Medical University and a team from Medical Academy in Ancona), understand some of the mechanics responsible for damage of the muscle under conditions of ischaemia and reperfusion

(with prof. M. Woźniak, prof. Z. Gruca and dr J. Szostakowski from the Gdańsk Medical University, prof. A. Corsi and prof. E. Bertoli from Ancona, and prof. C. P. Lee from Detroit, USA).

He was also an author of biochemistry teaching materials for students of the Physical Education Academy.

Beginning on the 1st of September 1977, the Jędrzej Śniadecki Higher College of Physical Education (later the Physical Education Academy) became the main and only place of Jerzy Popinigis's employment, at which he opened an institute and then the Faculty of Bioenergetics. In this way, he modernised the biochemistry courses for young students of physical education.

He was an author of 67 experimental works, 18 opinion ones and 129 announcements. His publications were original, creative and profoundly important for the development of scientific discipline which he represented - the medical biology. Most of his experimental works were published internationally. 38 of his papers were published in periodicals included in the so called "Philadelphia list" at the National Library of Medicine and another 11 works in English were included in books published abroad.

In 2001 Jerzy Popinigis was given the academic title of the Full Professor (professor ordinarius).

The essence of the research conducted by Jerzy Popinigis was the understanding and knowledge of mechanics responsible for the pathogenesis of afflictions. The main subjects of his work included: the process of breathing and ultrastructure of mitochondria, the role of free radicals in damaging of cells and tissues, energy metabolism of skeletal muscles and physical fitness. The subject of his research lays somewhere between physiology and pathology of cells, and at the same time it was based on molecular biology.

The most important achievements of Jerzy Popinigis include the fact that in 1970 he was the one of the first in Europe who announced the printed work supporting the Mitchel chemiosmotic hypothesis of oxidative phosphorylation. In 1973 he indicated the involvement of lipid peroxidation in pathogenesis of Malignant Hyperthermia, a fact which was proven in 1990. In his habilitation work, he drew attention to the possibility of regulation of metabolism through the changes brought to the ultrastructure of mitochondria, a process which was recently confirmed. During his stay at the Pathology Institute at the University of Nagoya-City in Japan, he linked the creation of mitochondria with overproduction of free radicals.

Professor Popinigis had repeatedly stated at his public appearances that "whether we want it or not, the 21st century in the world of sport will be the century of biochemistry and nutrition". By this statement, professor Popinigis had confirmed his very modern attitude towards science. For many years, he had carried out his work in the communist reality in which it was much more difficult to be up-to-date with science going on in the world. Yet in these "hermetic" times, Popinigis managed to develop contacts with scientists abroad and conduct research at the highest international level. It started from his research stay at the Enzymes Institute at the University of Wisconsin in Madison, USA, and continued through his contacts with science centres in Italy, the Federal Republic of Germany, and others in the USA and Japan. As already stated earlier, prof. Jerzy Popinigis maintained a relationship with professor Takashi Wakabayashi from the University of Nagoya-City, which had lasted for many years and resulted in his research stay at the Faculty of Molecular Pathology at the University of Nagoya. The tradition of strong links between the Gdańsk Medical University and the University of Nagoya has been maintained until today through an exchange of students, post-graduate students and scientists through the NUPACE program which stands for the Nagoya University Program for Academic Exchange.

A proof of a scientist's creative thinking is given by the fact that his theories are acknowledged in the years to come. As far as Jerzy Popinigis is concerned, his quoted vision of the importance of the biochemistry and nutrition for the 21st century sportsmen was fully confirmed. It is impossible to imagine a modern-day sport without an involvement of physiologists, nutritionists and sport physicians. An appropriate nutrition and metabolism is the starting point for achieving a high level of fitness.

The team at the Faculty of Bioenergetics which was managed by Jerzy Popinigis had worked in the years of 1981–1990 on the Inter-Department Problem which was coordinated by the Experimental Biology Institute, PAS, in Warsaw. From 1991 to 2000 he managed research carried out in accordance with international and statutory agreements. Between 1991 and 1995 his team took part in the program called Tempus No. 1001 in cooperation with the universities in Ancona, Marseilles and Duisburg. From 1996 to 2000 he participated in execution of the Polish-Japanese inter-government agreements by cooperation with the University of Nagoya, and from 1996 to 1999 in execution of the Polish-Italian agreements by cooperation with the Ancona group. He initiated the signing of the science cooperation agreement by all universities and colleges in the Tricity area. In 1981 he was again awarded recognition by The President of the General Sport and Physical Culture Committee "for the exceptionally important and creative achievements in the field of science". In 1991 he was awarded recognition by the Chairman of the Physical Culture and Tourism Office "for the scientific achievements expressed by the organisation of the research team and the management of its scientific and research work". He was awarded the AMG rector prize and four times the AWF prize.

Professor Jerzy Popinigis was a member of many commissions, for example the Anaesthesia and Resuscitation Committee of PAS, he was an expert of the Senate Committee of the Republic of Poland, the Social and Health Policy Committee, the Culture, Media, Physical Education and Sport Committee. In 2000 he was offered a membership in the International Council of Coach Education where he was involved in the preparation of an online educational program for coaches. He was also the member of the Ageing Biology Commission of the Cell and Molecular Pathology Committee of PAS.

Between 1981 and 1983 he was the President of the Gdańsk Chapter of the Polish Biochemical Society, where he was a member of the Board of Directors for four tenures.

Personally, prof. Jerzy Popinigis thought that his greatest scientific achievement was the fact that four of his works were accepted for print by Nobel Prize winners. Three of them were accepted by Hans A. Krebs, and one by Paul

Boyer. Exactly these works gave prof. J. Popinigis the greatest satisfaction and were the incentive for continuation of his scientific research.

As his biggest experimental successes he considered the following: showing that basic proteins influence substantial changes in a morphology and functionality of mitochondria; taking part in the experiments which clarified the pathophysiology of the Malignant Hyperthermia syndrome; the description of an occurrence of a carrier in a mitochondrial membrane for bicarbonate; showing a role of free radicals in the process of an oxidative phosphorylation; observations of a protective function of aminoxylys for lipid and protein peroxidation; indicating that hydrazine can generate free radicals; taking part in the experiments confirming an ability of free radical scavengers to prevent a formation of megamitochondria; taking part in the research showing how drinking of ethanol, propanol and butanol affects a chemical composition and a structure of liver's mitochondria; description of an occurrence of additional membrane structures in an intercrystal space; showing that oxidative phosphorylation is not interrupted by a short-term mitochondria incubation of a human skeletal muscle or rat skeletal muscle in an environment of pH=6.45; confirmation of the ways and speed of skeletal muscle mitochondria in the process of lactate oxidation; setting reference values for several energy metabolism enzymes of a human skeletal muscle; showing that mitochondria of a hog's adrenal gland actively oxidise glutamate; designing "sprint versus endurance" the efficiency test which allows to define a grade of adaptation and shows effort predispositions.

Already in his lifetime, prof. Jerzy Popinigis gained the acknowledgement and respect in the scientific community, but his further success comes from our grateful memory of him and the confirmation of his visionary concepts by the contemporary science.

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