

Chronicle

Professor ordinarius Alicja Kurnatowska, M.D., Ph.D. – the 80th birthday anniversary: scientific, didactic and organizational achievements in the field of parasitology and medical mycology



Prof. Alicja Kurnatowska, M.D. was born in Pabianice in the family of the educated elite. She graduated from Queen Jadwiga's Women's Grammar School and Secondary School. She was a committed girl guide, who held different functions in the Scouts Association – from a patrol leader to a member of the Regional Management Council in Łódź.

She began her studies at the Medical Faculty, Medical Academy in Łódź in 1950 and graduated in 1955 as an outstanding student. She obtained specialization in obstetrics/gynecology in 1959. In

the course of her University career Prof. Kurnatowska achieved scientific titles and degrees: Doctor of Philosophy (1963), Associate Professor (1968), Professor extraordinarius in the Medical Sciences (1977), Professor ordinarius in the Medical Sciences (1989). While still a second year medical student, on September the 1st 1951 she started her didactic and scientific activity at the Chair and Department of Biology, Medical Academy (present: Chair of Biology and Medical Parasitology, Medical University in Łódź), subsequently taking on the consecutive posts of: a deputy assistant (1951–1955), junior assistant (1955–1958), senior assistant (1958–1963), senior lecturer (1963–1969), Associate Professor (1969–1977), Professor extraordinarius (1977–1989) and Professor ordinarius (since 1989). She performed the function of the Deputy Director of the Biology and Morphology Institute, Medical Academy in Łódź for 18 years and simultaneously, since 1983 – the function of Head of the Center of the Treatment of Parasitic Diseases and Mycoses at the Department; she was the Head of the Chair between 1991 and 2002. She was engaged as a consultant in parasitology and mycology by the 1 Department of Gynecology and Obstetrics, Medical Academy (1959–1969) and by the Specialist Dermatology Health Care Center (1980–1990). She was a member of the Management Board of the Institute of Gynecology and Obstetrics, Medical Academy in Łódź for 17 years. Since 2001 she has been a member of the Scientific Board of the Polish Mother's Memorial Hospital, Research Institute, Łódź.

Between 1959 and 1983 she was undergoing supplementary training or was a visiting guest in many research centers abroad (Czechoslovakia, Yugoslavia, the Netherlands, Great Britain, France, Sweden, USA).

Prof. A. Kurnatowska's scientific achievements include 426 publications and 481 lectures and reports at scientific societies meetings and conferences. More than 100 of the aforementioned were published in foreign languages (English, German, Russian, Hungarian) of which 46 abroad (Great Britain, Czechoslovakia, Canada, India, Japan, Yugoslavia, Russia, Hungary, Italy, USA); she presented 107 analyses at over 40 international conventions. She is also a co-author of 40 unpublished expert opinions and 6 patents. Other forms of publications were 3 films on *Trichomonas vaginalis* Donné. Prof. Alicja Kurnatowska guided 3 habilitation theses, graduated 14 PhD and was a promoter of 30 Master theses. As a long-term chairman of Student Scientific Society at our Department she inspired and supervised approximately 70 students' research theses 56 of which got awards or distinctions.

The main directions of Prof. Alicja Kurnatowska's research interests include: biological properties of *Trichomonas vaginalis* Donné and their clinical significance, characteristics of fungi that occur in human organism, diagnosing systemic and recurrent mycoses, etiotropic effects of new compounds compared with the already introduced medications, including the phenomenon of *Trichomonas* and *Candida* strains resistance to drugs.

Prof. Alicja Kurnatowska's achievements include original analysis of biometric properties of *Trichomonas vaginalis* in cultures and different forms of trichomoniasis, assessed using different methods such as scanning electron microscope imaging; establishing associations among *T. vaginalis* or *T. tenax* invasions and some fungi strains that occur in the ontocenoses of the infected organs, original description of separate disease – trichomonosomycosis; establishing mutual interactions of *Candida* strains that stimulate the development of *T. vaginalis*. Prof. A. Kurnatowska developed research studies on *Toxoplasma gondii* infection mechanisms including the prevalence of this protozoa in its different development phases, performed assessment of diagnostic value of various tests and elaborated own model of analyzing titre or concentration levels of some definite antibodies against *T. gondii*. Recognition of renewed, specific immunoglobulins M in pregnant women and finding levels of immunoglobulins G increasing along with the development of pregnancy seem particularly interesting. Her other research achievements include creating own definition of recurrent invasions

(parasites, fungi), which are associated with multifocal and family infections, introducing own classification of organ mycoses, elaborating own method of fungi biotyping based on several dozens of properties (species and intraspecies differentiation), establishing associations between strain properties and pathogenicity, applying computer analysis for determination of the size of vegetative cells of pathogenic fungi various species. While formulating her own definition of recurrent invasions, which applied not only to fungi but also to zoonotic parasites, she proved that multifocal invasions play the crucial role in recurrent invasions, whereas family infections and formation of strains with diminished drug sensitivity are less common.

Prof. Alicja Kurnatowska was the first (not only in Poland) to begin studies on *T. vaginalis* and pathogenic fungi resistance to chemical agents. Accompanied by Prof. R. Kadłubowski, she worked out original methods such as calculating 50% concentrations of the compounds affecting the population of *Trichomonas*, determining curves for minimum concentrations (MIC) that inhibit growth of bacteria or fungi and, finally assessing curves for protozoan and fungal growth. She introduced evaluation of CL₅₀ and MIC value distribution (in the rectangular coordinate system) into further analysis, which contributed to selecting *Trichomonas* strains and fungi with lowered sensitivity to a given chemical agent. Those methods enabled to reliably compare the activity of numerous new compounds with model drugs and to discover (patents obtained with biochemists) trichomonacidal, mycostatic and bacteriostatic properties of those compounds that had not been reported before. Further interesting interpretation possibilities of the results from the discussed studies were created by applying the own index (proposed by Prof. A. Kurnatowska) of the „total compound effect” exerted on the elements from distinct systematic groups – the ontocenosis of the female vagina. It must also be mentioned here, that thanks to scientific cooperation with Pharmaceutical Industry Research Institute, Drug Research Institute and pharmaceutical companies she examined, for the first time in Poland, both *in vitro* and *in vivo* all the available antitrichomonal drugs that had been consecutively introduced into the treatment of trichomoniasis as well as anti-fungal drugs used in organ mycoses. She developed precise criteria for assessing the effectiveness of new antitrichomonal

drugs in clinical studies.

Prof. A. Kurnatowska took part in pre-clinical trials of medicines, which got into use; she also made a comparative assessment of a new derivative of polyfungine (that had been accepted by the Drug Commission for clinical trials) and other polyenes. In the course of the abovementioned research she proposed a new method that had not been reported in the literature before and which was based on treating the fungus sensitivity to a chemical agent as a quantitative feature expressed by the value of the minimum inhibitory concentration MIC, calculated using linear regression equation and which can be analyzed in sequences of variability by different MIC distribution parameters in the rectangular coordinate system. The method, which was tested by comparing data covering several thousands of polyene antibiotics and azole derivatives, received favorable reviews in Poland, England and Scotland.

In the studies that were conducted in the last decade, Prof. Kurnatowska assessed the prevalence of fungi in pregnant women with type I diabetes and pregnancy diabetes in comparison to healthy women, proving a few times greater risk of vaginal candidiasis and more frequent occurrence of multifocal infection in pregnant females with type I diabetes, however no relation between period of pregnancy and fungal prevalence was found. Analysis of characteristic features of fungi strains isolated from the same groups of pregnant women using the previously developed model of biotyping based on enzymatic properties of fungi strain, showed the greatest diversity of biotypes in strains occurring in the oral ontocenosis; strains isolated from the vaginal ontocenosis were characterized by the lowest grade of biotype diversity. No relations between occurrence of particular biotypes and location of *C. albicans* infection or occurrence of diabetes in pregnant were found. While assessing the effect of glycemia on the prevalence of fungi in 3 ontocenoses in those groups of patients and using own parameter (average weekly blood glucose level) marked tendency towards increase in fungal infection frequency, particularly in the vagina and gastrointestinal tract, with deteriorating blood glucose compensation was observed. It was reported for the first time, that strains from vaginal and anal ontocenoses, which were isolated from pregnant women with diabetes showed lower enzymatic activity of acid and alkaline phosphatases compared with strains from pregnant women without diabetes. The highest activity of both the enzymes was found

in fungal strains isolated from patients in the beginning of pregnancy. In the course of mycological studies conducted within the frame of cooperation with the Department of Obstetrics and Gynecology and Department of Pediatrics, Rikshospitalet University Hospital, Oslo and concerning multifocal mycoses in pregnant women and families with genetically conditioned MEDAC syndrome – chronic mucosal and skin candidiasis, detailed analysis of phenotypical features of fungi strains and clinical assessment of particular family members from the consecutive generations was performed and large diversity of species of isolated strains of *Candida*, *Aspergillus* and *Penicillium* was observed compared to the group of healthy subjects, whereas *C. albicans* exclusively was found among the controls.

While conducting studies concerning fungal infections in females from Pomerania-Drawsko region, where no similar studies have previously been performed, the fungi prevalence in the genital organs, strain phenotypical features, convergence of fungi occurrence with diagnosis and particular clinical symptoms of mycosis were determined. More than two times higher prevalence of fungi in the vaginal ontocenosis was shown in patients with genital organ inflammation compared to females, who regularly underwent prophylactic examinations. Chronic candidiasis was the most frequent clinical form of vaginal mycosis. The highest coincidence of fungal infection and clinical symptoms of inflammation was found for reddening and oedema of vaginal mucosa, burning sensation, itching and pain. Mycological analysis revealed that *C. albicans* strains isolated with seven other *Candida* species and two other genera (*Saccharomyces* and *Trichosporon*) were characterized with large diversity of morphological features and biological properties, which included 6 code inscriptions and 12 separate enzymograms, leucine arylamidase, acid and alkaline phosphatases and naphthol phosphohydrolase AS-BI had the highest activity.

While analyzing properties of *C. albicans* strains isolated from vagina, oral cavity, duodenum and rectum using biochemical parameters, particularly enzymograms of strain extracellular hydrolases, the usefulness of this method was shown for recognizing similarity or identity of strains from an individual's different organ ontocenoses; analyzing the enzymograms of 19 hydrolases that are responsible for strain pathogenicity was proved

significant for establishing intrasystemic fungal transmission. While investigating strains isolated from patients with predominant respiratory tract infections and assessing phenotypic morphological features as well as biochemical properties, value of a multiparameter analysis for establishing not only phenotypic differences but also important intraspecies properties has been demonstrated. Marked biological variability within species induces to take on differential investigations on the molecular level as well. Usefulness of own noncommercial immunoblot test in detecting specific anti-*T. gondii* antibodies with good sensitivity was demonstrated and this technique was recognized as a valuable supplementary method in the complex diagnostics of congenital toxoplasmosis.

Prof. Alicja Kurnatowska created in Łódź, her own school of microparasitology, which, in the scientific and clinical sense, covers protozoology and medical mycology and which has been appreciated in Poland and worldwide.

Prof. A. Kurnatowska represented the Polish scientific milieu at international conferences and symposia held in the academic centers in Poland as well as abroad: in Prague, Rome, Grenoble, Moscow, Erfurt, London, Rennes, Toronto, Vienna, Halle, Smolenice, Budapest, Salzburg, Izmir, Paris, Brussels, Lisboa, Glasgow, Dresden, Oslo and at Rodos.

Prof. A. Kurnatowska pursued her educational activity in the fields of medical biology with medical genetics, parasitology and medical mycology with the students of the Medical Faculty, Division of Dentistry, Faculty of Pharmacy and Division of Medical Analytics. As the Deputy Director of the Institute of Biology and Morphology for Teaching Affairs she organized and assessed annually the educational process, which covers more than 22 thousands of hours with students of the first and second years at the Medical Faculty and the Division of Dentistry. She is a co-author of the Curriculum in Biology and Genetics for students of the Medical Faculty and the Division of Dentistry that is constantly being modernized and a co-author of the first Polish training course for students of the Division of Medical Analytics at the Faculty of Pharmacy. She supervised students, who lived in the Residence Hall for 12 years; she was frequently appointed as a guide of numerous student groups. Due to performing duties of student guide, she was the head of the Teaching Board for the First Year Students of the Medical Faculty and the Division of

Dentistry for 5 years.

Prof. A. Kurnatowska's activity as the supervisor of the Student Scientific Society for 28 years deserves special appreciation; numerous scientific reports that were presented at university sessions, research conferences in Poland and abroad were granted awards and distinctions. Eleven members of the Society became professors of the Medical Faculty Council at the Medical Academy in Łódź, some are professors in the USA at present. It is worth mentioning that members of the Student Scientific Society have organized as many as eight National Symposia on Modern Human Ecology. In recognition of achievements of Prof. A. Kurnatowska and the Student Scientific Society were granted several awards from the University Authorities. Both in 1981 and 1989 she received the Golden Medal of the Student Scientific Society.

Since 1962 Prof. A. Kurnatowska has conducted postgraduate training courses for doctors and laboratory directors on mycology and parasitology, especially trichomoniasis and toxoplasmosis (courses offered by The Medical Center of Postgraduate Education and Medical Academy). She organized training sessions for doctors of specified specialties, linking the program with parasitology and mycology. She is the editor of guidebooks and monographs as well as author or co-author of 36 chapters on parasitology, medical mycology and ecology in books used by the students of the Medical Faculties, doctors of different specialties and laboratory staff. Ecology guidebooks elaborated by independent researchers from the Technical University of Łódź, University of Łódź and Medical Academy in Łódź are an attempt of finding a common language and seeking relations with other fields of science by academics and students. The chapter „Urogenital *Trichomoniasis* in Children” written for Prof. B.M. Honigberg, editor of a large monograph „*Trichomonads Parasitic in Humans*” (New York, 1989), which is addressed mainly to doctors, has its own unique character.

Prof. A. Kurnatowska is also an author of three science educational videos named „*Trichomonas vaginalis* Donné”.

Prof. A. Kurnatowska has served for many years as an advisor in the procedures of conferring the titles of Professor ordinarius and Professor extraordinarius, reviewed publications and scientific achievements in habilitation proceedings, doctoral theses, guidebooks and original papers submitted by publishers, editorials of magazines and by crucial

problem coordinators, interdepartmental coordinators or the State Committee for Scientific Research. She has also reviewed articles in magazines and served as a research consultant of publications on antiparasitic and antifungal drugs.

Prof. A. Kurnatowska took part in the Senate Committee proceedings at her home University and in professional environment: the Committee for Student Social Issues and the Senate Disciplinary Committee for Research Workers among others; in 1960 she was the President of the Organizational Committee of MA Graduate Meeting, which was the greatest in history (about 6 000 graduates); she was a founding member of the Medical Graduates' Society in Łódź. Since 1955 she has consulted patients from the whole region of Poland in the Consulting Ambulatory and then in the Center of the Treatment of Parasitic Diseases and Mycoses (present: the Department of Diagnostics and Treatment of Parasitic Diseases and Mycoses) and in various hospitals in Łódź and its region.

In 1953 she was one of the founding members of the Łódź Division of the Polish Parasitological Society where she hold the function of the Vice-President (3 tenures) and the President (10 tenures). She cooperated with the Main Governing Board of the Polish Parasitological Society as the Vice-President (3 tenures) and Secretary General or the President of the Trichomoniasis Committee (1958–1990). She was the Chairman or member of the Medical Section (3 tenures). She was a member of the International Group of Experts of Trichomonadosis working under the WHO auspices. She took part in organizing 8 national and 3 international symposia on *Trichomonas* biology and treatment of trichomoniasis in people, which was constantly associated with inspiring new directions of research in this field.

Prof. Alicja Kurnatowska served several times as the President of the Organizing Committee of the annual scientific meetings entitled „The Clinical Day of the Medical Parasitology” held in Lodz (50 Polish conferences with the participation of foreign guests); at present she is the Honorary President of the Organizing Committee of this Conference. For more than 20 years she was an active Member of the Committee of Parasitology of the 2nd Division of the Polish Academy of Sciences (PAN) and the Commission for Application of Mathematical Sciences in Basic and Clinical Studies of the 6th Division of the Polish Academy of Sciences. For 6 years she was also a Member of

the Scientific Committee of the Institute of Parasitology of the Polish Academy of Sciences in Warsaw. She initiated the establishment of the Mycological Team of the Parasitology Committee, Polish Academy of Sciences and worked there for more than 10 years. Furthermore, she worked in the Environmental Protection Committee, Polish Academy of Sciences, Łódź Division. Prof. Kurnatowska has cooperated with the European and the World Federation of Parasitologists, and has been a Member of the European Federation of Medical Mycologists, of the Lodz Scientific Society and the Polish Genetic Society; for many years she was also an active Member of the Polish Gynaecological Society.

Prof. A. Kurnatowska has received numerous awards: 9 scientific and 5 didactic prizes of the Minister of Health and Social Welfare, 40 of the Rectors of the Medical Academy and the Military Medical Academy, and 2 of the Scientific Societies. Having been a supervisor of the Student Scientific Society at the Medical Academy of Lodz in the years 1962–1989 she was awarded the title of the Honorary Member of this Society (1990).

Prof. Kurnatowska was honored with the Gold Cross of Merit (1969), the Knight's Cross of the Order of Polonia Restituta (1977), the Medal of the National Education Commission (1981), the Officer's Cross of the Order of Polonia Restituta (2002); she received the title of the „Distinguished Teacher of the Polish People's Republic”, the Medal of „Parasitologorum Polonia Societas”, the K. Janicki „Bene de Parasitologorum Meritum” Medal (1990), the Medal of the 50th Anniversary of the Medical Academy of Lodz (1995), the Medal of the 50th Anniversary of the Polish Society of Parasitology (1998), the title of the „Honorary Member of the Polish Society of Parasitology” (2001), the Decoration for Exemplary Work in Health Service, the Gold Medal of the Children's Friends Society (twice) and also a special Medal and Diploma of the Komenského University (Facultas Medica Universitatis Comenianae Bratislaviensis) for „Achievements in Developing Polish-Slovak Cooperation in the Field of Medical Parasitology” (1983).

Prof. Alicja Kurnatowska has been an outstanding scientist highly appreciated for her merits in Poland and abroad.

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