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# Decade of the cooperation between Polish, Ukrainian and Belorussian physiologists and pulmonologists (2004 - 2013)

*The initiative to organize the Polish-Ukrainian Respiratory Working Group has arisen in October 2003 during the official visit of Prof. Janusz Kowalski to the Bogomoletz Institute of Physiology, Kiev, Ukraine. The driving motion of this initiative was the great wish to establish closer collaboration between Polish and Ukrainian researchers and physicians, to inspire the exchange of mutual experiences in research work and clinical practice and finally to help our patients who suffer the same pain and diseases on both sides of Polish-Ukrainian border. This concept has been approved by Prof. Jerzy Kozielski (President of the Polish Respiratory Society, Silesia Medical Academy, Poland), Prof. Platon Kostyuk (Director of the Bogomoletz Institute of Physiology, Ukrainian National Academy of Sciences, Kiev) and National Delegates of the European Respiratory Society Prof. Joanna Chorostowska (National Research Institute of Tuberculosis and Lung Diseases in Warsaw, Poland) and Prof. Yuri Feshchenko (Institute of Phthisiology and Pulmonology AMSU, Kiev, Ukraine). Next year Ukrainian scientists and doctors were invited by the Organizing Committee of 28th Congress of the Polish Respiratory Society to participate in this meeting in Lodz. During the Congress the Polish-Ukrainian Working Group of Clinical and Experimental Pathophysiology of Respiration was established. Prof. Janusz Kowalski (Institute of Tuberculosis and Lung Diseases in Warsaw) and Prof. Tatiana Serebrovskaya (principal researcher of the Bogomoletz Institute of Physiology in Kiev) have been elected as Coordinators of this group. Since 2012 Prof. Piotr Gutkowski leads the working group. During following decade the annual meetings in Kiev (2005), Opole (2006), Donetsk (2007), Katowice (2008), Ternopil (2009), Mikolajki (2010), Chernivtsi (2011), and Wisla (2012) took place. In 2008 Belorussian colleagues from Grodno and Minsk joined working group. Besides scientific conferences, exchange of therapeutics and students was organized for training courses both in Polish and Ukrainian pulmonological clinics. The fundamental monograph «Lung function in lung diseases» (Eds. J.Kowalski, A. Koziorowski, L.Radwan) written by prominent Polish specialists in physiology and pathophysiology of respiration was translated from Polish to Russian by Dr. Eugenia Kolesnikova. The monograph was published in Poland, transported to Ukraine and distributed among main Ukrainian and Belorussian medical universities and libraries. A number of joint researches were provided, and international scientific papers were published in peer-reviewed journals. Many other initiatives have focused on the exchange of scientific and medical information between the Polish, Ukrainian and Belorussian colleagues to the benefit of the health of our populations. In conclusion, despite many organizational and financial difficulties in cooperation between Polish, Belorussian and Ukrainian universities, this initiative should be considered as significant and fruitful, integrating students, physicians and scientists of Central and Eastern Europe. The history of the Polish-Ukrainian-Belorussian Respiratory Working Group is going on. We ought to write it together.*

## INTRODUCTION

Due to the initiative of Polish and Ukrainian pulmonologists, lung physiologists and scientists, the Polish-Ukrainian Respiratory Working Group has been formed in 2004. During the decade 2004-2013, the five joint scientific meetings in Poland were organized within the program of the biennial congresses of Polish Society of Lung Diseases in Lodz (2004), Opole (2006), Katowice (2008), Mikołajki (2010) and Wisła (2012). Besides that, there were four conferences in Ukraine: Kiev (2005), Donetsk (2007), Ternopil (2009) and Chernivtsy (2011). After

ten years of the successful cooperation, the next anniversary conference "Physiology and Pathology of Respiration: Advances in basic research and clinical applications" has to be held in Kiev, October 2013. There were also multiple meetings in Grodno and Minsk (Belarus). From the beginning, the Belorussian participation is very important in all common activities. Therefore in 2012 the name of the Working Group has been modified from Polish-Ukrainian into Polish-Belorussian-Ukrainian. The main purpose of the cooperation is to create a platform for the introduction of advanced achievements in basic research of lung function from molecular to systemic level. In this mini-review we summarize the main topics of scientific meetings as well as the results of other common activity.

## BASIC RESEARCH

Every scientific meeting included exchange of views on the most significant achievements in modern basic research. One of such topics is the problem of intermittent hypoxia which was being intensively developed during the last decades. Many experimental and clinical data of Ukrainian scientists have demonstrated that intermittent hypoxia training (IHT) is an effective mean for increasing nonspecific body resistance to harsh or toxic environments and pathogenic agents. There were attempts to apply IHT for treatment of respiratory and cardiovascular diseases, endocrine disorders, and immunodeficits (Lei Xi & Serebrovskaya, 2009, 2012; Drevytska et al., 2009; Rozova & Mankovska, 2012; Mankovska et al., 2011; Serebrovskaya et al., 2013). It has been proved that IHT induces an increase in ventilatory sensitivity to hypoxia and various hypoxia-related physiological changes, including raised alveolar ventilation, lung diffusion capacity and heightened hematopoiesis. Intermittent hypoxia also transiently increases the release of reactive oxygen species which then induce a compensatory increase of antioxidant defense. These data could be considered as the theoretical base for the including of IHT in therapy of various diseases in which the patogenesis of oxidative stress is involved.

IHT procedure seems to be very attractive for sportsmen and alpinists training. Considering COPD and asthma patients who suffer from hypoxia due to bronchial obstruction, the special strict requirements for IHT application should be elaborated.

Prof. Iryna Mankovska's group from Bogomoletz Institute of Physiology is focused on the latest advances in the study of mitochondrial function under different types of hypoxia. Basic mechanisms of mitochondrial dysfunction associated with impaired oxygen delivery to mitochondria, intensification of free radical processes, reduced stability of mitochondrial membrane, etc was elucidated. The methods of non-pharmacological and pharmacological correction of mitochondrial dysfunction were vividly discussed (Drevytska et al., 2009; Mankovska et al., 2011).

Dr. Evgenia Kolsnikova from Bogomoletz Institute of Physiology (Kiev) presented her results about changes in respiratory control of Parkinson's diseases patients. Her experimental research of brainstem mitochondrial function under hypoxic conditions reveals the mechanisms of non-specific reactions at early stage of different disorders. The last observations on rats suggest that adaptation to IHT promotes the expression of a glycolytic gene - pyruvate dehydrogenase kinase-1 to maintain ATP production and to prevent toxic ROS production in the brain stem normalizing mitochondrial dysfunction (Kolesnikova, 2013).

Investigations of Dr. K.V. Rozova from Kiev about structural and functional changes in biological barriers and mitochondrial apparatus of the lung and heart during hypoxia and stress were of great interest at all meetings. Particularly, it was shown that the ultrastructural reorganization in lung and heart mitochondria during hypoxic hypoxia can be attributed to the compensatory- adaptive reactions of mitochondrial apparatus. IHT mode with more severe but shorter hypoxic bursts led to the prooxidant/antioxidant imbalance in the myocardial and lung tissues which was

accompanied by the significant disorders in their morphology and function. Moderate hypoxic exposures of different duration promoted the maintenance of optimal prooxidant-antioxidant homeostasis and development of compensatory adaptive changes in tissue structure (Rozova & Mankovska, 2012).

Scientists from Ukrainian State Institute of Gerontology (Department of clinical physiology and pathology of the internal organs, Kiev) presented the results of fundamental investigations devoted to age-related peculiarities of adaptation to hypoxia and new methods for the correction of age pathology. One of such methods is non- pharmacological method of IHT which was developed for the usage in geriatric clinics in close cooperation with other members of the Polish-Ukrainian working group. As a result, the guideline for IHT implementation in elderly healthy people and patients with coronary artery disease, arterial hypertension and chronic obstructive pulmonary diseases was elaborated (Korkushko et al., 2009; 2010; Shatilo et al., 2008).

## CLINICAL STUDY

Among discussed topics there was a predomination of papers devoted to chronic obstructive pulmonary diseases (COPD), asthma, interstitial lung fibrosis and tuberculosis. The progress in the bacteriological and radiological investigations, lung function tests and molecular diagnostic was very often discussed. The usefulness of modern lung function tests in differentiating COPD and bronchial asthma was presented by J. Kowalski (2008) and P. Gutkowski who also spoke about the identification and clinical relevance of the increased bronchial reactivity in the bronchial asthma diagnostics.

The very important lecture was presented by A. Dorofiejev from Medical University in Donetsk which was concerned with the impact of changes in performance barriers lining of the colon on the course of COPD (Donetsk 2007). The natural history of COPD was discussed by J. Kozielski (Opole). Very original was also the lecture of Prof. A. Swiencicki (Medical University in Kiev) who in perfect Polish presented his observations and thoughts on the impact of gastro esophageal reflux on the course of bronchial asthma (Katowice). Prof. J. Zielinski from the Medical University in Warsaw discussed the current rules for early detection of bronchial obstruction as a very important element of COPD diagnosis and therapy. The physiological and anatomical peculiarities of the respiratory system in children were referred by P. Gutkowski. The epidemiological situations of tuberculosis in Europe were presented by T.M. Zielonka from the Medical University in Warsaw. An interesting original report by E. Korzh from Donetsk demonstrated the epidemiological situation of tuberculosis in the Donetsk region. S. Lepishyna (Kiev) drew attention to the current state of drug-resistant tuberculosis in Ukraine. A.H. Hryshchuk from Ternopil University had presented his experience about spontaneous pneumothorax in the tuberculosis clinic. Prof. Z. Zwolska (Institute of Tuberculosis in Warsaw) demonstrated the rules of modern microbiological diagnosis of tuberculosis bacilli. In her original talks, Dr. Z. Zwolska discussed the situation caused by Mycobacterium tuberculosis Beijing in Europe.

Interesting paper about thyroid function in community-acquired pneumonia (CAP) patients was presented by Dr. Oxana Omelyanenko and Prof. Alexandr Makarevich from Medical University in Minsk (Belarus).

Colleagues from the Department of Pulmonary Diseases in Grodno (H. Alexo, L. Pigalkowa, O. Zhernosek) in a number of reports focused on various aspects of lung tuberculosis in students, including the treatment of patients with tuberculosis and abusing alcohol.

## YOUNG SCIENTISTS' SESSIONS

The Scientific Circle of students «Alveolus» at the Department of Pulmonology, Warsaw Medical University, led by Prof. J. Domagala-

Kulawik presented three reports: (1) Smoking among students.

WUM - A. Leskov, K. Orska, A. Mąka; (2) Newly detected COPD in patients with severe asthma - Śleszycka J. et al; (3) Nicotine addiction is a disease - K. Królikowski, E. Jopowicz. Since 2007 at all conferences the special young scientist sessions were organized. The student of Medical University in Donetsk A.V. Tereshkova presented preliminary observations on the use of "Coraxan" in patients with COPD and coexisting coronary artery disease, and at the same time the student O. Hryshchuk from University in Ternopil summarized the results of the treatment of liver disease in patients with pulmonary tuberculosis.

## HOSPITAL PRACTICE FOR YOUNG PHYSICIANS AND STUDENTS IN POLAND AND UKRAINE

The arrangement of a two week professional visits for young physicians from Ukraine and Belarus to leading pulmonary centers in Poland demonstrates the important activity of our group. The internships in Warsaw for doctors from Kiev (2 persons), Donetsk (2), Kharkiv (2), Ternopil (2), Chernivtsi (2), Grodno (5), Minsk (3) were organized with the support of the Board of Warsaw-Otwock Branch PTChP. This assistance included the organization of the stay and financial support (hotel, meals, public transport ticket). Outside Warsaw, Wroclaw Center was also very actively involved in the process of organizing of internships for young physicians from Ukraine and Belarus. Moreover the Department of Pulmonary Diseases in Zabrze organized a visit for two physicians from Donetsk.

## JOINT SCIENTIFIC PROGRAMS

Scientific contacts between Poland, Belarus and Ukraine resulted in joint research programs. These included the study of asthma prevalence in Poland, Ukraine and Belarus (coordinator Professor J. Zejda, Medical University of Silesia in Katowice), alpha-1- antytrypsine deficiency in patients with chronic bronchial obstruction (Coordinator Prof. J. Chorostowska-Wynimko, Institute of Tuberculosis and Lung Diseases in Warsaw). The program «Children of Chernobyl» in cooperation with pediatricians from Grodno Medical University, coordinated by Dr. P. Gutkowski, was focused on long-term effects of Chernobyl disaster on the respiratory system in children and young people living in areas of high contamination with radioactive isotopes.

## FINAL NOTES

In conclusion, it must be underlined that scientific cooperation between the clinics and medical universities in Poland, Belarus and Ukraine should be considered as the fruitful and significant activity, integrating students and physicians of our countries. We are still convinced of the need to continue the collaboration. Our assumption is that patient suffering from asthma, chronic bronchitis, pulmonary tuberculosis and other diseases is identical regardless the native language or place of residence.

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## ДЕСЯТИРІЧЧЯ СПІВРОБІТНИЦТВА МІЖ ПОЛЬСЬКИМИ, УКРАЇНСЬКИМИ ТА БІЛОРУСЬКИМИ ФІЗІОЛОГАМИ І ПУЛЬМОНОЛОГАМИ (2004 – 2013)

Ідея заснування Польсько-української робочої групи з патофізіології дихання виникла в жовтні 2003 року під час візиту професора Інституту туберкульозу та легеневих захворювань у Варшаві Януша Ковальського до Інституту фізіології ім. О.О.Богомольця у Києві. Головною рушійною силою цієї ініціативи було велике бажання

польських та українських вчених і лікарів вільно обмінюватись досвідом з фундаментальних досліджень і клінічної практики задля кращої допомоги пацієнтам, що страждають від одних і тих самих недугів по обидва боки польсько-українського кордону. Наступного року під час 28-го конгресу Польського респіраторного товариства в Лодзі (Польща) ця ідея була втілена у життя. Пізніше до цього руху приєднались фахівці з Білорусії. Впродовж десятиріччя були проведені щорічні наукові конференції в Києві (2005), Ополе (2006), Донецьку (2007), Катовіцах (2008), Тернополі (2009), Миколайках (2010), Чернівцях (2011) та Віслі (2012). Крім наукового обміну новітніми досягненнями з патофізіології дихання та пульмонології на конференціях і виконання спільних науково-практичних проектів, було організовано обмін молодими спеціалістами, що стажувалися на робочих місцях в провідних клініках Польщі та України. Перекладена на російську мову фундаментальна польська монографія «Функція легенів при легеневих захворюваннях» (ред. J.Kowalski, A. Koziorowski, L.Radwan, переклад Є.Е. Колеснікової), що коштом Польського респіраторного товариства була видана та розповсюджена серед провідних медичних університетів та бібліотек України та Білорусії. Започатковано багато інших ініціатив по обміну досвідом між провідними вченими та лікарями країн-сусідів, що має велике значення для плідної роботи фахівців центральної та східної Європи.

Ключові слова: патофізіологія дихання, пульмонологія, обмін досвідом.

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## ДЕКАДА СОТРУДНИЧЕСТВА МЕЖДУ ПОЛЬСКИМИ, УКРАИНСКИМИ И БЕЛОРУССКИМИ ФИЗИОЛОГАМИ И ПУЛЬМОНОЛОГАМИ (2004 – 2013)

Идея создания Польско-украинской рабочей группы по патофизиологии дыхания возникла в октябре 2003 года во время визита профессора Института туберкулеза и легочных заболеваний в Варшаве Януша Ковальского в Институт физиологии им. А.А.Богомольца в Киеве. Главной движущей силой этой инициативы было желание польских и украинских ученых и врачей свободно обмениваться опытом в области фундаментальных исследований и клинической практики для лучшей помощи пациентам, страдающим от одних и тех же недугов по обе стороны польско-украинской границы. В следующем году во время 28-го конгресса Польского респираторного общества в Лодзе (Польша) эта идея была воплощена в жизнь. Позже к этому движению присоединились специалисты из Белоруссии. На протяжении десятилетия были проведены ежегодные научные конференции в Киеве (2005), Ополе (2006), Донецке (2007), Катовицах (2008), Тернополе (2009), Миколайках (2010), Черновцах (2011) и Висле (2012). Кроме научного обмена новейшими достижениями по патофизиологии дыхания и пульмонологии на конференциях и выполнения совместных научно-практических проектов, был организован обмен молодыми специалистами, которые стажировались на рабочих местах в ведущих клиниках Польши и Украины. Переведена на русский язык фундаментальная польская монография «Функция легких при легочных заболеваниях» (ред. J.Kowalski, A. Koziorowski, L.Radwan, перевод Е.Э. Колесниковой). Монография была издана на средства Польского респираторного общества и распространена среди ведущих медицинских университетов и библиотек Украины и Белоруссии. Воплощены в жизнь многие другие инициативы по обмену опытом между ведущими учеными и врачами стран-соседей, что имеет большое значение для плодотворной работы специалистов центральной и восточной Европы.

Ключевые слова: патофизиология дыхания, пульмонология, обмен опытом

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