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АЛЬБЕРТ МИХАЙЛОВИЧ ЗАЙЧИК — ВЫДАЮЩИЙСЯ РОССИЙСКИЙ ПАТОФИЗИОЛОГ: УЧЕНЫЙ И ПЕДАГОГ (К 80-ЛЕТИЮ СО ДНЯ РОЖДЕНИЯ)

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РЕЗЮМЕ. Статья посвящена 80-летию со дня рождения видного советского и российского патофизиолога профессора Альберта Михайловича Зайчика. Блестящий организатор и талантливый преподаватель А.М. Зайчик преобразовал научную и образовательную базу кафедры патофизиологии Ленинградского педиатрического медицинского института, сделав его кузницей научных и преподавательских кадров, колыбелью творческих инициатив, не имевших аналогов в системе отечественного медицинского образования и медикобиологической науки. Работа профессора А.М. Зайчика и его последователей привела к открытию эффектов регуляторных гормоноподобных иммуноглобулинов, способных стимулировать генетический аппарат живых клеток эндокриноцитов тех органов, против ядерных антигенов клеток, из которых они были получены. Эти передовые для мировой науки разработки, в то же время являлись развитием идей учителей А.М. Зайчика: Л.Р. Перельмана. Е.С. Лондона, А.А., Богомольца и восходили к воззрениям И.И. Мечникова. Профессор А.М. Зайчик — автор более 400 научных и учебно-методических трудов. Под чутким руководством этого талантливого ученого и педагога около 90 его учеников защитили кандидатские и докторские диссертации. Уникальный стиль его научного мышления соединял конкретные прикладные научные разработки с глубоким философским осмыслением и обобщением, используя логические и исторические подходы. В его интерпретации коренным вопросом всего курса патофизиологии была относительность целесообразности механизмов защиты, парадоксальная способность естественных защитных реакций приводить к самоповреждению организма.

КЛЮЧЕВЫЕ СЛОВА: Альбер Михайлович Зайчик, патофизиология, аутоантитела, иммуноглобулиновая регуляция.

ALBERT ZAICHIK — OUTSTANDING RUSSIAN PATHOPHISIOLOGIST: SCIENTIST AND SCHOLAR

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ABSTRACT. The paper is devoted to the 80-th birthday of the outstanding Russian Pathophysiologist Professor Albert Sh. Zaichik. A wonderful organizer and bright teacher Albert Zaichik had transformed scientific and educational-methodological basis of Pathophysiology department of the Leningrad Pediatric Medical Institute into an advanced research and educational center of Soviet Pathophysiology, a birthplace of scientific and teaching personnel, a cradle of creative initiatives that had no analogues in the domestic medical education and biomedical science. The work of Albert Zaichik and his collaborators resulted in the production of regulatory hormone-like immunoglobulins, stimulating the genetic apparatus of living cells, affecting their growth and function. With world novelty, these works continued the studies started by Elijah E. Mechnikov, Efim S. London and Leonid R. Perelman and concerned the problem of the regulatory role of physiological natural auto-antibodies. Professor Zaichik published about 400 papers, books and

manuals. He was a gifted teacher. About 90 of his students defended dissertations under his guidance becoming Candidates and Doctors of Medical Sciences. His cognitive style was unique because of combining concrete applied ingenious mind with inclination to deep philosophical reasoning and generalization. He created intermingled unity of logical and historical approaches. In his interpretation the most essential part of the whole course of Pathophysiology was relativity of defense, the paradoxical ability of natural defensive mechanism to cause self-harm.

KEY WORDS: Albert Zaichik, Pathophysiology, Autoantibodies, Immunoglobulin regulation.

On January the 8th, 2018, the outstanding Russian Pathophysiologist Professor Albert Sh. Zaichik would be celebrating his 80th birthday. Plenty of his friends, colleagues and disciples would gather to congratulate him and say kind and laudatory words. Unfortunately it is not possible for he is not with us anymore. But we can write about him and his life.

He was born in 1938 in Leningrad. Almost immediately after his birth his family temporarily moved to Zlatoust in Ural Mountains, and therefore this town was officially mentioned in his metrics as a place of his birth. His father was a dentist and young Albert eventually had selected and pursued more than successful medical career but he was a very gifted boy and was very good in jazz and piano-playing, motor sports and motorcycling, ham radio sports, gliding, engineering, etc. Yet, according his own reminiscences, he selected among several Leningrad medical higher schools the one famous for its best amateur students' jazz band — and started to study Medicine there. In 1962 he had graduated from Leningrad Medical Institute of Hygiene and Sanitation where he had entered a postgraduate course at the Pathophysiology Department headed by a great scientist and scholar — Professor Leonid R. Perelman (1900–1969), closest disciple of the greatest Russian pathophysiologist academician Aleksander A. Bogomolets (1881–1946). Professor Perelman instilled in his student a brilliant culture of experimental work and conveyed to him ardent interest in the problems of physiological and pathological autoimmunity and Endocrinology adherent to the main trend of Bogomolets' school. Young Albert Zaichik had started experimental medical studies while still a graduate student. Soon he mastered all sophisticated methods and techniques necessary for research of «cytotoxines», i.e. regulatory autoantibodies. In 1965 he had defended his Candidate Dissertation (PhD thesis) disclosing the role of thyroid gland in adenohypophysis-adrenal cortex system reactions [3] and started working as an Assistant Professor of Pathophysiology Department; later in 1970–77 he became Associate Professor of the same department. In 1974 he had defended his second dissertation continuing his studies of mechanisms of hormone-production stimulation in adrenal cortex and thyroid gland and got his Doctor of Medical Sciences degree [6].

In December 1976 he was elected Head of Pathophisiology Department at the Leningrad Pediatric Medical Institute and in June, 1978 he was officially awarded full Professorship. For a long time — almost 30 years of his research and teaching carrier proceeded at the world oldest graduate pediatric higher medical school — Leningrad Pediatric Medicial Institute (later renamed into Academy and then University) where Albert Sh. Zaichik established one of the leading Pathophysiology Departments of the world and raised an effective team of collaborators achieving priority reasearch results in Immuno-endocrinology and greatly improved methodology and content of Pathophysiology. It was at this department, which had formerly (1938-1950) been headed by his teacher L.R. Perelman, that Professor Zaichik entered the prime of his creative activity.

A great experimentalist raised by Professor Perelman he had later published with a team of his colleagues manuals in experimental Pathology [19, 25] that were natural off-springs of L. Perelman's original classical manual [23] and had later reincarnated in analogous textbooks of his disciples [2].

A wonderful organizer and bright teacher, who had a unique engineering talent, Albert Zaichik had transformed both scientific and educational-methodological basis of his department turning it into an advanced research and educational center of Soviet Pathophysiology of that period, a birthplace of scientific and teaching personnel, a cradle of creative initiatives that had no analogues in the domestic medical education and biomedical science.

The work of Albert Sh. Zaichik and his collaborators resulted in the production of regulatory hormone-like immunoglobulins, stimulating the genetic apparatus of various endocrinocytes, affecting their growth and function. With world novelty, these works continued the studies started by the brightest disciples of the school of Elijah E. Mechnikov (1845–1916) — the founder of Pathophysiology Department of Leningrad Pediatric Medical Institute, i.e. the Nobel Prize nominee Efim S. London (1869–1939) and Leonid R. Perelman and concerned the problem of the regulatory role of physiological natural auto-antibodies. Begun long before the creation by Niels K. Erne (1911–1994) of the idiotype-antiidiotypic concept of the immune system, these studies and data obtained are further brilliantly fitting in it, and in many ways research projects conducted by Professor Zaichik stood a step ahead of his time. The theory developed by Albert Sh. Zaichik insisted on Immunoglobulin-mediated regulation of cell functions in health and disease, assigning autoantibodies the role of "index finger" in synchronization of the morphofunctional processes in various somatic cells of multicellular organism. It found many supporters in different countries of the world. Since 2005 when Moscow International Symposium on the Problems of Physiologic and Pathologic Autoimmunity was first organized its participants from many countries — appreciate the works by Albert Zaichik as milestones for the whole of this research area.

His main legacy in this field is related to first prove of the antibody penetration living cells (1973–1981). A. Zaichik (and his collaborators) was the first to prove this fact *in vivo* for antinuclear rabbit antibodies towards rat adrenocortical cell deoxyribonucleoprotein antigens. The antibodies selectively penetrated target cells only; it was documented by accumulation of immunofluorescent or radio-iodine labelled specific (but not pre-immune) immunoglobulins. Simultaneously and independently from Albert Zaichik a Mexican rheumatologist Donato Alarcon-Segovia (1935–2004) had demonsrtrated similar phenomenon *in vitro* with natural human anti-ribonucleoprotein autoantibodies from blood serum of Lupus patients and human lymphocytes. The data of Zaichik's and Alarcon-Segovia's studies exploded a real bomb in immunological communities of the USSR and Western countries because almost all scientists and physicians at that time shared a dogma that immunoglobulins are too large for intracellular penetration and can only travel between cells or on their surface only. It is a pity that these two pioneers of intracellular and intranuclear Immunology never met each other. We remember a conference at the Institute of Physiology in 1981 soon after this discovery, where Professor Zaichik who reported antibody penetration in cell nuclei was questioned by an astonished young scientist: "Mr. Zaichik, how is that possible? Everywhere it is clearly written that they are just circulating immunoglobulins, and we already planned big project based on their non-doubtful non-penetration and invested a lot of our time and money?!". "Back at Lavoisier's time, it was common knowledge that stones never fall from the sky", — the Professor replied.

Another great achievement by A. Zaichik was proving the programmed nature of the adrenal cortex atrophy in rats devoid of pituitary in 1977, long before the term apoptosis by default was discovered and clearly understood. Moreover, the pioneer works of A. Zaichik demonstrated the possibility to inhibit programmed cell death and organ atrophy by means of RNA-dependent blockers or by means of growth stimulating antibodies against nuclear antigens of target cells. In was much earlier than the existence of growth stimulating immunoglobulins were demonstrated in clinics of some thyroid diseases.

The efforts of Professor Zaichik and his team provided the highest level of teaching Pathophysiology, brought the themes and methods of scientific work at his department closer to the world best standards. For example, A. Zaichik was the first to introduce the radioimmunological assay into domestic practice: he became a co-developer of the first Soviet diagnostic kits for this method and created the first domestic laboratory of such a profile, certified by quality standards of the WHO. In the 1970–80 the priority works based on microcalorimetry of immune interactions were performed at his department.

Under his leadership in 1988 for the first time in higher medical school of our country a special course of Immunopathology was developed and introduced into the curriculum. In 1985 his department was the first among all profiles in the application of local educational television system, later — the leading one in application of video and computer technologies.

When USSR faced radionuclide contamination after terrible Chernobyl disaster, since 1986 under the leadership of Professor Zaychik a large medical and social program started to study and overcome the medical consequences of the Chernobyl accident and other radio-ecological catastrophes in Belarus and Russia. In the course of expeditions related to this program, the innovative medical and social technologies of mass medical follow-up and check-up were elaborated and tested, which later found wide application in pediatric and adolescent health care.

Professor Albert Zaichik initiated and directed the first English-medium M.D. program in the history of domestic medical education (1993-1998) which was successfully realized. As a result of this project citizens of USA received Russian M.D. diplomas. For this achievement he was awarded the honorary diploma of the State Senate of New York (1994). In the future, the experience of this pilot program was widely on demand in Russia and formed the basis for teaching Medicine in English, which is practiced until now in many Universities of post-Soviet countries. The materials of this unique pioneer program became the basis for publishing textbooks and a cycle of methodological papers.

Since 2006 till the last day of his life (27 February 2014) Professor Albert Zaichik was Director General of the Institute of Endocrinology at Saint Petersburg Medical Academy of Postgrad-

uate Studies which later merged with his Alma Mater, Mechnikov North-West Medical University.

Professor Zaichik published about 400 papers, books and manuals. It's impossible to mention all of them; we will only give references to 20–30 most important ones [1, 3–22, 24–28].

He was a bright lecturer and a gifted teacher. About 90 of his students defended dissertations under his guidance becoming Candidates and Doctors of Medical Sciences. Now they are heading departments, clinics or laboratories, working at many universities, research and clinical centers around the world. Many thousands of students listened to his memorable and inspiring lectures during their graduate studies. His cognitive style was unique because of combining concrete applied ingenious mind with inclination to deep philosophical reasoning and generalization. He created intermingled unity of logical and historical approaches. In his interpretation the most essential part of the whole course of Pathophysiology was relativity of defense, the paradoxical ability of natural defensive mechanism to cause self-harm.

While talking to students and colleagues we frequently used to: "There is no Mr. Know-All inside our body who always selects the best option. Who knows when we are closer to the Creator's ideal — in health or in disease?" Now, when he is closer to the Lord than any of us we again remember and re-think this paradoxical minim coined by him.

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