

ISSN 1857 - 92

**INTERNATIONAL
JOURNAL**

Institute of Knowledge Management

KNOWLEDGE



Scientific Papers
Vol. 15.1.

KNOWLEDGE IN PRACTICE



<http://globalimpactfactor.com/knowledge-international-journal>
Global Impact and Quality Factor 1.823 (2015)

Eleventh International Scientific Conference
KNOWLEDGE IN PRACTICE
16-18 December, 2016 Bansko, Bulgaria

Eleventh International Scientific Conference
KNOWLEDGE IN PRACTICE
16-18 December, 2016 Bansko, Bulgaria

KNOWLEDGE



***INTERNATIONAL JOURNAL
SCIENTIFIC PAPERS
VOL 15.1***

16-18 December, 2016

Bansko, BULGARIA

Eleventh International Scientific Conference
KNOWLEDGE IN PRACTICE
16-18 December, 2016 Bansko, Bulgaria

INSTITUTE OF KNOWLEDGE MANAGEMENT

SKOPJE, MACEDONIA



KNOWLEDGE

International Journal Scientific papers Vol. 15.1

EDITORIAL BOARD

Vlado Kambovski PhD, Robert Dimitrovski PhD, Simeta Zaric PhD, Maria Kavdanska PhD, Venselin Terziev PhD, Mirjana Borota – Popovska PhD, Predrag Trajkovic PhD, Jova Kekenovski PhD, Svetlana Trajkovic PhD, Zivota Radosavljevic PhD, Margarita Koleva PhD, Mile Matijevic PhD, Nonka Mateva PhD, Rositsa Chobanova PhD, Aleksandar Nikolovski PhD, Marija Knezevic PhD, Snežana Miličević PhD, Irima Singaveskaya PhD, Dzalijana Tomovska PhD, Oliver Dimitrijevic PhD, Nedžad Koraljic PhD, Nebojša Pavlovic PhD, Nikolina Ognenska PhD, Dimitrija Popovski PhD, Lisen Bashkurti PhD, Tomo Naumov PhD, Trajce Dojcinovski PhD, Jana Merdzanova PhD, Zoran Sreanitic PhD, Nikolai Sashkov Cankov PhD

Preparing and correction: Liljana Pushova

Print: GRAFOPROM – Bitola

Editor: IKM – Skopje

For editor

Robert Dimitrovski, PhD

KNOWLEDGE

International Journal Scientific Papers Vol. 15.1

ISSN 1857-92

SCIENTIFIC COMMITTEE

President: Academic, Prof. Vlado Kambovski PhD

- Prof. Robert Dimitrovski PhD, Faculty of Management, MIT University, Skopje (Macedonia)
- Prof. Zivota Radosavljević PhD, Dean, Faculty FORCUP, Union University, Belgrade (Serbia)
- Prof. Venelin Terziev PhD, University of Rousse (Bulgaria)
- Prof. Paul Sergius Koku PhD, Florida Atlantic University (USA)
- Prof. Cesar Buzza PhD, University of Bucharest (Romania)
- Prof. Rosica Cobanova PhD, Bulgarian Academy of Sciences (Bulgaria)
- Prof. Aleksandar Nikolovski PhD, FON University, Skopje (Macedonia)
- Prof. Anita Trajkovska PhD, Rochester University (USA)
- Prof. Simisa Zarić, PhD, Faculty of Economics, University of Belgrade (Serbia)
- Prof. Milan Radosavljević PhD, Dean, Faculty of strategic and operational management, Union University, Belgrade (Serbia)
- Prof. Anka Trajkovska-Peškoska PhD, UKLO, Faculty of technology and technical sciences, Bitola (Macedonia)
- Prof. Predrag Trajković PhD, JMPNT, (Serbia)
- Prof. Lidija Tozi PhD, Faculty of Pharmacy, Ss. Cyril and Methodius University, Skopje (Macedonia)
- Prof. Bistra Angelovska, Faculty of Medicine, University "Goce Delčev", Štip (Macedonia)
- Prof. Misha Hristovski PhD, Faculty of Veterinary Medicine, Ss. Cyril and Methodius University, Skopje (Macedonia)
- Prof. Jove Kalesnovski PhD, Faculty of Tourism, UKLO, Bitola (Macedonia)
- Prof. Sasho Korunoski, Dean, Faculty of Tourism, UKLO, Bitola (Macedonia)
- Prof. Cvetko Andreovski, Vice rector, Faculty of Tourism, UKLO, Bitola (Macedonia)
- Prof. Margarita Koleva PhD, Dean, Faculty of Pedagogy, University Neofit Rilski, Blagoevgrad (Bulgaria)
- Prof. Aleksandar Donchev, MIT University, Faculty of Law, Skopje (Macedonia)
- Prof. Maria Kavdanaka PhD, Faculty of Pedagogy, University Neofit Rilski, Blagoevgrad (Bulgaria)
- Prof. Mirjana Borota-Popovska, PhD, Centre for Management and Human Resource Development, Institute for Sociological, Political and Juridical Research, Skopje (Macedonia)
- Prof. Marija Topuzovska-Latković, PhD, Centre for Management and Human Resource Development, Institute for Sociological, Political and Juridical Research, Skopje (Macedonia)
- Prof. Marija Knezević PhD, Academic, Banja Luka, (Bosnia and Herzegovina)
- Ljupce Naumovski PhD, Forum for Mobility and Research, Bitola (Macedonia)
- Prof. Oliver Iliev PhD, Faculty of Communication and IT, FON University, Skopje (Macedonia)
- Prof. Dimitrija Popovski PhD, Faculty of Sport, Ss. Cyril and Methodius University, Skopje (Macedonia)
- Prof. Yuri Doroshenko PhD, Dean, Faculty of Economics and Management, Belgorod (Russian Federation)
- Prof. Ilija Nazov PhD, Research and Development center PLASMA, Skopje (Macedonia)
- Prof. Sashko Plachkov PhD, Faculty of Pedagogy, University Neofit Rilski, Blagoevgrad (Bulgaria)
- Prof. Ivan Peškov PhD, Rector, European Polytechnic University, Pernik (Bulgaria)

Eleventh International Scientific Conference
KNOWLEDGE IN PRACTICE
16-18 December, 2016 Bansko, Bulgaria

- Prof. Vladimir Lazarov PhD, European Polytechnic University, Pernik (Bulgaria)
- Prof. Tosko Krstev PhD, European Polytechnic University, Pernik (Bulgaria)
- Prof. Antoanela Hristova PhD, European Polytechnic University, Pernik (Bulgaria)
- Prof. Azra Adžajlić – Đedović PhD, Faculty of criminology and security, Sarajevo (Bosnia & Herzegovina)
- Prof. Aleksandar Korabiev, PhD, Dean, Faculty for economy and management, Saint Petersburg State Forest Technical University, Saint Petersburg (Russian Federation)
- Prof. Primož Dolenc, PhD, Faculty of Management, Primorska University, Koper (Slovenia)
- Doc. Igor Štubelj, PhD, PhD, Faculty of Management, Primorska University, Koper (Slovenia)
- Prof. Hristo Beloev PhD, Bulgarian Academy of Science, Rector of the University of Rousse (Bulgaria)
- Prof. Branko Sotirov PhD, University of Rousse (Bulgaria)
- Prof. Karl Schöpf, PhD, Akademie für wissenschaftliche forschung und studium, Wien (Austria)
- Prof. Isa Spahiju PhD, International Balkan University (Macedonia)
- Prof. Volodymyr Denysyuk, PhD, Dobrov Center for Scientific and Technological Potential and History studies at the National Academy of Sciences of Ukraine (Ukraine)
- Prof. Laste Spasovski PhD, Vocational and educational centre, Skopje (Macedonia)
- Prof. Branislav Simonovic PhD, Faculty of law, Kragujevac (Serbia)
- Prof. Dragan Kokovic PhD, University of Novi Sad, Novi Sad (Serbia)
- Prof. Saska Kicosev PhD, University of Novi Sad, Novi Sad (Serbia)
- Prof. Pero Tumbas PhD, Faculty of Economics, University of Novi Sad, Subotica (Serbia)
- Prof. Natalija Kirjzenko PhD, Faculty For economic and Business, Institute of Entrepreneurial Activity, Minsk (Belarus)
- Prof. Zoja Kutra PhD, Prorector, Euro College, Istanbul (Turkey)
- Prof. Mustafa Kacar PhD, Euro College, Istanbul (Turkey)
- Prof. Evgenia Penkova-Pantaleeva PhD, UNWE -Sofia (Bulgaria)
- Prof. Nikolina Ogmenska PhD, Faculty of Music, SEU - Blagoevgrad (Bulgaria)
- Prof. Tihomir Domazet PhD, President of the Croatian Institute for Finance and Accounting
- Prof. Stojan Ivanov Ivanov PhD, Faculty of Public Health and Sport, SWU Neofit Rilski, Blagoevgrad (Bulgaria)
- Maja Lubanova Cholakova PhD, Faculty of Public Health and Sport, SWU Neofit Rilski, Blagoevgrad (Bulgaria)
- Daniela Ivanova Popova PhD, Faculty of Public Health and Sport, SWU Neofit Rilski, Blagoevgrad (Bulgaria)
- Prof. Branimir Kampl PhD, Institute SANO, Zagreb (Croatia)
- Prof. Marina Šimin PhD, College of professional studies in Management and Business Communication, Sremski Karlovci (Serbia)
- Prof. Miladin Kalinic, College of professional studies in Management and Business Communication, Sremski Karlovci (Serbia)
- Prof. Helmut Štramske PhD, former Head of the University of Vienna Reform Group (Austria)
- Prof. Ahmad Zakeri PhD, University of Wolver Hampton, (United Kingdom)
- Prof. Tzako Pantaleev PhD, NBUniversity, Sofia (Bulgaria)
- Prof. Lisen Bashkurti PhD, Global Vice President of Sun Moon University (Albania)
- Prof. Baki Koleci PhD, University Hadri Zeka, (Kosovo)
- Prof. Ivana Jelik PhD, University of Podgorica, Faculty of Law, (MNE)
- Prof. Islam Hasani PhD, Kingston University (Bahrain)
- Prof. Rumen Valcovski PhD, Immunolab Sofia (Bulgaria)

Eleventh International Scientific Conference
KNOWLEDGE IN PRACTICE
16-18 December, 2016 Bansko, Bulgaria

- Prof. Jenko Kunchev PhD, University „Cernorizac Hrabar“ - Varna (Bulgaria)
- Prof. Nedjad Korajlic PhD, Faculty of criminology and security, Sarajevo (Bosnia & Herzegovina) - Prof. Alisabri Sabani PhD, Faculty of criminology and security, Sarajevo (Bosnia & Herzegovina)
- Prof. Jovna Ataljevic PhD, Faculty of Economy, University of Banja Luka, (Bosnia & Herzegovina)
- Prof. Branislav Simonovic PhD, Faculty of law University of Kragujevac (Serbia)
- Doc. Taryana Soboljeva PhD, State Higher Education Establishment Vasilij G. Getman Kiyev National Economic University, Kiyev (Ukraine)
- Prof. Svetlana Trajkovic PhD, High School of applied professional studies, Vranje (Serbia)
- Prof. Suzana Pavlovic PhD, High health – sanitary school for professional studies, Belgrade (Serbia)
- Prof. Zorka Jugovic PhD, High health – sanitary school for professional studies, Belgrade (Serbia)
- Prof. Dragan Marinkovic PhD, High health – sanitary school for professional studies, Belgrade (Serbia)
- Prof. Dusan Ristic, PhD Emeritus – Faculty of Management, Sremski Karlovci (Serbia)
- Prof. Ramen Stefanov, PhD, Dean, Faculty of public health, Medical University of Plovdiv (Bulgaria)
- Prof. Stojana Ristevska PhD, Dean, High Medicine School, Bitola, (Macedonia)
- Prof. Snezana Stoilova, PhD, High Medicine School, Bitola, (Macedonia)
- Prof. Lence Mircevska PhD, High Medicine School, Bitola, (Macedonia)
- Prof. Durdijana Tomovska, PhD, Dean, Faculty of Biotechnical sciences, Bitola (Macedonia)
- Prof. Mitre Stojanovski PhD, Faculty of Biotechnical sciences, Bitola (Macedonia)
- Prof. Ljupce Kocovski PhD, Faculty of Biotechnical sciences, Bitola (Macedonia)
- Prof. Vasil Zecov PhD, College of tourism, Blagoevgrad (Bulgaria)
- Prof. Nikola Bozkov PhD, College of tourism, Blagoevgrad (Bulgaria)
- Prof. Vasil Pehlivanov PhD, College of tourism, Blagoevgrad (Bulgaria)
- Prof. Oliver Dimitrijevic PhD, High medicine school for professional studies “Hipokrat”, Bujanovac (Serbia)
- Prof. Erzika Antic PhD, High medicine school for professional studies “Hipokrat”, Bujanovac (Serbia)
- Prof. Jelena Stojanovic PhD, High medicine school for professional studies “Hipokrat”, Bujanovac (Serbia)
- Prof. Georgi Georgiev PhD, National Military University “Vasil Levski”, Veliko Trnovo (Bulgaria)
- Prof. Miodrag Smelcerovic PhD, High medicine school for professional studies “Hipokrat”, Bujanovac (Serbia)
- Doc. Ana Dramaljeva PhD, South-West University “Neofit Rilski”, Blagoevgrad (Bulgaria)
- Doc. Marija Kostic PhD, Faculty of Hotel Management and Tourism, Vrnjaska Banja (Serbia)
- Doc. Sandra Zivanovic PhD, Faculty of Hotel Management and Tourism, Vrnjaska Banja (Serbia)
- Doc. Suetana Milicevic PhD, Faculty of Hotel Management and Tourism, Vrnjaska Banja (Serbia)
- Doc. Nebojsa Pavlovic PhD, Faculty of Hotel Management and Tourism, Vrnjaska Banja (Serbia)
- Prof. Kamal Al-Nakib PhD, College of Business Administration Department, Kingdom University (Bahrain)
- Prof. Venus Del Rosario PhD, Arab Open University (Philippines)
- Prof. Nishad M. Navar PhD, Kingdom University (India)

Contents

CONTEMPORARY KNOWLEDGE MANAGEMENT	19
Paul Sergius Koku, Ph.D	19
EMPLOYEES ATTITUDES AND EXPECTATION OF YOUNG PROFESSIONALS IN BULGARIA (AN EMPIRICAL SURVEY).....	23
Todor Krastevich, Ph.D	23
DEVELOPMENT OF SME'S FOR REDUCING UNEMPLOYMENT IN THE REPUBLIC OF MACEDONIA	33
Robert Dimitrovski, Ph.D	33
Venelin Terziev, Ph.D	33
Laste Spasovski, Ph.D	33
Liljana Pashova, MSc	33
DISCUSSING ORGANIC PRODUCTION IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT	41
Venelin Terziev	41
INQUIRY-BASED SCIENCE EDUCATION (IBSE) - GOOD PRACTICES	47
Dragomir Marchev Ph.D	47
Nataliya Pavlova Dr.Sc	47
Svetlana Nedelcheva Ph.D	47
INTRODUCING A CREDIT SYSTEM IN VOCATIONAL EDUCATION AND TRAINING	53
Laste Spasovski, Ph.D	53
Robert Dimitrovski, Ph.D	53
Liljana Pashova, MSc	53
METHODOLOGY ROIT - ASSESSMENT TOOLS FOR PRACTICAL APPLICATION OF THE KNOWLEDGE AND SKILLS PARTICIPATION OF UNEMPLOYED PEOPLE IN VOCATIONAL TRAINING COURSES	61
Kamelia Potkova, Ph.D	61
KNOWLEDGE AS A FACTOR OF ENDOGENEOUS GROWTH	69
Slobodan Cvetanovic, Ph.D	69
Danijela Despotovic, Ph.D	69
PARAMETERS OF THE MANAGEMENT CULTURE AND COMPETENCES OF THE ADULT EDUCATION MANAGERS	75
Viara Gyurova, DrSc	75
KNOWLEDGE IN EU DEVELOPMENT STRATEGIES	83
Jovan Basic, Ph.D	83
Mirjana Knezevic, Ph.D	83
THE IMPORTANCE OF MANAGEMENT IN THE DUAL SYSTEM EDUCATION	89
Semirja Smilovic	89
Elma E Zukerlic	89
DECISION THEORIES AND THEIR IMPLICATIONS: UNDERSTANDING THE DYNAMICS OF DECISION-MAKING	95
Juliana Osmanli, Ph.D	95
ON THE AMENDMENTS TO THE INTERNATIONAL FINANCIAL REPORTING STANDARDS RELATING TO THE FINANCIAL REPORTING OF FINANCIAL ASSETS	103
Radka Andasarova, Ph.D	103

DEVELOPMENT OF PROTOCOLS FOR DUTIES OF THE NURSE IN INTENSIVE CARE UNITS AND EVALUATION THE EFFECTIVENESS OF THEM	281
Valentina Lalova	281
Gergana Petrova	281
OFTALMOPATIA BILATERALIS AS UNUSUAL PRESENTATION OF A LONG TERM LOCALIZED HODGKIN'S LYMPHOMA	287
Irina Panovska-Stavridis	287
Liljana Hadzi-Pecova	287
Slavco Tosev	287
Marija Popova-Labacevska	287
EVALUATION OF THE DIABETIC FOOT – WHY, WHEN AND HOW?	293
Slavcho Tosev	293
Lujana Grueva	293
Daniela Chaparovska	293
Irina Panovska	293
ON INTEGRATION - ACTUAL QUESTIONS, CHALLENGES AND TENDENCIES	299
Silvia Trudkova, Ph.D	299
Vihra Stoyanova	299
Petkana Hristova, Ph.D	299
Zoya Museva	299
ALGORITHM OF FUNCTIONAL RECOVERY AFTER ALOPLASTICA OF THE HIP JOINT	307
Hristo Georgiev Atanasov, PhD	307
COXARTHROSIS AS UNDERLYING DISEASE IN PATIENTS WITH PHYSIOTHERAPY AFTER ALLOPLASTICA OF THE HIP JOINT FRACTURE	311
Hristo Georgiev Atanasov, PhD	311
ASPECTS OF THE RESTORATION OF HARD DENTAL TEXTURE WITH VENEERS	315
Svetozar Yankov	315
Svetoslav Slavov	315
SERIOUS GAMES – INNOVATIVE APPROACH FOR SCREENING AND REHABILITATION OF COGNITIVE IMPAIRMENT	319
Antonia Yaneva	319
Nonka Mateva	319
PERSPECTIVES FOR APPLICATIONS OF NANOTECHNOLOGY AND NANOMATERIALS IN MEDICINE	323
Vaso Taleski	323
Milka Zdravkova	323
Liljana Simjanovska	323
OPINION OF EMPLOYEES FROM MEDICAL UNIVERSITY OF PLOVDIV ON ASSURANCE OF OCCUPATIONAL SAFETY AND JOB SATISFACTION – PRELIMINARY RESULTS	327
Rositsa Dimova, PhD	327
Mariya Pavlova	327
THE ART OF COMMUNICATION IN RESOLVING CONFLICTS IN THE PROCESS OF EDUCATION AND TRAINING OF HEALTH CARE SPECIALISTS	331
Petya Kaznakova, PhD	331

**PERSPECTIVES FOR APPLICATIONS OF NANOTECHNOLOGY AND
NANOMATERIALS IN MEDICINE**

Vaso Taleški
Milka Zdravkovska
Liljana Simjanovska

Faculty of Medical Sciences, University „Goce Delchev“ -Štip, Republic of Macedonia
vaso.taleski@mgd.edu.mk

Abstract: Nanotechnology is a new science that comprise several science fields (chemistry, biology, physics, material science and engineering) conducted devices or materials that have at least one dimension under size of 100 nm. Nanomaterials are chemically or physically different to their macro-scale counterparts and may have unique health and environmental impacts. Nanoparticles can be synthesized by reactions in solid state (breaking the larger materials) and chemical methods (wet chemical synthesis). Extremely small size enables nanoparticles to enter the human body through usual or unusual routes, pass through cell membranes, or cross the blood-brain barrier.

At present, potential use of nanotechnology in a range of applications at any stage in food industry: production, processing, packaging, labelling, transporting, tracing, keeping the quality of food product and extend the product shelf-life, leading to less food waste, water filtration, removal of undesirable tastes, flavors or allergens from food products.

Applications of nanotechnology and nanomaterials in medicine (Nanomedicine) based on Nano (bio) sensors enables rapid and sensitive detection of pathogenic bacteria and trace levels of viruses in small sample volumes, at lower costs. Early detection of pathogens enables accurate and prompt treatment.

Sensors to detect biofilm formation by bacteria on surfaces are developing.

Multi-drug resistant microorganism (MDR) are one of the most serious and increasing global, public health threat. New strategies urgently needed to combat MDR, includes nanomaterials as very promising approach.

Metal nanomaterials (silver, gold, copper, titanium, zinc, magnesium, cadmium, and alumina) possess unique antimicrobial activities.

Researchers are developing:

- Method to release insulin from sponge-like matrix and Nano-capsules, when the glucose level rise
- Nano-particles to be taken orally (pills), could pass the intestines into the bloodstream
- Sensors to detect bacterial biofilms on surfaces
- Nano-particles to defeat viruses by delivering an enzyme that prevents their reproduction in the patients' bloodstream
- Gelatin nanoparticles can be used to deliver drugs to damaged brain tissue
- Nanoparticles to deliver vaccine, allowing the vaccine a stronger immune response

Risks of nanotechnology are still unknown and unpredictable.

Keywords: applications, nanomedicine, nanoparticles, nanotechnology

1. INTRODUCTION

Nanotechnology, subsumes knowledge of several scientific fields (chemistry, biology, physics, material science and engineering), operates with (nano) devices or (nano) materials that have dimensions between 1 to 100 nm and presents one of the most challenging and promising science of the 21st century.

Application of nanotechnology to medicine is called nanomedicine. Major goal of nanomedicine is to improve, significantly, individual and global health, comprising three molecular technologies (Jokanovic, 2012):

- Nano materials and devices for advanced diagnostics and biosensors, targeted drug delivery, smart drugs and antimicrobials;
- Use of molecular medicine via genomics, proteomics and artificial engineered microbes;
- Medical nano robots that will allow rapid pathogen diagnosis and eradication, chromosome replacement and individual cell surgery *in vivo*.

2. HISTORY

First beginnings of use of nanoparticles date from 2000 years ago when Greeks and Romans used sulfide nanocrystals to dye hair. About 1000 years ago (Middle Ages), gold nanoparticles of different sizes were used to produce different colors in stained glass windows.

First concept of nanotechnology connected with "There's Plenty of Room at the Bottom", written by Richard Feynman (1959), predicting possibility in the future to manipulate atoms and molecules, where different physical phenomena's exist (gravity loses impact and importance, while surface tension and Van der Waals constants has more importance). He received the Nobel Prize in physics in 1955. He also wrote following books: *Unhatched the Future* (1991), and more recent technical book *Nanosystems: Molecular Machinery, Manufacturing, and Computation* (1992).

Term nanotechnology was introduced in 1974, by Norio Taniguchi, professor of Tokyo University of Science.

American engineer Eric Drexler is best known for popularizing the potential of molecular nanotechnology. He unknowingly used a related term in his 1986 book "Engines of Creation", to describe what later became known as molecular nanotechnology.

First book about nanomedicine was published in 1999.

Further development of nanotechnology and nanoscience was enabled by developing of Scanning tunneling microscope (STM) in 1981 by Gerd Binnig and Heinrich Rohrer (at IBM Zurich). They received the Nobel Prize in Physics in 1986.

Great progress was enabled by development of fullerenes (a molecule of carbon, 0,7 nm in diameter), in the form of a hollow sphere, ellipsoid, tube, and many other shapes. Carbon nanotubes are manufactured as single wall or multiwall carbon nanotubes. Potential applications of fullerenes is due ability to incorporate cations, as a carriers of radioactive materials or drugs for targeted therapy of malignant diseases of bones and soft tissues. Nanotubes can easily penetrate membranes such as cell walls, looks like miniature needles, at the cellular level.

3. APPLICATION OF NANOTECHNOLOGY

Products and methods of nanotechnology are applicable in: Manufacturing and Materials, Environment, Energy and Electronics, Information technology, Food industry and Medicine. Numerous companies are specializing in the production of new forms of nano-sized materials. Nanotechnologies are projected by 2020 to impact at least \$3 trillion across the global economy. Worldwide may require at least 6 million workers to support nano-industry.

At the present, use of nanotechnology in food industry includes: production, processing, packaging, labelling, transporting, tracing, keeping the quality of food product and extend the product shelf-life, leading to less food waste, water filtration, removal of undesirable tastes, flavors or allergens from food products (Bata-Vidica, 2013, Duncan, 2011).

4. NANOMEDICINE

Researchers have demonstrated that: gelatin nanoparticles can be used to deliver drugs to damaged brain tissue, nanoparticles to deliver vaccine, allowing the vaccine a stronger immune response.

Nano robots could actually be programmed to repair specific diseased cells, functioning in a similar way to antibodies in our natural healing processes.

Researchers are developing:

- a method to release insulin from sponge-like matrix and nano capsules, when the glucose level rises
- a nanoparticles to be taken orally (pills), could pass the intestines into the bloodstream
- Sensors to detect bacterial biofilm formation on surfaces
- Nano particle to defeat viruses by delivering an enzyme that prevents their reproduction in the patient's bloodstream
- Carriers of radioactive materials or drugs for targeted therapy of malignant diseases of bones and soft tissues.

Nanotechnology may provide rapid and sensitive detection of pathogenic bacteria and trace levels of viruses in small sample volumes, at lower costs than current in-use technologies. Early detection enables accurate and prompt treatment. Test for detection of *E. coli O157:H7*, *S. aureus*, *S. typhimurium*, *C. jejuni*, *E. cloacae*, *B. subtilis*, *L. monocytogenes* and yeast (*Saccharomyces cerevisiae*) are developed.

Antibiotics have been one of the greatest success stories in medicine. But there is growing concern that the drugs usefulness is coming to an end. In 2013, in Europe more than 25,000 people died of bacterial infections that were resistant to antibiotics. Resistance to antibiotics poses a "Major global threat" to public health, says a report by the World Health Organization (WHO). The world is heading towards a post-antibiotic era in which many common infections will no longer have a cure. Some authorities consider microbial resistance as an apocalypse talking that. A terrible future could be on the horizon, which rips one of the greatest tools of medicine out of the hands of doctors.

Also, bacteria can adhere and produce biofilms on dental implants, catheters, artificial hips, prosthesis, contact lens, wounds and lungs.

The treatment options with respect to MDR (multi drug resistant bacteria): *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, *Escherichia coli*, *Proteus mirabilis*, *Staphylococcus aureus* (MRSA) are very limited. Major challenges for scientists and highest priorities of modern medicine and biotechnology has become developing of novel alternative methods.

Nanostructures used in Anti-infectious therapy (Belkomyshv, 2013):

- Zinc Oxide Nanoparticles
- Silver Nanoparticles
- Magnetic Nanoparticles: such as Fe₃O₄
- Synthesis of Fe₃O₄ Nanoparticles
- Functionalized Magnetic Nanoparticles
- Antimicrobial Nanosolvents
- Antimicrobial Nano-modified Surfaces (Anti-adherent Nano-surfaces)

Metal nanomaterials (silver, gold, copper, titanium, zinc, magnesium, cadmium, and alumina) possess advantage of unique antimicrobial activities. Some studies established that silver ions has strongest bactericidal effect, copper and gold weaker one (Sondi, 2004). Inside the human body ionic silver quickly combines with chloride to form an insoluble compound called silver chloride which is far less reactive than metallic silver nanoparticles. Ionic silver cannot survive inside the human body because blood serum is rich in sodium and potassium chloride that quickly forming silver chloride. Only metallic silver nanoparticles can survive inside the body because they are unaffected by chloride ions (Santos, 2013).

One of the earliest nanomedicine applications was the use of nanocrystalline silver which is as an antimicrobial agent for the treatment of wounds and burn dressing that is coated with nanocapsules containing antibiotics.

15 new EU research projects are devoted on antimicrobial resistance. Following three projects, nanotechnology-based are funded by the EU Seventh Framework Program (FP7):

- *PneumoNP* (Nano therapeutics to treat pneumonia infections)
- *FORMAMP* (Innovative Nano formulation of antimicrobial peptides to treat bacterial infectious diseases)
- *NAREB* (Nano therapeutics for antibiotic resistant emerging bacterial pathogens)

5. CONCERNS (BENEFITS VS RISKS)

Rapid emergence of nanotech applications in consumer products has raised a number of ethical and societal concerns ranging from possible health risks of using or consuming nano enabled products, to their effects on the environment, intellectual property rights governing them, and the new challenges they may raise. The developments in food nanotechnology are comparable to those of genetically modified foods, another area that has been controversial, with many consumers being suspicious of the technology involved.

In a scientific paper published in March 2015, academic concern was expressed: Silver nanoparticles are a continuous source of ions that could be toxic for aquatic organisms that are swimming around or in the sediment. It will end up in the food chain (EFSA, 2011).

4. CONCLUSION

Nanotechnology and nanoparticles has a great potential for use in various fields with great challenge and perspective for use in medicine.

Major goal of nanomedicine to improve health and lives globally, by improving diagnostics and treatments of patients suffering from a range of disorders overcoming some of the difficulties experienced by usual medical approaches.

Nanomedicine can play an important role in ensuring enough of the drug enters the body, stays in the body for long periods and is targeted specifically to the areas that need treatment. At the same time use of nanotechnology must be safe for the patient.

It is possible, by studying and identifying individual molecules, to diagnose disease in time to improve the prognosis for the patient.

5. REFERENCES

- Guidance on the risk assessment of the application of nanoscience and nanotechnologies in the food and feed chain. Scientific opinion. EFSA Authority. EFSA Journal, 2011, 9 (5): 2140.
- Bata-Vidacs I, Adanyi, Becmer NU, Farkas J, SzekacsA. Nanotechnology and Microbial Food Safety. Microbial pathogens and strategies for combating them: science, technology and education (A. Mándar-Vilas, Ed.) © FORMATEX 2013.
- Belkanychev VI, Malkouin II. Nanomaterials and Coatings with Antimicrobial Properties. Nanoscience and nanotechnologies. Nanoscience and Nanotechnologies. Encyclopedia of Life Support Systems (EOLSS), 2013.
- Duncan V. T. Applications of nanotechnology in food packaging and food safety: Barrier materials, antimicrobials and sensors. Journal of Colloid and Interface Science, 2011 Nov 1; 363(1):1-24.
- Jokanovic V. Nanomedicina, najveci izazov 21 veka. DATA STATUS, Beograd, 2012.
- Santos CL, Albuquerque AJR, Sampaio FC, Keyson D. Nanomaterials with Antimicrobial Properties: Applications in Health Sciences. Microbial pathogens and strategies for combating them: science, technology and education (A. Mándar-Vilas, Ed.) © FORMATEX 2013.
- Sondi I, Salopek-Sondi B. Silver nanoparticles as antimicrobial agent: a case study on *E. coli* as a model for Gram-negative bacteria. Journal of Colloid and Interface Science 275 (2004) 177–182.