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## MEDICAL RESEARCH IN SERBIA: DAYS OF FUTURE PAST

**Abstract:** In the light of the COVID-19 pandemics, we tried to summarize concepts and ideas which would increase the capacity for medical scientific research in Serbia, and probably other Western Balkan countries to cope with the present situation where (i) more knowledge about medicine at the cellular and molecular level is urgently needed and (ii) medical students, PhD students, and young medical doctors are at risk for their professional future, if isolation from European medical science community would continue. We suggest several ways to improve medical science of Serbia, and review funding available for such projects. Our paper presents an open call for dialogue between stakeholders and beneficiaries of such projects and should by no means be viewed as a final proposal, but rather as an invitation to participate in designing a better future.

**Keywords:** Serbia, Germany, Medical research, COVID-19, Future

In one of the most intense sequels of the X-men franchise “Days of future past”, in order to change a grim future for the human race, X-men send Wolverine to the past, hoping that he may change the key events that led humanity to the wrong path.

Much like this, mankind faces a great challenge today, and the choice of the future development is entirely up to us. This letter emphasizes the importance of investments in basic medical research in order to face future health related crises and challenges in Serbia. The time to act is now, before it gets too late and the only remaining option comes down to time-travel.

There is no doubt, COVID-19 pandemic is horrible. To use the phrase from National Library of Medicine, it is an emerging, rapidly evolving situation. So many people die, others are severely ill for months, as the virus affects not only the lung but also many other organs. In addition, our social life is suffering, economy is down, the financial crisis is apparent, and many people are desperate. Are we helpless? Fortunately, not! As stated, e.g., in a recent editorial [1] we should celebrate our immunologists, especially vaccine experts, epidemiologists, clinicians, and public health scholars, as our optimistic future is the result of decades of research in many fields.

What are, logically, the consequences for 2021? We propose that an increase in European funding for medical research should be used to maximize the efficiency of response to global and local health related challenges in the future. We therefore propose several measures, which could be financed from European Union funds, and could substantially improve medical research in Serbia and other Western Balkan countries.

Founding of a Campus Research Center at medical faculties in larger university centers, such as Belgrade, Novi Sad, Kragujevac. Linking the labs, best in one building, collecting and organizing multidisciplinary research in *anatomy, biochemistry, biophysics, immunology, histology, pathology, stem cell research, neurosciences, molecular oncology, molecular human genetics, and molecular microbiology*, sharing instruments, consumables, knowledge, applications, industry connections, with one address and one responsible speaker towards ministry, industry, press.

Founding of one larger financial pool for graduate programs, specifically for master and PhD students and young postdocs for interdisciplinary graduate programs (such as Graduate Schools in Germany, Austria, etc.) for master and PhD students and young post-docs, financing scholarships, and young postdoc salaries in limited and focused research topics. Funding is meant for best students and young researchers to become competitive in Europe, limited e.g. for the first 5 years, and should enable them to apply for further funding within EU framework programs, or with single EU partner countries (e.g. Germany), in other foundations. Selection of participating researchers would be done after a public call by a Serbian/German committee.

Financing basic bench equipment for the young scientists + special equipment I - used together by selected groups (fridges, incubators, sterile benches) + special equipment II - used together by all groups (e.g. RT-PCR, laser microscope, HPLC instruments).

Founding of twinning programs with advanced European Research Institutions: master and PhD students and young researchers, who are working in two labs (e.g. 7 + 5 months/year), they are obliged to stay in Serbia for some time. A special program should also relate to the Serbian science diaspora. Aim: rapid transfer of knowledge, skills and mind to Serbia. "Brain drain" hopefully would thus revert to "brain gain".

Proven by our more than 20 years long cooperation at the Medical Faculty/University of Hamburg, we suggest this from the heart, and in friendship with the whole Belgrade University staff with only one aim: promoting the future of our young colleagues in Serbia. Collecting ideas in our institutions, in clinics and basic science institutes, in medical faculties, in Ministry of Science & Ministry of Health, what should be implemented now and what are the priorities. Organize a local/internal committee under the umbrella of the Clinical Centre of Serbia in Belgrade for collection of ideas and realization in the near future.

It is important to emphasize strong international cooperation, as each institution alone is lost in answering the modern-day challenges. Foundation and financing of several international Graduate Schools (with various topics, e.g. biochemistry, neurobiology, immunology, oncology, genetics, public health). Organization of regional summer schools with invited international experts, international conferences and policy meetings. Local scientific societies should actively participate, bringing experts from all fields together to give sound advice to the government and to promote a new culture of discussion.

Financing these goals is essential. Fortunately, European Union and several European countries have already promised substantial financial contributions:

Zagreb Declaration, 2020, Billions of euros for Southeast European countries.  
Key words: infrastructure, health, young people;

German Academic Exchange Service (DAAD);

European medical and science societies and other organizations.

It should be emphasized that, considering the condition of its health care system, Serbian response to the current pandemics was formidable, specifically in the view of the very low mortality rate (around 1%) and quick start of vaccination with vaccines from several sources [2]. There were, however, weak spots, for example unusually high mortality among doctors and other medical personnel [3]. It is, therefore, important and necessary to promote international cooperation in both research and clinical protocols, as the exchange of knowledge and skills is the only way to survive and thrive as medical staff, as peoples, and as species. Furthermore, it is important that such initiatives are carried out in a bottom-up fashion, with participation of all local stakeholders and beneficiaries, who are the best to estimate actual needs of each given university. In the present situation we, as medical scientists, have a special responsibility for the welfare of our country, for the future of research, for our young colleagues and finally for our patients.

**- Let us all do our job -**

### Rezime

U kontekstu pandemije COVID-19, pokušali smo da rezimiramo koncepte i ideje koje bi povećale kapacitet za medicinska naučna istraživanja u Srbiji, a verovatno i drugim zemljama Zapadnog Balkana da se nose sa sadašnjom situacijom kada (i) hitno potrebno više znanja o medicini na celularnom i molekularnom nivou i (ii) studenti medicine, doktoranti i mladi lekari su u opasnosti za svoju profesionalnu budućnost

ukoliko budu izolovani od evropske medicinske nauke. Predlažemo nekoliko načina za poboljšanje medicinske nauke u Srbiji i pregled raspoloživih sredstava za takve projekte. Naše pismo predstavlja otvoreni poziv na dijalog između zainteresovanih strana i korisnika takvih projekata i nikako ga ne treba posmatrati kao konačni predlog, već kao poziv za učesće u dizajniranju bolje budućnosti.

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