

National background report on Health for Serbia

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1. Purpose of the national background report and summary of the consultation process

The objective of this report is to provide an overview of the health research environment in the Republic of Serbia (hereinafter: Serbia), with a SWOT analysis of the research capacities and identification of research priorities for Serbia in the period 2008-2012, based on a consultation process with experts in the field.

This report is intended to contribute to shaping of the future European Union (EU) – West Balkans (WB) research cooperation, through relevant European Commission (EC) initiatives, policies and funding programmes, in the way which meets the interests and actual needs of health stakeholders in the region.

In order to identify research priorities in the field of health and to aid in putting this report together in an impartial manner, a consultation process took place in February 2009. The questionnaires were sent to project managers of all the ongoing health research projects (105 projects) funded by the Ministry of Science and Technological Development of the Republic of Serbia. Presumably due to the limited time available, very few experts have responded in writing; thus; some interviews (with a limited number of researchers) were undertaken.

Based largely on the outcome of the consultation process, rather than identifying a set of (f)actual priorities, the text will define areas of strong research capacities and human potential within the health sector, in line with the proclaimed objective of the **WBC-INCO.NET** project, which is to identify RTD potentials and priorities for take-up in FP7 and other European research programmes and funding schemes, as well as to enhance participation of researchers from the region in European projects.

2. The Health S&T System in Serbia

2.1. The policy framework

2.1.1 The overall Health policy framework

In 2009 the Government of the Republic of Serbia adopted the *Strategy on continuous health care quality improvement and patient safety* (Official Gazette of the Republic of Serbia No. 15/09, 27 February 2009).

A new Strategy of Public Health will be adopted next week by the Government of the RS.

2.1.2 The elements of Health research policy making

The work on a new *National strategy for science and technological development* is currently underway, and is scheduled to be completed by the end of June 2009. It is expected to define national strategic priorities of Serbia's development in the S&T field, including the health sector.

While the Serbian Ministry of Science and Technological Development (MSTD) provides strong funding (currently 105 research grants) in the area of health, there are no explicit target research areas/themes as such (i.e. no areas / themes predefined by the MSTD). Rather, the approach is bottom-up: MSTD typically announces calls for proposals for research grants in the field of health, and then goes through an evaluation process of proposals submitted by institutionalized research groups based on reviews of qualified (external) reviewers to select those to be funded.

Budgetary allocation for scientific research and technological development in 2007 was about 100 million EUR which present 0.3 % of GDP.

MSTD's support for health research projects in 2007 was 3.585.226 Euros which present 3.6 % of whole budgetary allocations for S&T activities and 9.4% of the budget allocated to Basic Research program of the MSTD.

While the projections for coming years were to increase this amount by a certain percent (as occurred during the whole period 2001-2008), in view of the global economic crisis, it is not realistic to expect an increase in 2009.

2.2 Overview of Health research activities

2.2.1 Health research projects

There are presently 105 ongoing research projects in health funded through the MSTD's latest completed calls for proposals (90 in the period 2006-2010 and 15 in the period 2008-2010). These projects are coordinated by 21 different research institutions:

- School of Medicine Belgrade
- School of Medicine Kragujevac
- School of Medicine Nis
- School of Medicine Novi Sad
- School of Medicine Kosovska Mitrovica
- School of Pharmacy
- Institute for Medical Research Belgrade
- "VINČA" Institute of Nuclear Sciences
- Institute of Chemistry, Technology and Metallurgy, Belgrade
- Institute of Molecular Genetics and Genetic Engineering, Belgrade
- Institute of Virology, Vaccines and Sera TORLAK, Belgrade
- Institute of Veterinary Medicine
- Institute for Biological Research "Sinisa Stankovic"
- Institute for Multidisciplinary Research
- National Cancer Research Centre
- Faculty of Special Education and Rehabilitation Belgrade
- Faculty of Science, Nis
- Faculty of Dental Sciences
- Faculty of Veterinary Medicine
- Faculty of Sport and Physical Education
- Faculty of Biology, Belgrade

Involvement of Serbian health researchers in European research projects (FP6, FP7, etc.)

FP7 Health CP:

BECAN- Balkan Epidemiological Study on Child Abuse and Neglect, Faculty for Special Education and Rehabilitation, University of Belgrade

PsychCNVs- Copy number variations conferring risk of psychiatric disorders in children, Institute of mental health

FP6-INCO:

HISERBS- Health improvement in Serbia through reinforcement of biomedical science and technology, Institute for Medical Research, Belgrade

SERBPARZOON- Reinforcement of the Serbian Centre for Parasitic Zoonoses, Institute for Medical Research, Belgrade

FP6-Food Quality and Safety - NoEs

EUROFIR - European Food Information Resource Network, Institute of Medical Research, Belgrade

EURRECA - Harmonizing nutrient recommendations across Europe with special focus on vulnerable groups and consumer understanding, Institute of Medical Research, Belgrade

For more details concerning the involvement of Serbian research institutions in European health research projects, please refer to Annex IV.

2.2.2 Key competencies in Health research field

The 105 ongoing research projects in health funded by the MSTD cover all areas of both basic and clinical research in medicine, and range from large projects (in terms of human resources engaged and accordingly, research funding) encompassing basic (molecular, genetic etc) and translational research, to rather small projects focusing on limited (generally clinical) aspects of specific diseases.

For the full list of MSTD-funded ongoing R&D projects in the field of health, please refer to Annex II.

Collaboration on health research between research institutions and commercial enterprises is extremely limited, in terms of lacking initiative for research from health stakeholders, as well as with regard to poor transfer of research findings (results) into (operational) practice. More recently, there have been certain initiatives to bring together industry and research institutions, such as a programme coordinated by the Belgrade Chamber of Commerce, but these have yet to give concrete results.

2.2.3 Health research infrastructure

On a national level, health RTD contributions are supported first and foremost by the MSTD. Except for providing research grants for health RTD projects, the MSTD also supports and finances the KOBSON service (Consortium of Serbian libraries for joint supplies, <http://nainfo.nb.rs/Kobson/page/>) – providing research institutions with a free access to e-versions of relevant scientific journals and scientific information in general.

Main research performers in the S&T field of health in Serbia include:

- University of Belgrade School of Medicine, Belgrade
- Institute for Medical Research, Belgrade
- Institute of Molecular Genetics and Genetic Engineering, Belgrade
- National Cancer Research Center, Belgrade

For the full list of health research performers in Serbia, including their postal and web addresses, please refer to Annex II.

2.3 Key drivers of Health research

2.3.1 Main Health sector trends in Serbia

The health sector in Serbia is dominated by the national public healthcare system, which is complemented by a rising private sector. However, there are no accredited private higher education nor research institutions in the health area, resulting in non-existence of private institutions engaged in health research.

According to official statistics, in 2008 budgetary revenues to the Human health activities (Public administration, social insurance, education included) was 87.355.710.000 RSD which is 14.54 % from total budget revenues.

In 2008 the health sector employed more than 113.925 personnel.

2.3.2 Main socio-economic challenges in Serbia

This section (2.3.2) is composed from excerpts from the World Bank's *Country Brief 2008*, available from:

<http://www.worldbank.org.yu/WBSITE/EXTERNAL/COUNTRIES/ECAEXT/SERBIAEXTN/0,,contentMDK:20630647~menuPK:300911~pagePK:141137~piPK:141127~theSitePK:300904,00.html>

Serbia is a middle-income country with great potential for fast economic development, as the country is endowed with natural and mineral resources and fertile and arable agricultural land. Serbia is also well positioned for development of a transportation hub, given its strategic location at the crossroads of major road and rail routes in South-eastern Europe. Most economic activity is concentrated in services (about 65 percent of GDP), industry (24 percent), and agriculture (11 percent).

After the turmoil of the 1990s, Serbia has made significant progress with a wide ranging program of democratic and economic reforms which started in 2001. Macroeconomic stability has been restored which provided basis for fast growth of the economy, and

incomes have risen strongly. GDP per capita, estimated at \$2,100 in 2002, has reached \$5,400 in 2007. During the same time period, poverty has fallen from 14 percent of the population to about 6.6 percent (according to last year's *Living Standards Measurement Survey*).

Recent economic developments

During the 1990s, Serbia was exposed to wars and economic sanctions. The political changes since 2000 have laid the foundation for making a clean break with the past decade of economic decline. They have done so by creating the basis for economic and social reforms as well as for the increased donor support.

Strong economic progress has been achieved since 2001, particularly in expanding private sector participation in the economy. Macroeconomic stability, achieved swiftly in the first years of transition, has been broadly maintained. During the first seven years of transition the economy grew on average 5.6 percent per annum, peaking in 2004 with 9.4 percent GDP growth, one of the highest growth rates among transition economies. In 2007, growth remained strong at estimated 7.5 percent. There have also been major improvements in the business environment that saw Serbia ranked as the top reformer globally in *Doing Business 2006* report, for reforms carried out in 2004-2005. Still, further reforms to strengthen the environment for sustained private sector led growth, including continued structural reforms and privatization, will be vital to ensure that living standards continue to converge with those in Europe.

However, despite Serbia's strong growth performance, significant **challenges** remain. External weaknesses are apparent in double-digit and expanding current account deficit. Despite significant decline of the public debt, external debt remains about 60 percent of GDP as private external liabilities continue to grow quickly. Although policy action and fiscal restraint will be required to address external weaknesses, Serbia's reserves position is currently very comfortable as a result of strong private sector inflows including foreign direct investments (FDI). FDI averaged 7.2 percent of GDP over the last 5 years, resulting in Serbia being among the top countries in Europe and Central Asia with respect to attracting such investment. FDI was especially strong in 2006, as a result of several large privatization deals, including the sale of a mobile telephone operator.

At over 40 percent of GDP, public expenditures remain high. While a fiscal adjustment occurred between 2003 and 2005, with expenditures falling from almost 44 percent of GDP to just over 40 percent, those gains have been reversed with recent wage rises and spending pressures as a result of election promises in run-up to the series of parliamentary elections, and a deficit has again emerged. Fiscal loosening has also created inflationary pressures and pushed the annual average inflation rate close to 7 percent. Rising inflation in Serbia has been also the result of the global increase in oil and food prices.

Unemployment, poverty, and poor inclusion of the vulnerable remain concerns in Serbia . During the past decade, a long period of instability, international isolation, and economic

turmoil adversely affected living standards of the vast majority of the population. The country's poor economic performance over that period led to a decrease in real earnings and was accompanied by deterioration in social protection and health services. As a result, poverty rose sharply in the 1990s. Although currently around 6.6 percent of the population falls below the poverty line (according to *Living Standard Measurement Survey*), one third of the country's people are barely above the poverty line and remain in danger of slipping into poverty if any adverse economic developments occur. The unemployment rate (as per internationally comparable Labour Force Survey) is still high at 14 percent of the labour force despite the significant decline from a year ago. Unemployment is affecting young people and minority groups in particular.

Challenges ahead

- Harmonizing the fragmented political scene. Despite major improvements, the fragmented political scene hinders the development of a more stable political environment.
- Accelerating EU integration. The Stabilization and Association Agreement with the European Union has been signed, but is still not effective.
- Maintaining macroeconomic stability. Due to fiscal deficit and high current account deficit, macroeconomic stability remains vulnerable, particularly to external shocks.
- Improving governance and building effective state institutions. Building effective state institutions to improve governance and transparency, and implementing comprehensive legal and judicial reform are essential to improve government performance, increase foreign investment, and ensure sustainable growth..
- Improving the well being of the most vulnerable and building human capacity. The political sustainability of the reform effort will depend to a large extent on the government's success in shielding the vulnerable and building human capital. Improving social protection mechanisms and boosting the quality and efficiency of health services and educational system are the key challenges. Particular efforts will also be required to alleviate poverty among minority groups, rural poor, and in depressed regions formerly home to large industrial and mining industries..
- Addressing environmental problems and mitigating disaster risks. Significant environmental issues associated with the legacies from heavy mining and industrial industries will need to be addressed and managed. Also, recent floods, droughts, and fires have highlighted the need for effective regional disaster preparedness and response capabilities. These issues are also thrown into focus by the increasing need for climate change mitigation and adaptation measures.

3. Integration of Serbia in the European Research Area in the field of Health

- **Thessaloniki Agenda for the Western Balkans: Moving towards European integration**

At the European Summit in Thessalonica held on 21 June 2003, the European Union offered **European Partnership to the Western Balkans countries** as one of the key instruments of the EU pre-accession strategy for the potential EU membership candidates. The EU Council of Ministers adopted the Decision on the principles, priorities and conditions contained in the European Partnership with Serbia-Montenegro including Kosovo, in compliance with the UN Security Council Resolution 1244 of 10 June 1999.

The Partnership lists short- (12-24 months) and mid-term (3-4 years) priorities for the preparations for further integration in the EU. This mechanism shall exclusively determine relations between the EU and Serbia until the Stabilisation and Association Agreement has been signed.

One of the most important facts regarding European Partnership is that the financial assistance is conditioned by the implementation of the priorities (Annex to the document, Article 5). In other words, the document shall exclusively arrange relations between the EU and our country all the way through to the signing of in the Stabilisation and Association Agreement-it is a new framework for defining relations between the EU and the Western Balkans. Financial assistance is also conditioned by the progress achieved in meeting the Copenhagen criteria, although these are the criteria set to be met for the membership, not for the association.

On the publication of this document, Serbian Government adopted Information on European Partnership and the need to adopt the Action Plan in order to meet the priorities set in the European Partnership.

[Source: The EU Integration Office of the Government of Serbia,
<http://www.seio.sr.gov.yu/code/navigate.asp?Id=67>]

- **Signed but not yet effectively in force: the Stabilisation and Association Agreement between EU and Serbia**

On 9 September 2008, National Assembly of the Republic of Serbia ratified the Stabilisation and Association Agreement (SAA) and Interim Trade Agreement. This formally marked the end of the process initiated on 10 October 2005, when negotiations for conclusion of this agreement were started between the Republic of Serbia on one side and the European Communities and their member states on another. SAA and Interim Agreement were initiated on 7 November 2007, and they were signed on 29 April 2008. SAA will enter into force after its ratification by the EU Council of Ministers and the European Parliament and after it is ratified by all signatories i.e. Member States of the EU. The Interim Agreement will enter into force after it is ratified by the EU Council of Ministers and the European Parliament.

[\[http://www.seio.sr.gov.yu/code/navigate.asp?Id=106#744\]](http://www.seio.sr.gov.yu/code/navigate.asp?Id=106#744)

- **Memorandum of Understanding for Serbia’s participation in EU research programmes**

Serbia is an associated country to the EU’s Framework Programmes for research and technological development, making all legal entities established in Serbia eligible for funding on the same footing as legal entities from the Member States.

Memorandum of Understanding associating Republic of Serbia to FP7 were signed on 13 June, 2007. The provisions of the above association instruments are all applicable since 1 January, 2007.

[\[ftp://ftp.cordis.europa.eu/pub/fp7/docs/third_country_agreements_en.pdf\]](ftp://ftp.cordis.europa.eu/pub/fp7/docs/third_country_agreements_en.pdf)

4. SWOT analysis of the Health research capacity in Serbia

<p>Strengths</p> <ul style="list-style-type: none"> -Health recognized among national priorities. -Institutional support for RTD in health by the MSTD -Policy of R&D funding growth -Number of public institutions participating in health research -Number of well-trained highly-motivated individuals pursuing careers in the health sector -Increasing performance of researchers as measured by number of publications in SCI journals -Presence in EU research programmes. 	<p>Weaknesses</p> <ul style="list-style-type: none"> -Lack of specific (target, predefined by the MSTD) priorities (themes) -Little or no joint research between research institutions and industry -Lack of wide-based information on EU-funded research programmes -Lack of skills for preparation of proposals for EU-funded research programmes -Lack of project management skills -Insufficient support for young researchers -Uneven research infrastructure among and within research institutions
<p>Opportunities</p> <ul style="list-style-type: none"> -<i>National strategy for science and technological development</i> to be in place in the coming months <ul style="list-style-type: none"> – Health research among priorities. -Presence in EU research programmes. -EU accession process in perspective 	<p>Threats</p> <ul style="list-style-type: none"> -Economic crisis – endangered RTD funding. -Unstable economic situation -Research infrastructure - continuous need for institutional support for acquisition of latest technologies -Brain drain. Loss of health researchers to both foreign research institutions and to the private health sector

4.1 Strengths

- Health recognized among national priorities.
- Institutional support for RTD in health by the MSTD
- Policy of R&D funding growth
- Number of public institutions participating in health research
- Number of well-trained highly-motivated individuals pursuing careers in the health sector
- Increasing performance of researchers as measured by number of publications in SCI journals (steadily increasing from 2000 to 2008, by 4-fold between 2001 and 2008)
- Presence in EU research programmes

4.2 Weaknesses

- Lack of specific (target, predefined by the MSTD) priorities (themes) – no clear health research strategy; no clear focus on areas that might provide most benefits for the healthcare system, economy and society as a whole.
- Little or no joint research between research institutions and industry – insufficient communication, cooperation and transfer of research findings. Health research lacks initiative from health-related industries (pharmaceutical and food industry).
- Lack of wide-based information on EU-funded research programmes
- Lack of skills for preparation of proposals for EU-funded research programmes
- Lack of project management skills
- Insufficient support (incentives) for young researchers – lack of funding and of longer-term positions in research institutions.
- Uneven research infrastructure among different research institutions and among departments/laboratories within research institutions

4.3 Opportunities

- *National strategy for science and technological development* to be established in the coming months – health research among priorities.
- Presence in EU research programmes. Serbia is an FP7-associated country. Access to EU research funds.

- EU accession process in perspective

4.4 Threats

- Economic crisis – endangered RTD funding.
- Unstable economic situation
- Research infrastructure - institutional support for acquisition of latest (state-of-the-art) technologies needs to be continuous.
- Brain drain. Loss of health researchers to both foreign research institutions and to the private health sector, jeopardizing the prospects of health research in Serbia.

5. Health research priorities for Serbia

As stated previously, there are no policy documents at the moment which define strategic goals for the future in the R&D sector in Serbia, including health research. However, the work on a new *National strategy for science and technological development* is currently in the final stages, and is scheduled to be completed by the end of June 2009. It is expected to define national strategic priorities of Serbia's development in the S&T field, including the health sector. However, being strategic priorities, these will not translate into specific priorities / themes. In addition, the strategic priorities are being formulated with two goals in mind:

- to heighten cooperation with industry (thus, priorities on pharmacogenetics and pharmacogenomics as well as on nutrigenomics and nutrigenetics)
- to include all existing research capacities and human resources in both basic and clinical research (strategic priorities on molecular basis on monogenic, poligenic and multifactorial diseases, and on the enhancement of diagnostic and therapeutic procedures in clinical practice, respectively)

The main funding body for health research in Serbia has for decades been, and still is, the MSTD. While funding of research projects is based on regular competitive calls for project proposals (for a typical duration of 5 years), these are not thematic (i.e. no areas/themes predefined by the MSTD). Rather, the approach is bottom-up, as described in 2.1.2.

Since the main research performers in the health sector in Serbia are in the academic sector, comprised of both higher education and research organizations, research in the health area has so far been driven by the interests of the main research performers themselves. As a result, few common broader research targets, and subsequently, priorities, can be defined in such a setting (they translate to each performer's own field of interest).

Based on all of the above, rather than identifying a set of (f)actual thematic priorities, areas of strong research capacities and human resources within the health sector based on both readiness and future potential are defined.

5.1 Health research priorities on the basis of the country's readiness

Based on existing infrastructure, human resources and recent performance (as judged by the number of publications in SCI indexed journals), the top fields in the Serbian health research sector include:

- Pharmacology and Pharmacy
- Neurosciences / Clinical Neurology
- Biochemistry and Molecular Biology
- Immunology
- Oncology
- Cardiac and Cardiovascular Diseases
- Haematology

Various topics within these disciplines may be supported as priorities in terms of both existences of the necessary human and material resources and of research interest for the country.

Among these, based on success within the FP programmes, issues of prevention and diagnosis of malignant diseases, zoonotic infections, and nutrition and obesity, have been identified as themes of readiness to pursue cutting-edge research and development at the EU level.

5.2 Health Research priorities on the basis of future potential

More areas are envisaged to enhance performance in case of availability of capacity building programmes. EU programmes for enhancement of human and material resources are therefore strongly advocated by the Serbian health research sector.

Annex I. Classification of the *Health* research fields

Please refer to Annex V

Annex II. List of Health R&D institutions

List of institutions / organizations: main RESEARCH PERFORMERS in the PUBLIC sector in the S&T field of *Health*

	Name	Postal address	Web-site
1	School of Medicine Belgrade	Dr Subotića 8	www.med.bg.ac.yu
2	School of Medicine Kragujevac	Svetozara Markovića 69	www.medf.kg.ac.yu
3	School of Medicine Nis	Dr Zorana Đinđića 81	www.medfak.ni.ac.yu
4	School of Medicine Novi Sad	Hajduk Veljkova 3	www.medical.ns.ac.yu
5	Institute for Medical Research Belgrade	Dr Subotića 4, Bg, p.fah 102	http://www.imi.bg.ac.yu/
6	"VINČA" Institute of Nuclear Sciences, Belgrade	Mike Petrovića Alasa 12-14, Vinča, Bg, P. fah 522	www.vin.bg.ac.yu
7	Institute of Chemistry, Technology and Metallurgy, Belgrade	Njegoseva 12, Belgrade	www.ihtm.bg.ac.yu
8	Institute of Molecular Genetics and Genetic Engineering, Belgrade	Vojvode Stepe 444a, Belgrade	www.imgge.bg.ac.yu
9	National Cancer Research Center	Pasterova 14, Belgrade	www.ncrc.ac.yu
10	Institute for Multidisciplinary Research	Kneza Višeslava 1, Belgrade	www.imsi.rs
11	Faculty of Special Education and Rehabilitation Belgrade	Visokog Stevana 2, Belgrade	www.fasper.bg.ac.yu
12	Faculty of Science, Nis	Višegradska 33, Nis	www.pmf.ni.ac.yu/
13	Faculty of Dental Sciences	Dr Subotića 8, Belgrade	www.stomf.bg.ac.yu
14	Faculty of Veterinary Medicine	Bulevar oslobođenja 18 Belgrade	www.vet.bg.ac.yu
15	Institute of Veterinary Medicine	Vojvode Toze 14, Belgrade	
16	Faculty of sport and Physical Education	Blagoja Parovića 156, Belgrade	www.dif.bg.ac.rs
17	School of Pharmacy	Vojvode Stepe 450, Belgrade	www.pharmacy.bg.ac.rs
18	Institute of Virology, Vaccines and Sera T20ORLAK, Belgrade	Vojvode Stepe 458, Belgrade	www.torlakinstitut.com
19	Faculty of Biology, Belgrade	Studentski trg 3, Belgrade	www.bio.bg.ac.rs
20	Institute for Biological Research "Sinisa Stankovic"	Bulevar Despota Stefana 142, Belgrade	www.ibiss.bg.ac.yu
21	School of Medicine Kosovska Mitrovica	Anri Dinana bb, Kosovska Mitrovica	http://www.medf.pr.ac.yu/

Annex III. Ongoing MSTD-funded research projects in the health research field

Ref. No.	Project Title	Project Coordinator	Institution
145001	Experimental and clinical pharmacological investigations of mechanisms of drug actions and interactions in nervous and cardiovascular system	Milica Prostran	200110 School of Medicine, University of Belgrade
145002	Intracellular microorganism-induced (re)emerging infections: transmission, molecular epidemiology, host-pathogen relationship, and clinical relevance	Olgica Djurkovic-Djakovic	200015-Institute for Medical Research Belgrade
145003	Regulatory Peptides in Integrative Processes of Nervous and Endocrine Systems	Vesna Starcevic	200110 School of Medicine, University of Belgrade
145004	Research of etiology, pathogenesis, prevention and treatment of Balkan endemic nephropathy and urothelial cancer	Vladisav Stefanovic	200113- School of Medicine, Nis
145005	Pharmacological analysis of effects of substances with biological activity on isolated smooth muscles from gastrointestinal and urogenital tracts	Slobodan Jankovic	200111- School of Medicine, Kragijevac
145006	Investigation of the effects of biological response modifiers in physiological and pathological conditions	Zorica Juranic	200043- National Cancer Research Center
145007	Structure of genetic variation of microsatellite loci in Serbian population	Oliver Stojkovic	200110 School of Medicine, University of Belgrade
145008	Pharmacoeconomic researches of the new therapeutic strategies under conditions which dominate in Serbia and other transition countries	Dragan Milovanović	200111- School of Medicine, Kragijevac
145009	The role of glutathione S-transferases in carcinomas of urinary tract	Tatjana Simic	200110 School of Medicine, University of Belgrade
145010	Biochemical markers of organ damage and dysfunction	Nada Majkic-Singh	200161-School of Pharmacy, University of Belgrade

145011	Morphological, experimental and molecular biology studies of biliopancreatic system relevant to endoscopic diagnosis and therapy of chronic pancreatitis	Bojan Stimec	200110 School of Medicine, University of Belgrade
145012	Variations in the bone external morphology, density and internal architecture related to sex, age and mechanical stress in recent and archaeological populations.	Marija Djuric	200110 School of Medicine, University of Belgrade
145013	Community noise and arterial blood pressure in urban children	Goran Belojevic	200110 School of Medicine, University of Belgrade
145014	Vascular wall, risk factors and oxidative stress: from molecules to the physiological basis of prevention and therapy	Dragan Djuric	200110 School of Medicine, University of Belgrade
145015	Endothelial Dysfunction and Receptor Transduction Mechanisms: the Significance for the Action of Endogenous Vasoactive Substances and Drugs	Miroslav Radenkovic	200110 School of Medicine, University of Belgrade
145016	Homeostatic control of structural integrity and size of lymphatic organs	Novica Milicevic	200110 School of Medicine, University of Belgrade
145018	Molecular biomarkers of growth, invasiveness and metastasis of breast cancer: biological and clinical aspects	Dragica Nikolić-Vukosavljević	200043- National Cancer Research Center
145019	New molecules involved in the regulation of growth hormone secretion and energy homeostasis in humans. Molecular basis of MEN syndrome and endocrine-related tumors	Vera Popovic-Brkic	200110 School of Medicine, University of Belgrade
145020	Multi-disciplinary study of risk factors for the development of thromboses	Dragomir Marisavljevich	200110 School of Medicine, University of Belgrade
145022	Behavioral characterization of newly synthesized ligands selective for distinct subtypes of GABAA receptor benzodiazepine binding site	Miroslav Savic	200161 - School of Pharmacy

145023	Genetic epidemiology and pharmacogenomics of vascular diseases	Dragan Alavantic	200017 -"VINČA" Institute of Nuclear Sciences
145025	Neuroimaging and genetic analysis in determining of vascular component of dementia: the significance in evaluation and evolution of dementia	Nadezda Covickovic-Sternic	200110 School of Medicine, University of Belgrade
145026	Investigations of mechanisms of resistance and toxicity of anthelmintics - GABA and nicotinic agonists	Sasa Trailovic	200143 Faculty of Veterinary Medicine, University of Belgrade
145027	Personality Dimensions, Quality of Parenting and Child Abuse – Transgenerational Transfer of Trauma	Dusica Lecic Tosevski	200110 School of Medicine, University of Belgrade
145028	Prevention of chronic renal disease in children	Amira Peco-Antic	200110 School of Medicine, University of Belgrade
145029	Development of the animal models of epilepsy and the effectiveness of convulsant and anticonvulsant drugs	Olivera Stanojlovic	200110 School of Medicine, University of Belgrade
145030	The examination of the mechanisms of action, interaction and toxic effects of analgesics as well as vasoactive substances	Radica Stevanovic Petrovic	200161-School of Pharmacy, University of Belgrade
145031	Psychoneuroendocrinology of the hypothalamo-pituitary-adrenal axis	Milos Zarkovic	200110 School of Medicine, University of Belgrade
145032	Effects of exogenous factors on induction of autoantibodies and autoimmune diseases	Miloš Nikolić	200110 School of Medicine, University of Belgrade
145033	Functional-anatomical and hemodynamic studies of different diseases and disorders by nuclear medicine methods	Vladimir Obradović	200110 School of Medicine, University of Belgrade
145034	Immunomorphological characterization of cells involved in kidney regeneration and fibrosis	Jasmina Markovic Lipkovski	200110 School of Medicine, University of Belgrade
145035	Pharmacodynamics and pharmacogenetics of new drugs and predictive/prognostic factors for drug efficacy in oncology	Sinisa Radulovic	200043- National Cancer Research Center

145036	Investigation of biochemical and genetic risk factors as causes and markers of atherosclerosis and other diseases: analytical and clinical aspects	Zorana Jelic Ivanovic	200161-School of Pharmacy, University of Belgrade
145037	Clinical/epidemiological investigations concerning diseases of medical and public health importance	Slavenka Jankovic	200110 School of Medicine, University of Belgrade
145038	Prognostic value of preoperative functional testing and myocardial histomorphometric properties in patients with aortic stenosis and left ventricular systolic dysfunction	Aleksandar Neskovic	200110 School of Medicine, University of Belgrade
145039	Diagnostic and prognostic significance of biomarkers of inflammation, oxidant stress and cell death in ischemic heart disease	Vidosava Djordjevic	200113- School of Medicine, Nis
145040	Morphometric, immunohistochemical and molecular research of altered myocardium in cardiomyopathies	Jovan Vasiljevic	200110 School of Medicine, University of Belgrade
145041	Functional Electrical Therapy (FET) for reshaping motor patterns after cerebro-vascular accident	Mirjana Popovic	200053, Institute for Multidisciplinary Research
145042	Periodontal medicine, the use of growth factors in periodontal and implant therapy	Vojislav Lekovic	200129, Faculty of Dental Sciences, Belgrade
145043	Kidney diseases in the elderly: development of a strategy for early detection, prevention and treatment	Visnja Lezaic	200110 School of Medicine, University of Belgrade
145044	The mechanisms of autoimmune neuropathies	Slobodan Apostolski	200110 School of Medicine, University of Belgrade
145045	Quality of life in neurological disorders: global measurement of effects of diseases	Tatjana Pekmezovic	200110 School of Medicine, University of Belgrade
145046	Risk factors in congenital and acquired progressive renal diseases in children	Radovan Bogdanovic	200110 - School of Medicine, University of Belgrade

145047	Biological consequences of viral genetic variability	Tanja Jovanovic	200110 School of Medicine, University of Belgrade
145048	Cellular and molecular mechanisms involved in the regulation of hematopoiesis	Pavle Milenkovic	200015-Institute for Medical Research Belgrade
145049	Neuroimmunomodulation: role for the sympatho-adrenomedullary system	Gordana Leposavić	200161 - Faculty of Pharmacy
145050	Acute coronary syndrome-acute myocardial infarction and unstable angina pectoris: the current diagnostic methods and therapies as the choice for the improvement of patients' survival	Zorana Vasiljevic-Pokrajcic	200110 School of Medicine, University of Belgrade
145051	Aneurysmatic disease of thoracoabdominal aorta	Lazar Davidovic	200110 School of Medicine, University of Belgrade
145052	Invasive and non-invasive diagnostic of early atherosclerosis in patients with coronary artery vasospasm and endothelial dysfunction	Milan Nedeljkovic	200110 School of Medicine, University of Belgrade
145053	Ischemic heart disease, early diagnostics, estimation of severity and choice of optimal treatment	Miodrag Ostojic	200110 School of Medicine, University of Belgrade
145054	Role of biologically active molecules in experimental models of cardiovascular disorders	Djurdjica Jovovic	200015-Institute for Medical Research Belgrade
145055	Tumors of the upper aerodigestive pathways and surrounding and related structures; biological behavior of subpopulations; markers of prediction, prognosis, sensitivity and progression; possibilities of different therapeutic modalities modulation on molecular level aimed at better therapeutic effect	Svetislav Jelic	200043- National Cancer Research Center
145056	Investigation of regulatory mechanisms related to immunomodulation in malignant diseases	Gordana Konjevic	200043- National Cancer Research Center

145057	Investigation of clinical and genetical correlations of motor and non-motor symptoms and signs in neurodegenerative diseases associated with movement disorders	Vladimir Kostic	200110 School of Medicine, University of Belgrade
145058	Molecular mechanisms involved in the regulation of the cell death in physiological and pathological states	Vladimir Bumbasirevic	200110 School of Medicine, University of Belgrade
145059	Treatment protocol optimisation in solid tumors based on molecular and radiobiological prognostic and predictive markers as well as fractal analysis of treatment modalities interactions	Ivan Popov	200043- National Cancer Research Center
145060	Natural products – biomolecules of plant and animal origin – from synthesis to clinical application	Vida Jakovljevic	200114 - Медицински факултет
145061	Molecular genetic markers of clonally transformed hematopoietic stem cells	Milica Colovic	200110 School of Medicine, University of Belgrade
145062	The role of brainstem and spinal cord structures in the modulation of blood pressure and heart rate short-term variability	Nina Japundzic Zigon	200110 School of Medicine, University of Belgrade
145063	Myocarditis, pericarditis, cardiomyopathies, congestive heart failure, neuronal network	Petar Seferovic	200110 School of Medicine, University of Belgrade
145064	Local neuroendocrinoimmunological axis of inflamed gastrointestinal tract – molecular, pathological, biochemical and immunohistochemical investigations	Vera Todorovic	200015-Institute for Medical Research Belgrade
145065	Immunoregulatory interactions in tumor and autoimmune phenomena	Slobodan Arsenjevic	200111 School of Medicine, Kragujevac
145066	Mechanisms of innate and adaptive immunity in autoimmune diseases and infection	Marija Mostarica Stojkovic	200110 School of Medicine, University of Belgrade
145067	Endocrine regulatory mechanisms in metabolic disorders	Dragan Micic	200110 School of Medicine, University of Belgrade

145068	Biocompatibility and feasibility of applying of biomaterials based on hydroxyapatite and biopolymers in tissue repair - experimental and clinical investigations	Vojin Savic	200113 - School of Medicine, Nis
145069	Phenotypic and genotypic characterization of bacteria causing infections in hospital settings	Milena Švabić-Vlahović	200110 - School of Medicine, University of Belgrade
145070	Clinical and morphofunctional investigations of peritoneal in various pathological conditions	Biljana Stojimirovic	200110 School of Medicine, University of Belgrade
145071	Development and implementation of new therapeutic procedures in the management of primary and secondary liver tumors: Role and mechanism of polyunsaturated fatty acids	Marija Glibetic	200015-Institute for Medical Research Belgrade
145072	Regeneration of skeletal tissues assisted by biomaterials as tissue scaffolds – in vitro and in vivo study	Stevo Najman	200110 School of Medicine, University of Belgrade
145073	Cytotoxic, cytoprotective and immunomodulatory effects of nanoparticles	Vladimir Trajkovic	200110 School of Medicine, University of Belgrade
145074	Cytohistological, immunohistochemical and clinical investigations of vascular remodeling in blood vessel diseases and angiogenesis	Vesna Lackovic	200110 School of Medicine, University of Belgrade
145075	The influence of genetic variability of the folate pathway on disease susceptibility and modulation of therapeutic response	Ljiljana Lukovic	200110 School of Medicine, University of Belgrade
145076	Analysis of cell-cycle alterations in non-melanocytic tumors of the skin and of the head and neck region	Ivan Boricic	200110 School of Medicine, University of Belgrade
145078	Influence of the disease stage, tumour pathology and treatment on long term survival of patients operated for primary non-small cell lung cancer	Dragan Subotic	200110 School of Medicine, University of Belgrade
145079	Factors that influence local recurrence, quality of life and functional results in patient operated for rectal carcinoma	Zoran Krivokapic	200110 School of Medicine, University of Belgrade

145081	Genomix and proteomix target modulators of redox cell signalling, proliferation and inflammation: new diagnostic and therapeutic options	Dusica Pavlovic	200113 - School of Medicine, Nis
145082	Evaluation of methods for assessment of the role of muscular and neural factors and their adaptive changes in human locomotion	Slobodan Jaric	200154 - Faculty of sport and Physical Education, University of Belgrade
145083	Cortical excitability and plasticity in healthy subjects and patients with motor disorders – neurophysiological studies of mechanisms of development and aspects of modulation, with functional and therapeutic implications	Milos Ljubisavljevic	200015-Institute for Medical Research Belgrade
145084	Epidemiological investigations of risk factors for selected diseases	Sandra Sipetic	200110 School of Medicine, University of Belgrade
145085	Membrane ionic transport	Dusan Cemerikic	200110 School of Medicine, University of Belgrade
145087	Structural, ultrastructural, immunohistochemical and MRI examination of the brain, pituitary and adrenal parenchyma and vasculature	Slobodan Marinkovic	200110 School of Medicine, University of Belgrade
145088	Investigation of parameters which influence the number and functional ability human fetal and adult islets in culture in order to achieve the optimal graft content for transplantation in type 1 diabetes	Vesna Dimitrijevic-Sreckovic	200110 School of Medicine, University of Belgrade
145089	Insulin resistance: the role in the pathogenesis of the onset and progression of neurodegenerative disorders and atherosclerotic vascular disease	Nebojisa Lalic	200110 School of Medicine, University of Belgrade
145091	Evaluation of sarcoidosis patients- diagnosis, therapy and quality of life	Violeta Vucenic	200110 School of Medicine, University of Belgrade
145092	Novel approaches to mitral valve regurgitation: from structure to function	Bosiljka Vujisic Tesic	200110 School of Medicine, University of Belgrade

145094	Supraselective genetic screening of familiar thyroid cancer and preventive surgery of medullary thyroid cancer	Radan Dzodic	200043- National Cancer Research Center
145096	Automated detection of microcalcification in digitized mammograms for early diagnosis of breast cancer	Branimir Reljin	200103 - School of Electrical Engineering
145097	Epidemiological and seroimmunological characteristics of natural foci diseases determinate by activities of vectors and causes of hemorrhagic fevers, rickettsioses and meningoencephalitis transmitted by ticks	Svetomir Samardzic	200112 School of Medicine Kosovska Mitrovica
145099	Morphometrical, immunohistochemical and electronmicroscopic investigation of epithelial and perivascular spaces of the human thymus in accidental and age-related involution	Zlatibor Andjelkovic	200112 School of Medicine Kosovska Mitrovica
145101	CELL-TO-CELL INTERACTION IN THE LUNG: The role of neurogenic inflammation in the pathogenesis of airway diseases	Tomislav Djokic	200112 School of Medicine Kosovska Mitrovica
145102	The effects of various drugs on stress-induced ulcer development in rats	Snezana Janicevic Hudomal	200112 School of Medicine Kosovska Mitrovica
145103	Diabetes mellitus and disorders skin	Tatjana Novakovic	200112 School of Medicine Kosovska Mitrovica
145104	Etiopathogenesis, freqence and pathological-morphological characteristics of maligne tumors on Kosovo and Metohia	Nebojsa Mitic	200112 School of Medicine Kosovska Mitrovica
145105	Health condictiones of persons in refugies camps with inappropriate ekological conditions of environmental and work condictiones in municipality of north Kosovo end Metohija	Milan Parlic	200112 School of Medicine Kosovska Mitrovica

145107	Micromorphological and immunohistochemical investigations of cranial segments of cerebral nerves	Zdravko Vitosevic	200112 School of Medicine Kosovska Mitrovica
145108	Research, incidence, diagnostics and treatment of malign diseases of abdominal organs in Kosovo i Metohija	Slobodan Sekulic	200112 School of Medicine Kosovska Mitrovica
145109	Endocrine and paracrine activity of adipose tissue and it's relation to metabolic syndrome, diabetes and coronary artery disease	Aleksandar Jovanovic	200112 School of Medicine Kosovska Mitrovica
145110	Frequency of spontaneous abortions, premature births and disorders in pregnancy in women at Kosovo and Metohia after NATO bombing	Goran Relic	200112 School of Medicine Kosovska Mitrovica
145112	Oxidation stress in age-related intraocular diseases	Lepsa Zoric	200112 School of Medicine Kosovska Mitrovica
145114	Changes in pulmonary function following spinal deformities	Mirjana Miric	200112 School of Medicine Kosovska Mitrovica
156010	The diffuse stellata cell system and role in tissue damage reparation and neoplastic processes in mammals	Sanja Aleksic Kovacevic	200143 Faculty of Veterinary Medicine, Belgrade
156011	Characteristics of gait pattern disturbances in neurodegenerative diseases	Sasa Radovanovic	200015-Institute for Medical Research Belgrade
156017	Dental pulp stem cells - molecular and functional characteristics and significance for tooth tissue regeneration	Nadezda Milosevic Jovic	200015-Institute for Medical Research Belgrade
156031	Age and sex-related morphological and structural differences of the basal telencephalon	Branislav Filipovic	200110 School of Medicine, University of Belgrade
156039	Biological basis of therapeutic procedures in oral surgery	Ljubomir Todorovic	200129, Faculty of Dental Sciences, Belgrade

Annex IV. Involvement of Serbian researchers in European health research projects

FP6

FP6-INCO:

HISERBS - Health improvement in Serbia through reinforcement of biomedical science and technology, Pavle Milenković, Institute for Medical Research, Belgrade

SERBPARTZOON - Reinforcement of the Serbian Centre for Parasitic Zoonoses, Olgica Djurković-Djaković, Institute for Medical Research, Belgrade

DIEPHY - Dietary exposure to polycyclic aromatic hydrocarbons and damage, Gordana Joksić, Vinca

TRIOH - Targeting replication and integration of HIV, Veljko Veljković, Vinca

NANOMYC - Multiparametric detection of biomolecule conjugated nanoparticles for the diagnostic investigation of mycobacterial infections of humans and animals, Mirjana Čomor, Vinca

INTERESE- Integrated Assessment of Health Risks of Environmental Stressors in Europe, Milena Jovašević Stojanović, Vinca

FP6-Food Quality and Safety - NoEs

EUROFIR - European Food Information Resource Network, Marija Glibetić, Institute for Medical Research, Belgrade

EURRECA - Harmonizing nutrient recommendations across Europe with special focus on vulnerable groups and consumer understanding, Marija Glibetić, Institute for Medical Research, Belgrade

FP7 Health Collaborative projects

BECAN - Balkan Epidemiological Study on Child Abuse and Neglect, Faculty for Special Education and Rehabilitation, University of Belgrade

PsychCNVs - Copy number variations conferring risk of psychiatric disorders in children, Institute of Mental Health, Belgrade

Annex V. Principal results of recent health research projects in Serbia

Healt (SCI)									
Naziv	2000	2001	2002	2003	2004	2005	2006	2007	2008
ALLERGY	2	3	52	3	2	3	4	30	48
ANATOMY & MORPHOLOGY	3	1	2	1	4	4	8	5	4
ANDROLOGY					2		1		
ANESTHESIOLOGY	1		1		1	1	1	3	5
BIOCHEMISTRY & MOLECULAR BIOLOGY	53	59	64	42	44	70	63	81	77
CARDIAC & CARDIOVASCULAR SYSTEMS	40	38	37	35	44	55	59	34	54
CLINICAL NEUROLOGY	6	16	30	50	109	134	114	82	142
CRITICAL CARE MEDICINE	4	1	9	2	3	2	1		3
DENTISTRY, ORAL SURGERY & MEDICINE	4	16	6	5	1	15	11	20	18
DERMATOLOGY & VENEREAL DISEASES	2	5	8	5	5	8	7	7	9
EMERGENCY MEDICINE	2		1				2		3
ENDOCRINOLOGY & METABOLISM	24	17	37	23	46	32	47	74	55
GASTROENTEROLOGY & HEPATOLOGY	25	9	20	13	12	12	17	16	18
GENETICS & HEREDITY	7	4	26	11	15	17	22	29	16
GERIATRICS & GERONTOLOGY			3	7	5	4	3	3	
GERONTOLOGY				5		2			
HEALTH CARE SCIENCES & SERVICES	1	1	2	2	1	5	13	10	10
HEALTH POLICY & SERVICES						3	10	8	8
HEMATOLOGY	12	12	11	6	14	22	40	69	97
IMMUNOLOGY	17	20	69	13	36	30	27	55	75
INFECTIOUS DISEASES	4	2	9	4	10	12	9	15	13
INTEGRATIVE & COMPLEMENTARY MEDICINE				4		1		2	1
MEDICAL ETHICS							1	1	
MEDICAL INFORMATICS	1	2			1	2	2	1	2
MEDICAL LABORATORY TECHNOLOGY	3	2	4	7	7	70	9	22	13
MEDICINE, GENERAL & INTERNAL	6	8	7	1	15	7	9	22	21
MEDICINE, LEGAL	1	1		13	6	6	3	7	2
MEDICINE, RESEARCH & EXPERIMENTAL	9	1	7	12	19	19	16	25	20
MICROBIOLOGY	5	9	4	13	11	14	9	22	27
MICROSCOPY	1	1	1	1		1	5	3	31
NEUROIMAGING		1		6	2	1		1	
NEUROSCIENCES	15	20	30	53	54	96	83	56	127
NURSING						1			
NUTRITION & DIETETICS	4		1	2	17	13	4	42	22
OBSTETRICS & GYNECOLOGY	5	4	3	3	9	20	24	18	22
ONCOLOGY	31	22	49	26	51	101	92	84	108
OPHTHALMOLOGY	1				1	1	4	6	7

Healt (SCI)									
Naziv	2000	2001	2002	2003	2004	2005	2006	2007	2008
ORTHOPEDECS	2			1	4	10	5	7	5
OTORHINOLARYNGOLOGY			1		2	3	5	10	6
PARASITOLOGY	2	4	1	3	3	5	2	3	3
PATHOLOGY	5	7	3	5	3	6	7	64	22
PEDIATRICS	8	7	10	7	6	6	19	48	57
PERIPHERAL VASCULAR DISEASE	16	5	23	40	52	37	93	41	52
PHARMACOLOGY & PHARMACY	32	31	42	51	86	84	105	121	159
PHYSIOLOGY	9	12	11	9	16	9	26	23	36
PSYCHIATRY	18		37	24	51	38	24	48	79
PUBLIC, ENVIRONMENTAL & OCCUPATIONAL HEALTH	5	4	6	10	19	24	29	28	23
RADIOLOGY, NUCLEAR MEDICINE & MEDICAL IMAGING	7	9	10	19	39	20	23	38	23
REHABILITATION		1	1	2	13	2	4	1	6
RESPIRATORY SYSTEM	4	3	6	8	19	37	19	17	9
RHEUMATOLOGY	2	15	6	34	33	31	38	33	15
SOCIAL WORK								1	
SPECTROSCOPY	15	14	13	14	16	10	15	19	19
SURGERY	17	20	14	12	36	39	36	35	44
TOXICOLOGY	7	12	5	10	16	13	36	24	45
TRANSPLANTATION	4	14	2	3	10	20	18	26	8
TROPICAL MEDICINE				1	1			7	1
UROLOGY & NEPHROLOGY	16	17	14	12	16	28	41	71	43
VIROLOGY		1	2	2	3	7	6	3	1
	465	451	700	636	993	1219	1278	1524	1720