THE CROATIAN ACADEMY OF SCIENCES AND ARTS The Department of Biomedical Sciences in Rijeka

> UNIVERSITY OF RIJEKA Council of Professors Emeriti The University Club of retired professors

> > **Symposium**

AGEING OF THE POPULATION: CHALLENGES AND OPPORTUNITIES FOR SOCIETY AND UNIVERSITY





Rijeka, December 2, 2021

Organizers

THE CROATIAN ACADEMY OF SCIENCES AND ARTS The Department of Biomedical Sciences in Rijeka

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Program Committee

Co-chairmen: Snježana Prijić Samaržija, Daniel Rukavina Nenad Bogdanović, Pavao Komadina, Sanja Ažić Smojver

Registration: online via registration form

Event address for ZOOM attendees will be sent to all registered participants by e-mail

Free admission. Participants who want a certificate from the Croatian Medical Chamber need to register.

Information

Željana Mikovčić, Department of Biomedical Sciences in Rijeka Radmile Matejčić 2, Rijeka; Phone: 051 584 826, e-mail: <u>rimed@hazu.hr</u>

Andrea Mešanović, Rectorate, The University of Rijeka, Trg braće Mažuranića 10, Rijeka; Phone: 051 406 570; e-mail: <u>andrea.mesanovic@uniri.hr</u>

P R O G R A M OPENING (10,00 - 10,30)

Introduction

Snježana Prijić Samaržija, PhD, Professor, Rector, University of Rijeka; President of the Young European Research Universities Network (YERUN)

Daniel Rukavina, M.D., PhD, Professor Emeritus, Head of the Department of Biomedical Sciences in Rijeka, Croatian Academy of Sciences and Arts

Welcome adress

Goran Hauser, M.D., PhD, Associate Professor, Dean, Faculty of Medicine, University of Rijeka, Rijeka, Croatia

Alen Ružić, M.D., PhD, Professor, Head, Clinical Hospital Center Rijeka, Rijeka, Croatia

Pavao Komadina, PhD, Professor Emeritus, Head, Council of Professors Emeriti, University of Rijeka, Rijeka, Croatia

Snježana Prijić Samaržija, PhD, Professor, Rector, University of Rijeka; President of the Young European Research Universities Network (YERUN)

10,30 – 12,15 h

I. PLENARY INTRODUCTORY LECTURES

Chairmen: Snježana Prijić Samaržija and Daniel Rukavina

Dubravka Šuica, European Commission, Vice-President for Democracy and Demography **Message to participants**

Snježana Prijić Samaržija, PhD, Professor, Rector, University of Rijeka; President, Young European Research Universities Network (YERUN) **Demographic challenges from the perspective of universities**

Athanase Benetos, M.D., PhD, Professor, University Hospital of Nancy, Nancy, France; President, European geriatric medicine society **Slowing down the ageing process: opportunities and limitations**

Natale Gaspare De Santo, Professor Emeritus, University of Naples, Naples, Italy: President, European Association of Professors Emeriti The creativity of aging artists and scientists

Break for refreshment: 12,15 - 12,45

12,45 – 14,15 h

II. SOCIAL ASPECTS

Chairmen: Elvio Baccarini and Sanja Ažić Smojver

Sanja Smojver-Ažić, PhD, Associate Professor, Faculty of Humanities and Social Sciences, University of Rijeka, Rijeka, Croatia Promoting active aging through lifelong learning: The role of the university of the third age

Jože Gričar, PhD, Professor Emeritus, University of Maribor, Maribor, Slovenia **E-** Seniors Engaging in Active Aging

Massimo Reichlin, Professor, Vita-Salute San Raffaele University, Milan, Italy The use of quality-adjusted life year (OALY) in healthcare rationing and its ageistic implications

Elvio Baccarini, PhD, Professor, Faculty of Humanities and Social Sciences, The University of Rijeka, Rijeka, Croatia Ageing and Just Capabilities

Break for refreshment: 14,15 – 14,30

14,30 – 15,45 h

III. MEDICAL ASPECTS

Chairmen: Vladimira Vuletić and Nenad Bogdanović

Nenad Bogdanović, M.D., PhD, Professor, Department for Neurobiology, Caring Science and Society, Division of Clinical Geriatrics, Karolinska Institute, Stockholm, Sweden

Medico-social care of eldery population - democracy at its best

Vladimira Vuletić, M.D., PhD, Assistant Professor, Medical Faculty, University of Rijeka, Clinical Hospital Center Rijeka, Rijeka, Croatia Ageing and Neurodegeneration

Dušanka Mičetić Turk, MD, PhD, Professor Emeritus, University of Maribor, Maribor, Slovenia

Changes of intestinal microbioma during ageing

Vladimir Mićović, M.D., PhD., Professor, Head of Teaching Institute for Public Health of the Primorje-Gorski Kotar County, Rijeka, Croatia Intergenerational solidarities in heath care amidst pandemic COVID-19 crisis

15,45 – 16,30 h

IV. ROUND TABLE DISCUSSION

Moderators Snježana Prijić Samaržija, Athanase Benetos, Natale G. De Santo

ABSTRACTS

Demographic challenges from the perspective of universities

Snježana Prijić Samaržija

University of Rijeka, Rijeka, Croatia

Demographic challenges have become one of the principal global issues in the 21st century and one of the most urgent themes for sustainable development. Declining fertility and mortality rates across the globe have significant implications for all aspects of society, including universities.

Shifting age demographics generate various implications for higher education and provoke changes toward age-sensitive policies and practices. For instance, educational programs for age-diverse learners can benefit institutions by helping offset the reduced enrollment of younger learners. More older learners are now looking into higher education to meet their professional needs, and many older adults plan to stay engaged in some form of learning for personal development. Aging populations generate new educational needs and career opportunities for trained experts, practitioners, and professionals in health and longevity economics, incorporating tourism, technology, fitness, travel, entertainment, home design, and other spheres.

Besides institutional challenges and opportunities, universities' public mission requires a meaningful shift toward age-friendly and inclusive programs and practices to prevent ageism, the established age-segregated structure at universities, and negative attitudes and unconscious biases that impact individuals of all ages. There are many methods of how higher education can shape teaching and learning environments that disrupt ageist beliefs and biases in constructive ways and promote intergenerational solidarity. Solid intergenerational relationships are the issue of well-being, health, and leading a productive life and an essential component of sustainable and liveable societies. The demographic challenges for universities are acknowledged in the initiative for 'Age-friendly universities' (AFU), the network that explores and promotes innovative educational practices of teaching, research, and community engagement which are of social, personal, and economic benefit for learners of all ages and all higher education institutions.

The creativity of aging artists and scientists

Natale Gaspare De Santo^{1,2}

¹University of Campania Luigi Vanvitell, Naples, Italy ²The European association of Professors Emeriti, Athens, Greece

Derek J. de Solla Price—The founder of bibliometry and scientometry and impact factor—in *Little Science Big Science* (1963) wrote "We can say that 80 to 90% of all the scientists that ever lived are alive now. Alternatively any retiring scientist looking back at the end of his career upon a normal life span, will find that 80 to 90% of the scientific work has taken place before his very eyes".

The German poet, essayist and physician Gottfried Benn-nominated for a Nobel Prize five times - wrote in *Altern als Problem für Künstlers* that in the last four hundred years 150-200 geniuses determined the cultural progress of Western Europe (1). Half of them were old-olds. The board members of the EAPE Bulletin have had the privilege of publishing an original article on "complexity" coauthored by Edgar Morin, one year before his hundredth birthday (2). In addition, Galileo Galilei at 75 years of age published, in Leyden 1638, a few years before death, "*Discorsi e Dimostrazioni matematiche intorno a due nuovescienze*".

Recently, the late Sir Michael Athiyah-one of the greatest experts in geometry and recipient of the Field Medal and the Abel Prize- and former President of the Royal Society - at 88 years of age, demonstrated the validity of the hypothesis of Walter Feit and John G. Thompson on the theory of groups (about the symmetry in geometry and algebra). Furthermore, Roberta Sinatra and her co-authors have published in *Science* in 2016, a study on "*Quantifying the evolution of individual scientific impact*" about the career of scientists. They showed that many scientists received the Nobel Prize for the part of their research that had been performed when they were retired and out of the academies. Thus, there is no specific age for producing a masterpiece, there is a random distribution, and the most important discovery may be the first as well as the last in the career of a scientist. Another typical example was John Fenn who received the nomination for chemistry in 2002, for research done many years after retirement (3).

Indeed, many artists including David Bailey, Montaigne, Katsushika Hokusai, Henry Moore, Oscar Niemeyer have produced masterpieces in their late years. Titian at age 99 painted *Danae* that can be seen at Museo di Capodimonte in Naples. We know that while working on this masterpiece he asked his collaborators to bring him all past works still in his possession and his comment was "that until that very day he had been just a weak canvas-knacker, a dauber". Rembrandt painted many self-portraits in the years 1629-1663 and their quality and power did not decay with aging. In addition, at Rijks Museum in Amsterdam, one can admire his Isaac and Rebecca (*The Jewish Bride*) that has been defined by Roderick Conway "as one of the most exciting studies on aging and on a life lived with fullness" Leonardo in his late days was nominated by Francis I of France "first painter, architect and engineer of France". During those

years he completed *Mona Lisa* and refused to sell it to the King of France, since he wanted to enjoy it until his own death, being aware of its outstanding value. Michelangelo worked till the last days on *La Pietà Rondanini* (Milan, Castello sforzesco), Anton Gaudì worked for *La Sagrada Famiia* till his death and Ian Mirò completed *La femme. et l'oiseau* when was 90 years old.

References: (i). Benn G. *Alters als Problem für Künstlers (Aging as a problem for artists)*. J.C. Cotta'sche Buchhandlung Nachfolger GMBH, Gegr. 1659, Stuttgart, 1954. (ii). Morin E, Gembillo G. *Complexity*. Bull Eur Assoc Prof Emer 2020 ; 1(2) : 20-21.(iii) De Santo NG. *Créativité et découvertes scientifiques après 65 ans*. Bull. Acad. Natle Méd., 2017, 201, nos 7-8-9, 1335-1347, séance du 10 octobre 2017

Promoting active aging through lifelong learning: The role of the University of the Third Age

Sanja Smojver-Ažić

Faculty of Humanities and Social Sciences, University of Rijeka, Rijeka, Croatia

A larger proportion of older people in the population poses a social, economic and cultural challenge to society and public welfare systems. Stereotypes of older people as dependent and as a burden on society ignore their diversity and heterogeneity, which we must respect while meeting their different needs. To improve the quality of life in old age, today's policy framework adopts the theoretical basis of active aging, which emphasizes the process of optimizing opportunities for health, participation and security.

The concept of active ageing places importance on learning for well-being later on in life. Researches indicate that seniors who participate in different types of education experience substantial benefits on both cognitive, affective and social levels. Learning in older age can be driven by the need to respond to changes in the increasingly complex contemporary environment. The motive for engagement in lifelong learning may arise from a personal curiosity for new insights or exploring goals that younger adults are too busy to pursue. Lifelong learning could provide older learners, even the most vulnerable, with a compensatory strategy to strengthen their reserve capacities and achieve their potentials, allowing them to be autonomous and fulfilled.

Among the various forms of lifelong learning, one of the widely spread models is the University of the Third Age. The first university of this kind was founded in 1972 in Toulouse, France, and today there are hundreds of similar institutions around the world with different ways of working. Its target audience is people of the third age. This refers mainly to a phase of life associated with withdrawing from active professional life and greater freedom in meeting personal needs due to the reduction of some roles and responsibilities.

According to the French model, the term *University* implies a link with a higher education institution. This link between University of the Third Age and higher education institution is the model we have implemented at the University of Rijeka.

Our experience in the field of this type of informal education, gained over the last decade, confirms the benefits of the University of the Third Age when administered by an institution such as the University. Mainly, because professors from different disciplines teach and lecture on contemporary knowledge using the classrooms of the faculty and the IT facilities, which ensures high-quality courses and leads to the great satisfaction of the participants.

eSeniors Engaging in Active Aging

Jože Gričar^{1,2} ¹University of Maribor ²Professors Emeriti Network

Presented will be generalized insights from the following networks:

- Seniors eLearning and eEducation: the cooperation of patronage services, educational institutions and libraries, <u>http://eregion.eu/seniors-elearning-eeducation/</u>.
- o Professors Emeriti Network, <u>http://eregion.eu/slovenia-professors-emeriti/</u>.
- Interdisciplinary eCollaboration Think Tank, <u>http://eregion.eu/interdiscipli-nary-ecollaboration-think-tank-network/</u>.
- Seniors 55+ eServices Guide, Edition 2020. elnclusion in Active Aging. For the adult children 55+ taking care of parents 75+, <u>http://eregion.eu/seniors-55-eservices-guide-edition-2020/</u>.

A network is a modern organizational form based on eTechnologies offering numerous advantages: activating individuals, accelerating collaboration, abolishing borders of all types, stimulating innovation, opening-up interdisciplinary cooperation in problem solving, enabling linking with similar networks. The networks do not require new investment since the basic Internet technology is in place and available to be used. They operate practically at no cost. They are a component of digitization and digital transformation. Their purpose is to promote the use of the Internet to support the members' activities. The networks are very relevant to the retired professors who have interest in active aging and wish to do something good for themselves, for their families, and for the society.

The networks do require, however, openness to eCollaboration, willingness to openly provide ideas and share best practices, readiness to consider others' opinion, expectation to exchange messages in a less hierarchy environment. The networks need time to be established and become operational. They are based upon the cognition that by telling someone everything we know we still have everything left.

A network may include several types of members. The representatives of the organizations sharing interest in similar topic. The individuals wishing to age actively. An example of such a network is the Network of *eSeniors* 55+ *Networks*, <u>http://eregion.eu/</u> <u>eseniors-55-rose-valley-ljubljana-network/</u>. The network is in the core of active aging. It is bringing together the individuals - family members, friends, neighbours.

The symposium participants are invited to join one of the indicated networks or set up their own network based on Internet - eTechnologies. Cross-border eCollaboration in the eRegion of the neighbouring countries is recommended.

The use of QALY in healthcare rationing and its ageistic implications

Massimo Reichlin

Faculty of Philosophy, San Raffaele University, Milan, Italy

QALYs have often been proposed as a method to ration scarce resources in healthcare. Reasons in favor of their use refer to the reasonable goal of maximizing the expected beneficial outputs of therapeutic measures. Among the troublesome effects of QALYs is their tendency to discriminate against the elderly. The purported ageistic implications of QALY will be discussed and an attempt will be made to define their compatibility with egalitarian principles of distribution.

Ageing and Just Capabilities

Elvio Baccarini

Faculty of Humanities and Social Sciences, University of Rijeka, Rijeka, Croatia

The capability approach offers a specific criterion for assessing and realizing justice in society. This criterion of justice is different from simple metrics, like, for example, the metric constituted by financial resources, or comfortable life. According to this approach, justice requires ensuring, or sustaining, to each person capabilities, i.e. effective capacities for realizing valuable achievements. Such effective capacities include internal capabilities, like, for example, the physical or mental abilities of a person, and external capabilities, like, for example, the social or environmental conditions for functioning.

This approach to justice puts a specific kind of demands to society, related to the question of ageing, as well as to other questions that regard justice in society. Provision of mere financial well-being, or comfortable conditions of life is not sufficient, or, better to say, do not represent the appropriate metric of justice, in relation to questions of ageing. It is demanded to provide, for example, support of creative activities, social inclusion, satisfaction of the possibility to enjoy in art, active participation in society, etc. As regards possible contributions of universities, this includes, for example, organization of activities like the University of the Third Age, directed to the general population, but, also, extended forms of engagement in teaching, or research activities of former members of the employed academic population.

Medico-social care of eldery population - democracy at its best

Nenad Bogdanovic^{1,2}

¹Karolinska University Hospital, Stockholm, Sweden ²Karolinska Institute, Stockholm, Sweden

Aging is the normal process of time-related physical and mental changes which begins with birth and continues until death. The public's perception of older adults implicates the pessimistic view of being old. Unfortunately, a widespread ageism is dominant view against elderly in the society today. Ageism generates unnecessary fear, waste, illness, and misery as Palmer has observed almost 16 years ago. The elderly is seen as less valuable due to the fact that with the aging process there is a possibility that one may experience some form of health complications or chronic disease, as a result of the physical changes taking place in the body. Thus, older people are often assumed to be frail or dependent. Public health professionals and society as a whole need to address these ageists attitudes which use to lead to discrimination, and to give maximal opportunities to older people to experience healthy aging. Health is a fundamental human right indispensable for the exercise of other human rights according UNHR. Every elderly person is entitled to the enjoyment of the highest attainable standard of health conducive to living a life in dignity. But accessibility and affordability of health care is significantly frailer in the low and middle-income countries where social and health

system remains weak. If a quality health system should be developed, it has to consider age-friendly services and comprehensive geriatric approach taking into account the diversity of older people regarding diverse health risks and medical circumstances. The good quality health system is resting on the adequate skilled, competent, and enthusiastic health workers with the knowledge in geriatric medicine. Geriatric medicine concerns not only physical, but also mental, emotional, social and environmental needs in the old age as well as underlines preservation of functional independence even in the presence of multiple chronic diseases. Geriatric medicine should be able to recognize the unique features of disease presentation in older people and to treat various comorbidities. Some of the typical giants in geriatric medicine that should be assessed and managed are frailty, sarcopenia, anorexia of aging, and cognitive impairment. These conditions are the forerunners of falls, hip fractures, depression, and delirium. Expertise in geriatric medicine should not be exclusive skill of geriatrician but of primary care or family doctors who should be able to manage those giants. The geriatric health care program should be the priority in each country where hospitals should offer an acute geriatric ward, an outpatient clinic, a geriatric day hospital and internal and external liaison functions. The key to deliver good health services for older people is a multidisciplinary partnership across the whole health and social care framework in a region. For the sake of growth and prosperity the geriatric medicine, the high-quality university-driven research on ageing and education in geriatric fields is exceptionally important. Geriatric care should provide longitudinal, proactive, and coordinated care to complex patients. It should create a positive image of the elderly patient by stimulating the knowledge about this patient population through graduate, postgraduate, whole-life education curriculums, and the development of research. Every society should establish a country-specific Geriatric Health Care Program as a proof that geriatric patients and their problems have been taken seriously by the government what is an essential element of democracy.

Aging and Neurodegenerative diseases

Vladimira Vuletić^{1,2}

¹Clinical Hospital Center Rijeka, Rijeka, Croatia ²Medical faculty University of Rijeka, Rijeka, Croatia

Term "Ageing" is usually used to a series of time-dependent anatomical and physical changes that reduce physiological reserve and functional capacity. Although human life expectancy has nearly doubled over the last century, this trend has been accompanied by an alarming increase in the prevalence of age-related neurodegenerative diseases including Alzheimer's disease and Parkinson's disease. Beside that those two most common neurodegenerative diseases will be new pandemics, the main problems are: their irreversibility, lack of effective treatment, and accompanied social and economic burdens. In seeking to ameliorate ageing and age-related neurodegenerative diseases are a major public health crisis of our time. A central objective of neuroscience is to make new discoveries that advance understanding of these disorders and stimulate development of new therapeutic approaches. Using a highly interdisciplinary translational approach is the best way for achieving new insights into pathogenic

mechanisms, biomarkers, neuroprotective strategies, and drug candidates relevant to age-related neurodegenerative diseases. Ageing is a major risk factor of neurodegenerative diseases. Ageing not only makes patients more prone to neurodegenerative diseases, but also impairs their abilities of self-repair. Many age-related neurodegenerative diseases are characterized by accumulation of disease-specific misfolded proteins in the central nervous system. These include beta -amyloid peptides and tau/phosphorylated tau proteins in AD, alfa-synuclein in PD, superoxide dismutase in amyotrophic lateral sclerosis and mutant huntingtin in Huntington's diseases. A lot of molecular mechanisms are associated with ageing, like accumulated oxidative stress, mitochondrial dysfunction, progressive telomere erosion, impaired DNA repair and decreased tissue regeneration. The most studies pointed out nine hallmarks of ageing: genomic instability, telomere attrition, epigenetic alterations, loss of proteostasis, mitochondrial dysfunction, cellular senescence, deregulated nutrient sensing, stem cell exhaustion, and altered intercellular communication. An influence of genetic and environmental factors is also important. Full understanding the pathophysiology of ageing and neurodegenerative diseases will provide insightful knowledge for future treatment. In addition to neurotransmitter-based therapies and rehabilitation, treatments focus on neuroprotection and neurorestoration will be also helpful.

In the future, more studies on neurodegenerative diseases are needed and should focus on the nine hallmarks of ageing, most of which show associations with neurodegenerative diseases. Due to the complex nature of neurodegenerative diseases, more holistic approaches or combined treatment strategies would be necessary and more likely to succeed. The association between neurodegenerative diseases and ageing hallmarks could bring new hope for the treatment of such diseases. Multi-targeted pharmaceutical evidence-based approaches might need to be combined with non-pharmacological approaches and/or lifestyle modification to slow the pandemics of neurodegenerative disease in elderly individuals. Our society must be prepared for these two pandemics and for that we need proper planning, and targeted communication between the medical profession, neuroscientists (clinical and basic) and social health care system.

In this overview, outlines aspects of our current understanding of the molecular and cellular basis of human ageing, with a focus on neurodegenerative disease will be provide.

Changes of intestinal microbiota during aging

Dušanka Mičetić-Turk

Faculty of Medicine, University of Maribor, Slovenia

The intestinal microbiota plays an important role in the devolopment, maturation, function and regulation of the host immune system and consequently on human health from birth to old age. The intestinal microbiota is a complex microbial ecosystem which contains up to 10¹⁴ different micro-organisms comprising at least thousand different bacterial species. The most represented microorganisms within the human microbiota are from two bacterial phyla, Firmicutes and Bacteriodetes, but also Archea, Eukaryotes, Fungi and many viruses and bacteriophages can be identified. Microbial colonization of the gut begins before birth, and increases after delivery when the neonate comes in contact with mother vaginal, fecal and skin microbiota. Later, the composition is mostly influenced by type of nutrition and other environmental factors,

becoming stabile between 18 to 36 months and similar to the adult microbiota. The typical adult intestinal microbiota is primarily comprised of approximately six or seven different bacterial phyla, of which Bacteroidetes and Firmicutes dominate. All these microbes have a strong influence on health, not only of the gut but the body as whole. Aging is defined as a genetically-determined and environmental-modulated process that leads to a generalized decline of physiological functions. As we age, the gut microbiota and the immune system undergo significant changes in composition and function. These age-related changes of microbiota depend on individual characteristics related to race and ethnicity, gender, lifestyle, nutrition, physical activity and use of medication. Most of the members of the genus Bacteroidetes and Firmicutes remain dominant, although Firmicutes are predominant in adults, and Bacteroidetes in the elderly. What mostly characterizes the gut microbiota composition in elderly is a decreased diversity, a reduced abundance of species producing butyrate (lower level of Bifidobacteria) and the presence of potential pathogens (increased levels of Clostridia and Enterobacteria).

Many recent studies suggest that targeted age related dysbiosis, by using probiotics, can improve health and lifespan in part through reducing systemic low-grade inflammation and imunosenescence, two hallmarks of the aging process. The term »immunosenescence« refers to functional impairments, faulty or abberant immune response observed in elderly, while the second hallmark, »inflammaging« means a non-resolving, chronic inflammatory state which represent a significant risk factor for morbidity and mortality. Bifidobacteria and Lactobacilli have been widely considered health promoting constituents of the microbiota. Some strains of these genera were used as probiotics and proved to have many health benefits for elderly, such as modulation of microbiota, control of opportunistic bacteria, improvement of bowel movements, positive effects on mental conditions, stimulation of immune system and many others. The use of commercial probiotics (one strain or a coctail) alone or in combination with prebiotics (synbiotics) or secreted solubile metabolites (postbiotics) is the most used strategy to obtain positively impact on gut microbiota by increasing the levels of bifidobacteria or modifying level of lactobacilli.