FOLIA MEDICA CRACOVIENSIA
Vol. LXV, 2, 2025: 75–82
PL ISSN 0015-5616 eISSN 2957-0557
DOI: 10.24425/fmc.2025.156125

Professor Stanisław Jan Konturek: imagination and knowledge — without them, there can be no true doctor

Aleksandra Szlachcic[1], Katarzyna Nawrot-Porąbka[2]

[1] Department of Physiology, Faculty of Medicine, Jagiellonian University Medical College, Kraków, Poland
[2] Department of Medical Physiology, Faculty of Health Sciences, Jagiellonian University Medical College, Kraków, Poland

Corresponding author: Aleksandra Szlachcic, Ph.D., D.Sc.
Department of Physiology, Jagiellonian University Medical College
ul. Grzegórzecka 16, 31-531 Kraków, Poland
Phone: +48 12 421 10 06; E-mail: aleksandra.szlachcic@uj.edu.pl

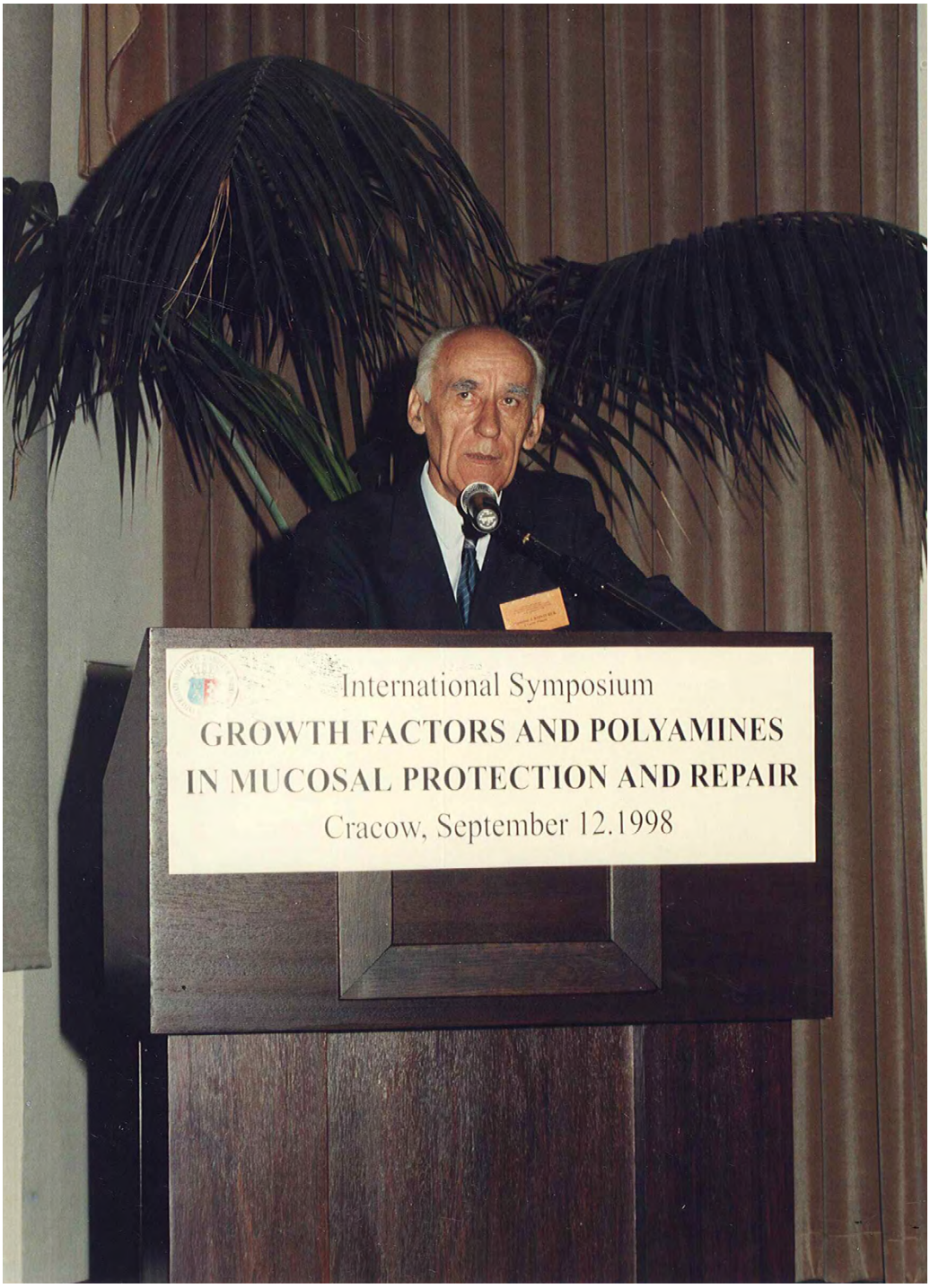
Abstract: Physiology, as a science, is the foundation of modern medical knowledge and the starting point for understanding the mechanisms of most diseases. The dynamic development of physiology at the Jagiellonian University dates back to the 14th century, but the last 150 years have yielded notable discoveries, including those of Napoleon Cybulski. Over the last century, the Department of Physiology at the Jagiellonian University have made a valuable contribution to the development of experimental and clinical gastroenterology, which Prof. Stanisław Konturek greatly expanded. This paper aims to present the biography and achievements of Prof. Konturek against the background of a short history of the Department of Physiology. For research purposes, historical studies on the development of the Krakow school of physiology over the centuries, as well as biographical notes and interviews conducted with Prof. Stanisław Konturek, were used and analyzed.

The most significant findings of the Department of Physiology in the 19th century, including the discovery of adrenaline and research on brain electrophysiology, are undoubtedly associated with Professor Napoleon Cybulski. The most valuable achievements of Prof. Stanisław Konturek include the role of neuropeptides and intestinal hormones in the physiology and pathology of the digestive system, as well as the involvement of Helicobacter pylori in the development of inflammatory, dysplastic, and neoplastic changes in the gastric mucosa.

Professor Konturek was one of the most outstanding physiologists of our time. His scientific legacy includes 650 articles, numerous books, and many successors, professors, and doctors who continue his work.

Keywords: history of physiology, gastroenterology, *Helicobacter pylori*.

Submitted: 03-Mar-2025; **Accepted in the final form:** 20-Jun-2025; **Published:** 31-Jul-2025.


International Symposium
GROWTH FACTORS AND POLYAMINES
IN MUCOSAL PROTECTION AND REPAIR
Cracow, September 12.1998

Introduction

The title of this paper is derived from an interview with Professor Stanisław Jan Konturek, a highly respected physician and physiologist who dedicated his professional career to the Department of Physiology at the Faculty of Medicine of Jagiellonian University, Medical College. He remarked: "Imagination and knowledge — without them, there is no true doctor. I know several individuals who are outstanding scientists, but they do not excel as doctors, because even the greatest knowledge means little when faced with illness and the patient" [1].

Professor Konturek continued the esteemed traditions of physiology at Jagiellonian University, becoming one of the most notable physiologists of the twentieth century and a pioneer in the advancement of experimental and clinical gastroenterology [2].

This paper highlights the remarkable biography and scientific accomplishments of a distinguished scientist, visionary, educator, and mentor to many professors, doctors, and students.

Methods

For research purposes, historical studies on the development of the Krakow School of Physiology over the centuries, along with biographical notes and interviews conducted with Professor Stanisław Konturek, were utilised and analysed.

Discussion

Anatomy and physiology serve as the foundation of medical knowledge, forming the basis for every discipline that investigates the mechanisms of pathological changes in the human body. The teaching of physiology at the Academy of Cracow dates back to the 14th century, drawing inspiration from the works of Hippocrates, Galen, and Avicenna. However, it was not until 1849, upon the request of Professor Maciej Józef Brodowicz, that an independent Department of Physiology was established within the Faculty of Medicine, with Professor Józef Majer appointed as its head [3].

Many distinguished scientists from Cracow contributed to research and education in physiology, including Jan Nepomucen Czermak and Gustaw Piotrowski. Professor Czermak gained recognition for his research on the physiology of vision, spatial sensation of the skin, and pulse. Thanks to his efforts, the Department of Physiology moved to a new location on Wiślna Street and was equipped with modern laboratory instruments. Professor Piotrowski is credited with discovering and describing the reaction used for the quantitative determination of protein and is also the author of the first Polish textbook on physiology [4, 6].

The most significant development in the Department of Physiology began in 1885 when Napoleon Cybulski took over as its head. He was one of the most outstanding Polish physiologists of his time. Cybulski developed an innovative device known as the photohemotachometer, which allowed for the examination of blood flow speed in vessels. This device enabled the continuous recording of blood flow speed on a moving strip of photosensitive paper. Professor Cybulski was also the first to graphically illustrate changes in blood flow speed during various phases of heart activity [4, 6].

Cybulski's interests extended beyond the circulatory system. Alongside Adolf Beck, he studied the electrophysiology of the brain, particularly focusing on the location of sensory centers in the cerebral cortex. However, his most remarkable achievement was the discovery of adrenaline, which he termed "nadnerczyna." In 1895, Cybulski and Władysław Szymonowicz discovered that

extracts from the adrenal medulla caused an increase in blood pressure in laboratory animals, similar to a substance found in venous blood flowing from the adrenal glands. Unfortunately, the Nobel Prize for this significant discovery was awarded in 1895 to George Oliver and Edward A. Sharpey-Schäfer, despite their research being entirely independent of the work done by the physiologists from Cracow [5].

In addition to his scientific contributions, Napoleon Cybulski was a social activist. He advocated for improving education and agricultural practices in society, while also promoting healthy eating and physical activity. Thanks to his initiative, construction began in 1892 on new facilities for the expanding Department of Physiology. Since 1895, the Department has been located on the second floor of a distinctive grey building at 16 Grzegórzecka Street [4–6].

Between 1947 and 1961, the Department of Physiology was led by Professor Jerzy Kaulbersz, who published numerous works in high altitude, aviation, and space physiology. During the Second World War, Professor Kaulbersz worked in the gastroenterology laboratory of the University of Detroit Surgery Clinic, focusing his research on gastric motor function and the factors that prevent peptic ulcer disease. These scientific interests were also the focus of his studies in Cracow, where he established the Department of Physiology as a leading center for experimental gastrointestinal tract research in Poland [3, 4, 7].

In 1969, the Department of Physiology was transformed into the Institute of Physiology, which comprised three departments: Clinical Physiology, Experimental Physiology, and Biophysics. Professor Stanisław Jan Konturek, another distinguished scientist, took over the management of the Institute. Born on October 8, 1931, in Zakliczyn, Konturek received his high school diploma in 1950 from a secondary school in Tarnów. As he recalled, his mother had dreamed of him becoming a priest, but but he was entirely consumed by biology, and decided to become a doctor. He studied at the Faculty of Medicine at the Medical Academy in Cracow, obtaining his medical degree in 1955. While still a student in 1954, he was employed as a junior assistant at the Department of Physiology by Prof. Kaulbersz, where he worked continuously for the next 48 years. In 1960, he earned the degree of Doctor of Medicine, awarded by the Faculty of Medicine Council based on his doctoral dissertation titled "The Influence of Hypophysectomy, ACTH, and Cortisone on Experimental Peptic Ulcers." He obtained his habilitation in 1963, based on his overall scientific achievements and his habilitation thesis, "Clinical and Experimental Studies on the Influence of Endocrine Glands on Gastric Secretion and the Development of Peptic Ulcers." In 1969, he was granted the title of Professor of Medical Sciences. Between 1969 and 1973, he served as the director of the Institute of Physiology [2].

In 1973, the Institute was transformed into the Department of Physiology of the Faculty of Medicine at the Nicolaus Copernicus Medical Academy, which was renamed the Department of Physiology of the Faculty of Medicine at the Jagiellonian University Medical College in July 1996. Professor Konturek continued to lead this Department until September 2001 [2].

After completing his studies, Prof. Stanisław Konturek worked for several years at the 1st Clinic of Internal Medicine, which was then headed by Prof. Leon Tochowicz. He began his career as a volunteer in 1962, became an assistant in 1963, and shortly after advanced to senior assistant within the same year. He continued his ascent through the ranks, eventually becoming an assistant professor and then a full-time associate professor in 1969. During his time at the 1st Clinic of Internal Medicine, he achieved both first and second degree specializations in internal medicine. While managing a private medical practice at that time, he realized that it was impossible to balance high-level scientific research with a full commitment to patient care. He chose to focus on

physiology, believing that his discoveries and modern scientific research would ultimately benefit medicine and improve patient treatment [1, 2, 8].

Several years later Prof. Konturek served as vice-rector of the Medical Academy in Cracow from 1989 to 1993. He was dean of the Faculty of Medicine at the Jagiellonian University Medical College from 1993 to 1996, and then served as vice-rector of the Jagiellonian University Medical College from 1996 to 1999 [2].

Prof. Konturek's scientific interests primarily focused on the physiology and pathology of the digestive system. While he was a student, he worked with Prof. Jerzy Kaulbersz, who was then head of the Department of Physiology, studying gastric secretion. His early research on factors that inhibit gastric secretion, specifically urogastron and enterogastron, was published in the journal Gastroenterology. As the professor mentioned in one of his interviews, he was the first Polish individual to publish an article in such a distinguished journal. In subsequent years, he published 33 more articles in Gastroenterology. Urogastron eventually became known as epidermal growth factor (EGF). A more precise definition of the chemical nature and the mechanism of release of these factors was made possible only after biochemical methods for detecting and isolating them were developed in the second half of the 1990s. These studies marked the beginning of Prof. Konturek's scientific career [1, 8].

Now, over 50 years later, he is recognized as the author or co-author of more than 1,400 publications, which include approximately 650 scientific papers and about 100 review articles. His publications have an h-index of 60, with a total of over 17,000 citations. He has been published in both English and Polish journals, including the "American Journal of Physiology," "Journal of Clinical Investigation," "Gastroenterology," "Gut," "Digestive Disease and Sciences," and "Digestion" [2].

Prof. Konturek's scientific research primarily focused on the physiological and pathological mechanisms that control the functions of the digestive tract. His significant achievements include elucidating the role and importance of growth factors and growth hormone in regulating cell proliferation in the gastric, pancreatic, and intestinal mucosa, both in healthy states and in the context of inflammation in the stomach and pancreas. This research, conducted in collaboration with Nobel Prize winners S. Cohen and H. Gregory, has enhanced our understanding of how growth factors contribute to the integrity of the gastric and pancreatic mucosa. Additionally, working with another Nobel laureate, A.V. Schally, Prof. Konturek investigated the role of endogenous opiates and neuropeptides in regulating digestive system functions. Under his supervision, this research aimed to clarify the gastroprotective effects of prostaglandins. The findings showed that the gastric mucosa maintains its integrity through the increased production of not only prostaglandins but also nitric oxide. The adaptation of the mucosa to damaging factors, such as non-steroidal anti-inflammatory drugs, was also explained [2].

Furthermore, the team led by Prof. Konturek confirmed that repeated episodes of short-term organ hypoxia reduce the damaging effects of ischemia by activating the sensory fibers of the gut-brain axis. Another area of exploration for Prof. Konturek involved the pathomechanism of Helicobacter pylori infection, its consequences, and treatment methods. He developed an original non-invasive detection method for this infection, utilizing his concept of a breath test using 14C- or 13C-labelled urea. These studies, conducted in collaboration with Nobel laureates B. Marshall and J. Warren, led to the discovery of Helicobacter pylori's role in the development of ulcers and gastric carcinogenesis [1, 2, 8].

Prof. Konturek's early scientific achievements led to his postdoctoral fellowship in 1965 at the CURE Gastroenterology Centre in Los Angeles, which was directed by Prof. M.I. Grossman. The

research conducted at this center resulted in his membership in the American Gastroenterological Association and a fellowship awarded by the National Institutes of Health in Bethesda. Professor highlighted in several interviews that this postdoctoral grant enabled him to equip the physiology department's laboratory with the most advanced equipment of that time, allowing him to continue his scientific research [1, 8].

Throughout his scientific career, Prof. Konturek served as a visiting professor at various institutions, including the CURE Gastroenterology Centre in Los Angeles, the Department of Physiology at the University of Oklahoma in Oklahoma City, the Department of Gastroenterology at the University of Texas in Galveston, the Department of Physiology at the University of Missouri in Columbia, the Department of Bioscience at Upjohn Co. in Kalamazoo, the Department of Physiology at Mt. Sinai Medical School in New York, and the Department of Physiology at Rochester University in New York. Prof. Konturek's deep commitment to advancing medical physiology in Cracow meant that during his visits to American and European centers, he often secured scholarships for young assistants to undertake scientific internships at the Department of Physiology [2].

In addition, Prof. Konturek was a member of the editorial teams for several journals, including "Archives of Gastroenterology," "Digestive Diseases and Sciences," "European Journal of Gastroenterology and Hepatology," "European Journal of Pharmacology," "International Journal of Pancreatology," "Italian Journal of Gastroenterology," "GUT," "Medical Science Monitor," "Regulatory Peptides," "Scandinavian Journal of Gastroenterology," "World Journal of Gastroenterology," and "Gastroenterologia Polska." Furthermore, he was the creator and chairman of the editorial board for the "Journal of Physiology and Pharmacology," which was established in 1990 to replace "Acta Physiologica Polonica" and achieved an impact factor close to 4.0 within a few years [2, 8].

Due to his outstanding achievements, he was honored as a member of many scientific societies. These included the Polish Physiological Society, where he served as president from 1990 to 1996 and again from 2002 to 2008; the American Gastroenterological Association; the British Gastroenterological Society; the Scandinavian Gastroenterological Society; the Czech Gastroenterological Society; the Japanese Gastroenterological Society; and the Polish Gastroenterological Society. He held several notable positions, such as president of the World Gastroenterological Organisation from 1985 to 1990, president of the European Pancreas Club from 1980 to 1985, and chairman of the European Gastric Club from 1979 to 1995. In 1986, he became a corresponding member of the Polish Academy of Sciences, achieving full membership in 2002. At the Academy, he served as chairman of the National Committee for Cooperation with the International Union of Physiological Sciences (IUPS). Since 2001, he has been a member of the National Committee for Cooperation with the International Council for Science (ICSU). He was also a member of various Polish Academy of Sciences (PAN) committees, including those focused on Physiological Sciences and Medical Sciences. Additionally, in 1986, he was elected as an active member of the Polish Academy of Arts and Sciences [2].

Prof. Konturek's professional activities encompassed not only research but also teaching. He was known to be strict and demanding of his students, yet his lectures attracted large audiences. Students often filled the lecture hall, taking seats on the floor, while latecomers remained in the corridor. His lectures were infused with passion and knowledge, frequently supplemented with personal experiences [2, 8].

It's noteworthy that Prof. Konturek, as the head of the Department of Physiology during the Solidarity uprising, made the department available for the medical students' strike, which

opposed the prevailing political climate at the time. The department also hosted gatherings and masses in support of the strikers. Professor Stanisław Jan Konturek was the author of the widely published five-volume textbook "Human Physiology for Medical Students." He also authored and co-authored several additional books focused on physiology and gastroenterology. Throughout his career, he supervised numerous doctoral dissertations, habilitation proceedings, and professorial appointments. His initiative led to the establishment of the English-language Medical School at the Faculty of Medicine for Foreigners. Furthermore, he founded the Foundation for the Faculty of Medicine at Jagiellonian University, which continues to operate today. Between 1996 and 1999, he served as chairman of the College of Rectors of Medical Universities. During his tenure, he facilitated the creation of a nationwide accreditation committee responsible for assessing the programs and teaching quality of both preclinical and clinical subjects for students from the USA and Canada. It was also during this time that English-language schools for students from Scandinavian countries were opened, and medical and dentistry curricula were established [1, 2, 8].

Professor Konturek received numerous awards and distinctions that underscore his remarkable character. He was honored with the title of doctor honoris causa from several institutions, including the Medical Academy in Białystok (1995), the Medical Academy in Wrocław (1998), Warsaw University of Life Sciences (2008), and the Medical University of Łódź (2008). He received individual and team scientific awards from both the Minister of Health and Social Welfare as well as the Minister of Science and Higher Education. Additionally, he was awarded the A. Jurzykowski Foundation Award in 1977 and became a laureate of the Foundation for Polish Science Award in 1995. Among his accolades are the "Jagiellonian Laurel" diploma and the Napoleon Cybulski medal. He was also recognized with several state decorations, including the Golden Cross of Merit (1974), the Knight's Cross of the Order of Polonia Restituta (1982), the Officer's Cross of the Order of Polonia Restituta (2001), the Commander's Cross of the Order of Polonia Restituta (2018), and the Medal of the National Education Commission (1978) [2].

Professor Konturek passed away in Cracow on 8 August 2019 and was laid to rest at Rakowicki Cemetery. In his final moments, he was bid farewell by family, friends, colleagues, and students who regarded him as a good father, a devoted friend, a mentor, and an authority in his field.

Conclusions

As this study demonstrates, the Department of Physiology at Jagiellonian University has experienced rapid development over the past 150 years. The height of its scientific research and discoveries occurred in the second half of the 19th century, including the pivotal discoveries of Napoleon Cybulski. The 20th century marked the era of experimental physiology of the digestive tract, initiated by Prof. Jerzy Kaulbersz. A notable successor in this scientific field was Professor Stanisław Konturek. Among his most significant achievements are the discoveries of the roles of growth factors, neuropeptides, and intestinal hormones in the physiology and pathology of the digestive system, as well as the gastroprotective effects of prostaglandins. An important accomplishment also includes a series of publications on the role of Helicobacter pylori in the development of inflammatory and neoplastic changes in the gastric mucosa. Professor Konturek was not only an outstanding researcher and a brilliant, inquisitive, and open-minded individual, but also a skilled organiser, teacher, and mentor. He left a legacy of numerous scientific articles, publications, scientific books, and textbooks for students.

References

1. *Czapliński C., Bolek J.*: Lekarze w walce o zdrowie [Doctors fighting for health]. 3. Warszawa: Państwowy Instytut Wydawniczy 2004; 128–143.
2. *Pawlik W.*: Stanisław Jan Konturek 8 X 1931–8 VIII 2019. Rocznik Polskiej Akademii Umiejętności. 2019: 249–255.
3. *Gajda Z.*: O Wydziale Lekarskim Uniwersytetu Jagiellońskiego [About the Faculty of Medicine at Jagiellonian University]. Kraków: Uniwersytet Jagielloński Collegium Medicum 2003; 85–89.
4. *Gajda Z.*: O ulicy Kopernika w szczególności o Wesołej w ogólności: prawie wszystko [About Kopernika Street in particular, and Wesoła District in general: almost everything]. Kraków: Uniwersytet Jagielloński Collegium Medicum 2005; 237–241.
5. *Mateja A.*: Recepta na adrenalinę. Napoleon Cybulski i krakowska szkoła fizjologów [A prescription for adrenaline. Napoleon Cybulski and the school of physiologists in Krakow]. Wołowiec: Wydawnictwo Czarne 2019.
6. *Kaulbersz J., Bilski R.*: Historia Katedry Fizjologii Wydziału Lekarskiego Uniwersytetu Jagiellońskiego i Akademii Medycznej [History of the Department of Physiology, Faculty of Medicine, Jagiellonian University and Medical Academy]. In: Sześćsetlecie medycyny krakowskiej. 2. Historia katedr [Six hundred years of medicine in Krakow. 2. History of the departments]. Kraków: Państwowe Wydawnictwo Naukowe 1964; 392–432.
7. *Konturek S.*: Professor Jerzy Kaulbersz, pioneer of polish gastroenterology. J Physiol Pharmacol. 2011; 62 (2): 257–265.
8. *Bętkowska T., Dziwisz E.*: Uczeni przed lustrem [Scientist before the mirror]. Kraków: Wydawnictwo Uniwersytetu Jagiellońskiego 2006; 233–242.