

New Trends on Sensing- Monitoring- Telediagnosis for Life Sciences

NT SMT-LS 2015

Brasov, Romania, Sept. 3-5, 2015

BOOK OF ABSTRACTS



Editors

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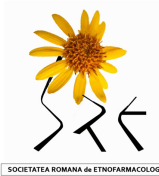
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1. Telediagnosis for Medicine

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**KN.1.1. ETHICAL ASPECT OF TELEMEDICINE
IN GLOBAL HEALTH**

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Developing ethical standard in global health in conjunction with the worldwide development of telemedicine requires an approach with greatly professionalism to the individual experience of each country on the opportunities and challenges related to the use of telemedicine, data that can be achieved only on the basis of initial research over the structures of decision-world countries.

Economic analysis does not affect the ethical analysis, the standards being connected with: satisfying indispensable and beneficial need, discretion and judgment, knowledge and skill, professional ideas, social services, legal status, well-formulated standards of admission and a very clear code of ethics.

The correlation between the global development and telemedicine will stand in focus of policy-makers in health domain, in recent years, given the need to establish an optimal balance between costs, resources and moral obligations.

KN.1.2. NEW ROLES FOR OLD DIETS: NEUROPROTECTION

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According to WHO estimations, 47.5 million people are currently living with dementia and 7.7 million new cases arise each year. There is still no cure for the major forms of dementia and neurodegenerative diseases (e.g. Alzheimer's, Parkinson's) and the estimated annual costs for healthcare systems worldwide are around US\$ 604 billion at present. The onset of neurodegenerative diseases and neuronal death occurs progressively along lifetime, much before first symptoms appear giving first-hand importance to protective and therapeutic strategies to circumvent neurodegeneration. Lately, it has been proposed that the use of natural products in diet, like the Mediterranean diet, seems to be an affordable and promising strategy. However, it has to be proven which components of dietary source convey neuroprotection and if they can reach the brain. As so we studied the neuroprotective ability and brain availability of some polyphenols present in tea and fruits that are also included in Mediterranean diet, using in vitro cell culture systems. We found that epigallocatechin gallate and cyanidin-3-glucoside are able to cross our blood-brain-barrier model and protect neurons from oxidative damage, particularly the first one, suggesting that their dietary inclusion may provide an affordable mean to reduce the impact of neurodegenerative diseases.

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**KN.1.3. EXTREME LIGHT INFRASTRUCTURE -
NUCLEAR PHYSICS (ELI-NP): STATUS AND
PERSPECTIVES.MEDICAL APPLICATIONS**

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The ELI-NP (Extreme Light Infrastructure - Nuclear Physics) facility, under construction in Magurele, Romania, will make possible experiments with high power lasers of 100 TW, 1PW and 10PW. The interaction of a high power laser with a solid, liquid or gaseous target can generate secondary radiation: electron, proton, or neutron beams and X-rays. Of particular interest are irradiation experiments of biological samples (proteins, DNA, cells, tissue) with multi-component, particle beams (for example protons and electrons). This will lead to understanding of biological material response to such complex conditions, available only in space missions. Future therapeutic applications for cancer could benefit from irradiation studies with combined or alternate particle beams that will use the radio-sensitization effect of resistant cancer cells and achieve dose reduction. At ELI-NP the two 1PW lasers (repetition rate of 1Hz) will be used for this purpose. An experimental set-up was designed for high throughput irradiation of bio-samples in a standard 96 well plate. SRIM-TRIM and GEANT4 simulations will provide insight in the spatial distribution of the deposited dose and dose estimations, as well as input for the experimental set-up optimization. Real-time sensing and diagnostic solutions will need to be developed to quantify the cellular response to radiation.

KN.1.4. UNDERSTANDING INDIAN TRADITIONS IN MUSIC THERAPY

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The hypothesis according to which music can be used to cure, comfort or stimulate has a special echo for any expert or student who is interested in Asian music. Some of the oldest Indian sources regarding the theory of music have provided information about the tight relations between music and medicine or physiology, especially aspects related to the genesis of the musical sound. The aesthetics of the Indian music strongly focuses on psychology and the structural aspects of music. The way an Indian musician inspires a listener can provide ways to comfort pains or any other therapy related actions. There are experts in music therapy both in India and abroad the Indian subcontinent. There are doubts whether they apply either the theory or their therapeutic methods as related to the classical Indian tradition. It really seems surprising that both the literature about the traditional Indian musicology and the indigenous Indian medicine of Ayurveda have little to say with reference to this issue. Nevertheless, the Indian medicine refers to music therapy. Although there is no clear evidence as regarding this issue, it is pretty obvious that the Indian medical treatments involve magical-religious related phrases and incantations - mantras - related both to the preparation of medicines and to the cure of some diseases.

KN.1.5. DETECTION OF CIRCULATING TUMOR CELLS IN BREAST CANCER PATIENTS

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Introduction: The appearance of circulating tumor cells in the blood vessels is an accentuated step during the metastasis formation. Based on the basic properties and the surface markers of the disseminated cells we can infer to the malignity of the primary tumor and monitor the disease state. Based on these considerations, the appropriate modeling of the *in vivo* tissue environment plays an important role in the course of *in vitro* investigation of the tumor spread.

Aims: We planned to develop isolation and culturing methods of circulating tumor cells obtained from cell lines and also from breast cancer patients and to investigate the growth characteristics, the phenotype of these cells by analyzing their surface markers, cytoskeleton and viability capabilities. Our long term aim is to find relationship between the number of circulating tumor cells, the state of the disease and the effectiveness of the applied therapy.

Results: As pre-investigation of future samples from breast cancer patients we started to develop and test 3D fibrin matrices with tumorigenic and non-tumorigenic cell lines by fluorescent dyes and microscopic methods. Also, different attempts were made to isolate tumor cells from peripheral blood of breast cancer patients.

O.1.1. THE ROLE OF TELEMEDICINE IN NATIONAL EFFORTS TO REFORM RESIDENCY EDUCATION IN SURGERY

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The old system of teaching for resident doctors in the surgery field in Romania, led in the present days to a heterogeneous training of the young specialists. The theoretical training and the acquisition of evidence-based surgery skills by the resident doctors in the surgery field are generating a lot of differences of their professional competency, with side effects affecting both the future specialists, as well as the future patients.

Solving the problem is a difficult task, but we imagined an effective solution, consisting in picking up a model of training and evaluation of the resident doctors, both with international validated results from those existing in the world, even different. For the Romanian system, a strategic implementation of a new surgical residency model is possible in three steps in order to be effective to obtain a certain standardization of the residents' training.

Despite some objective factors which are opposing to obtain such standardization, using the telemedicine is a viable solution and not very expensive, as processing vehicle. Telemedicine could be the fastest and more effective way by which the national efforts to reform residency education in surgery become reality. In the centre of this reform, the creation and using of a dedicated e-learning multi-centric platform will be mandatory.

Telemedicine will also provide an appropriate access to teaching evidence based medicine for the surgery residents and, in the same time, a real assessment of the surgical competency of them by the National Committees of each surgical speciality. In this way, the telemedicine would provide by real a needed new surgical residency model.

**O.1.2. LAP MENTOR CHOLECISTECTOMY
MODULE – VALUABLE TRAINING SOLUTION
FOR YOUNG SURGEONS**

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Minimally invasive surgery has become gold standard for many surgical procedures such as cholecystectomy.

The LAP Mentor (Synectics^R) surgical simulator was created to provide a lifelike training solution for young surgeons. It has a comprehensive library of modules which facilitate learning of many surgical procedures.

The cholecystectomy module provides a step by step tutorial of the laparoscopic cholecystectomy focusing on critical steps of the procedure: dissection clipping and cutting the cystic artery and duct and removal of the gallbladder from the liver bed.

Many studies have showed over the years the efficiency of the LAP Mentor as a training tool not only for cholecystectomy but for many other surgical procedures.

LAP Mentor proves to be a valuable tool for any trainee and the inclusion of this simulator into the surgical residency training program should be considered.

**O.1.3. TELEMEDICINE IN EX-COMMUNIST
COUNTRIES - AN OPPORTUNITY OR A
NECESSITY IN MEDICAL STAFF MIGRATION
CONTEXT**

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The massive migration of doctors, nurses, biochemists, psychotherapists and other health professionals in the former communist countries to other countries where the standard of living and working conditions are much better, made the medical and psychological assistance to the population in many regions to suffer, the coverage level with qualified personnel is often very small.

External migration is added to internal migration, often arises within the general trend of graduates wishing to practice only in major university centers, thus deepening shortage of skilled in deprived areas, once covered by mandatory distributions from an institution of higher education graduation.

In this context, based on official documents, raises two major problems of using telemedicine in compensatory purpose:

1. telemedicine alone is able to fill this lack of medical professionals in certain regions and
2. to which extent countries benefiting of well-prepared personnel should contribute to the development of telemedicine in the countries of origin of imported staff

To the ethical dilemmas raised by using telemedicine is added another one: it is moral to advocate for replacing direct consultation with that provided by telemedicine, given the condition that this system does not solve the underlying problems of health insurance, but can have a positive effect undeniable.

O.1.4. MONITORING OF LIVER FUNCTION IN PATIENTS TREATED WITH SSRI

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Background: Major depressive disorder is one of the most prevalent psychiatric illnesses in the World affecting more than 12% of men and more than 21% of women in their lifetime. Often is as debilitating illness even more severe than diabetes or hypertension. Selective serotonin reuptake inhibitors (SSRIs) are worldwide prescribed to treat depression. SSRIs drugs can cause drug-induced liver injury (DILI).

Aims: The aim of the study was to evaluate the liver function in patients treated with SSRI in order to detect DILI.

Methods: All the patients treated for Major depressive disorder (MDD) diagnosed according to DSM-IV-TR (Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revision) for at least 6 months hospitalized between January 2014 and December 2014 were entered into the study. The hepatic function panel included ALT, AST, Total and Direct Bilirubin, Albumin, Total Protein, GGT, PT, LDH, Hepatitis B, and Hepatitis C.

Results: Of 78 patients 67 (73%) were treated with SSRI with mean age were 47.5 (SD= 6.7), 43 women (64.1%). 10 patients (7.8%) were newly diagnosed with hepatitis, and 3 (4.4%) presented elevated values of ALT, AST. The mean duration of depression was 12.5 years (SD=7.3). A large proportion of patients (42%) were treated with antipsychotics as augmentation of antidepressant treatment.

Conclusions: The treatment with SSRI seems to be effective and safe in our sample. A relative high number of patients with MDD were diagnosed with viral hepatitis during this cross-sectional study. Aminotransferase surveillance is the most useful tool for detecting DILI, and prompt discontinuation of the drug responsible is essential. Further randomized and controlled trials are needed.

**Q.1.5. THE USE OF DERMATOSCOPES,
SURGICAL LENSES AND SURGICAL
MICROSCOPES IN THE DIAGNOSIS AND
TREATMENT OF CUTANEOUS TUMORS**

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Surgical lenses have been aiding surgeons to complete their mission with greater precision for some time now. Although they are currently used by few surgeons in clinical practice in our country, the surgical lenses use has increased in the past few years due to the higher demand for perfection, esthetical and functionally speaking and the lenses help do just that. Their younger brother the surgical microscope is a marvelous piece of engineering but due to the high cost of the microscope itself and also high cost of maintenance this piece of technology is still hard to have in a clinic outside Neurosurgery (a must).

Our clinic tries to take advantage of this technology by using multiple surgical lenses (2.5x DesignforVision; 4x Riestler Lens and a 4.5x Heine Lens set complete with 16000 Lux lightning system) and also a Karl Zeiss surgical microscope which help us deliver great results in cases of cutaneous tumor excision, allowing us to be both radical and conservative at the same time and other pathologies such as cleft lip repair (in congenital labio-maxilo-palatine cleft) with best esthetic results, allowing us to repair the defect with surgical sutures down to 9/0 size.

The paper will show the superior results that we and all surgeons can get by using surgical lenses and microscopes and will also encourage making a small investment (personal surgical lens kit) that is well worth the results.

O.1.6. SPECT – AN OPEN WINDOW INTO THE BRAIN

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"A few years ago, the psychiatrists were the only medical doctors that never look at the organ they treat. And when you never look at it, you miss brain trauma, you miss seizure activity, and you miss toxicity" (Dr. Daniel Amen).

In our days, Psychiatry is moving into a more biologically based paradigm and SPECT techniques provide a powerful tool and an open window into the function of the brain and promise to become an important component of the routine clinical evaluation of patients with neurological and psychiatric diseases, particularly in cerebrovascular diseases, dementias, epilepsy, head injury, obsessive-compulsive disorder, schizophrenia, depression, panic disorder, and drug abuse.

Most of the time, doctors can diagnose a child or adult with attention deficit disorder (ADD) simply by observing their behaviour and asking parents or spouses to describe their attention or behaviour problems - when they started, where they occur, and so on.

SPECT - Single Photon Emission Computed Tomography (SPECT) a new neuroimaging technique has aroused the most interest among those suspected of having ADD and ADHD. A 20-minute test measures blood flow within the brain, can show which regions are metabolically active ("hot") and which are quiescent ("cold") and provide information impossible to obtain from a simple clinical examination. Basically, it helps the doctors to give a diagnostic based on clear evidence, not on guessing in the dark.

P1.1. IMPROVING CARDIOVASCULAR AND RENAL PROTECTION IN CORONARY ARTERY DISEASE BY DRUGS WITH ANTIOXIDANTS EFFECTS

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Aims: In patients with coronary artery disease: stable angina (SA) and non ST acute coronary syndrome (unstable angina-UA, acute myocardial infarction with ST elevation - STEMI and without ST elevation – NSTEMI) incidence of sudden cardiac death, other major acute cardiovascular events (MACE), blood pressure control and renal function were evaluated in relation with administration of drugs with reducing effects on oxidative stress, platelets hyperactivity and endothelial dysfunction. **Methods:** 400 patients (pts) with coronary artery disease were divided in 8 groups: 4 treated untreated with drugs with complementary mechanisms mentioned above and 4 groups treated with drugs without this. Biomarkers for oxidative stress (Total antioxidant status, Myeloperoxidase), platelets hyperactivity (ASPItest, ADPtest by Multiplate®), endothelial dysfunction (von Willebrand factor activity, flow mediated dilation -FMD), kidney disease - creatinine clearance, blood pressure values and MACE were evaluated for 2 years. Statistic analysis: multiple regressions, chi square test. **Results:** In patients with stable angina and non ST acute coronary syndrome treatment with drugs with mentioned effects was followed by significant reduction in incidence of sudden cardiac death ($p<0.05$), cardiovascular death ($p<0.05$), nonfatal AMI ($p<0.025$), improving of blood pressure control ($p<0.05$), and renal function ($p<0.05$) in comparison with control group. **Conclusions:** In patients with stable and non ST acute coronary syndrome, a significantly reduced incidence of: sudden death, other cardiovascular death, acute myocardial infarction and a significantly improved blood pressure control and renal function were observed in groups treated with drugs with reducing effect on oxidative stress, platelets hyperactivity and endothelial dysfunction in comparison with control groups.

P1.2. DECREASING CARDIOVASCULAR DISEASE HEALTH COSTS THROU TELEMEDICINE. ARE WE PREPARED?

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Background: It is not clear yet if we can produce a benefit from accelerating the transition towards implementing decision support systems and monitoring solutions because of the knowledge of the patients. **Materials and methods:** Retrospective interview 262 patients admitted in the Cardiology Department, 45-65 years, with home treatment for high blood pressure (BP). Effectiveness of the medical treatment, rates of readmissions, use of the internet solutions and home medical devices for health status monitoring were evaluated. Statistics performed with Excel and EpiInfo. **Results:** Average 55.6 years, 53.43% female, 19% rural areas. Mean body mass index 26.2kg/m² at discharge, 27.15kg/m² at the interview. 26% readmitted at least once during this period. 25.57% used internet for health learning. 66% personal-computers, 25% Smartphone's, 9% tablet users. Manual BP or heart rate devices was 26.7%, 67% males. No users of telemedicine systems. Monthly income below 1500 RON, 72.5%. Patients with monthly income over 1500 RON interested to use the telemedicine more frequently than with low incomes 62.5%. More than 80% were interested in buying a monthly subscription.

Conclusions: Efficient BP control is closely related to hospital readmission rates. The downside towards using telemedicine is the monthly income in relation with the higher costs of the medical devices.

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P.1.3. ASSESSMENT OF SALIVARY ENZYMATIC PROFILE FOR ESTABLISH THE PERIODONTAL DIAGNOSIS

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Background: Periodontal diseases are considered to be inflammatory disorders which affect the oral activity. In response to periodontal inflammation, in addition to enzymatic and non-enzymatic antioxidants, numerous intracellular enzymes are released in saliva, such as: aspartate and alanine aminotransferase (AST and ALT), alkaline phosphatase (ALP), creatine kinase (CK). Salivary antioxidant and intracellular enzymes appear to be useful for the screening of periodontal disease or to measure the efficiency of periodontal therapy.

Objectives: The objectives in the present study were to analyse the salivary enzymes before and after periodontal treatment and to assess the differences of salivary enzymatic activities and clinical parameters (CPITN index) before and after periodontal treatment.

Methods: The study included 20 persons with chronic periodontitis and 10 healthy adults. Periodontal status of subjects was evaluated by CPITN index before treatment and at one and two month after treatment. The salivary enzymes were determined using colorimetric method. Statistical analysis was performed using commercial statistical software IBM SPSS statistics 20. **Results:** The activity of salivary SOD for patients was significantly lower compared with healthy persons ($p < 0.001$). The activity of salivary ALP, AST, ALT, CK of patients were significantly higher versus healthy persons ($p < 0.001$). There is a good correlation between the salivary enzymatic activities of SOD, ALP, ALT, AST, CK and the values of CPITN index.

Conclusions: The evaluated salivary enzymes can be considered as biochemical markers for establish the periodontal diagnosis and the monitoring chronic periodontitis patients.

P.1.4. EFFECT OF FLAVONOIDS AND OXYGEN ON PRIMARY AND METASTATIC HUMAN COLON CANCER CELLS GROWTH AND METABOLISM

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Introduction: Flavonoids are present in many fruit and vegetables, and are used as diet supplements. Quercetin and epigallocatechin gallate (EGCG) can affect lactate synthesis through inhibition of glutaminolytic enzymes - lactate dehydrogenase, malic enzyme, and L-glutamate dehydrogenase. The common feature of cancer cells is glycolytic synthesis of abundant amount of lactate even in the presence of sufficient oxygen level (the Warburg effect). However, cancerous cells can produce lactate also in oxygen-dependent glutaminolysis.

Aim: The aim of the study was to compare the effect of quercetin and EGCG on cell number and lactate production in the primary and metastatic colon cancer cells under tissue normoxia and hypoxia.

Materials and methods: The study was carried out on the primary (SW 480) and metastatic (SW 620) human colon cancer cells cultured at 1% hypoxia and 10% tissue normoxia using hypoxic chamber with oxygen controller. Quercetin and EGCG were added to the culture medium at pharmacologically relevant blood serum concentrations. Cell number was determined by trypan blue exclusion assay with the use of automatic counter, glucose and lactate levels with Randox kits.

Results: Studied flavonoids showed high inhibitory effect on both primary and metastatic colon cancer cell number. Their effect was more pronounced at hypoxia than normoxia. Quercetin and EGCG decreased lactate synthesis, but had no effect on glucose utilization in both lines, at both oxygen levels. There was no significant difference between quercetin and EGCG effect on lactate production.

Conclusions: Quercetin and EGCG attenuate lactate production but do not disturb glucose consumption by colon cancer cells. Thus, they may affect non-glycolytic (glutaminolytic) lactate formation.

P.1.5. INFLUENCE OF pH FOR SEROTONIN DETECTION

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Tests for identification and quantification of substances need to become more sensitive and more specific due to the progress of science by involving them in the diagnosis, control and monitoring of conditions such as depression, migraines, autism, inflammatory syndromes, serotonin-secreting carcinoid tumors.

The paper aims to optimise the detection methods for serotonin using Differential Pulse Voltametry (DPV) and screen-printed electrodes, at different pH values (5.8, 7 and 7.4).

Serotonin was studied separately, but also in combinations with dopamine and ascorbic acid, in order to analyze the different interferences effects of their mixtures.

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P.1.6. ACUTE VIRAL HEPATITIS A IN ACTUALITY AGAIN

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Acute viral hepatitis A is a worldwide vaccine-preventable disease, with yet increased incidence in less developed areas. The greatest reductions of incidence were seen in those states where routine vaccination of children is applied.

The transmission of virus A is almost exclusively fecal-oral by contact with sick person. Risk factors for the disease include close contacts of recently infected individuals, overcrowding and poor sanitation. The most commonly affected are the children. The illness is more often mild, but severe disease, including fulminant hepatic failure, can occur. After establishing the diagnosis the next steps for preventing the expanding infection is tracing contacts and notifying local public health authorities for taking appropriate measures.

In Romania, under the law, acute viral hepatitis requires hospitalization for isolation and treatment, with high costs. In the Infectious Disease Hospital of Brasov were admitted in 2014 a number of 519 patients with acute viral A hepatitis; 78,42% were children, with higher frequency in the age group of 5-14 years; 69,94% were from rural areas. The number of hospitalizations days was great (4159).

In conclusion we consider that application of prophylaxis pre-exposure (vaccination) and post-exposure (passive immunization) is absolutely necessary for the decrease of the incidence of acute viral hepatitis A.

P.1.7. WAS THE ANTI - HPV VACCINATION CAMPAIGN SUFFICIENTLY ORGANIZED?

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The fight against cervical cancer through vaccination and screening brings an important long-term benefit in controlling and decreasing this type of cancer.

The purposes and objectives of the research were followed by a questionnaire composed of 6 questions that follows the awareness on primary prevention through vaccination of cervical cancer, of 484 parents whose children were recommended to get vaccinations.

The results highlighted that although people did not know the benefits, contraindications, possible adverse reactions, and also the international use of the vaccine in a big number, they participated in taking a decision about vaccination of their own children anyway.

The faculty organisation of these campaigns bring prejudicial actions of the vaccination campaigns, generally by forcing people to take decisions without the adequate information.

P.1.8. ARE THE CERVICAL CANCER PREVENTIVE MEASURES KNOWN ENOUGH?

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The prophylactic methods in the case of cervical cancer have been based on the early detection of disease by cytological screening but in the last years it has been added the primary prophylactic method through vaccination.

The study took place between 1st November 2009 and 30th April 2010, on a sample of 315 people, with aim to evaluate the information level related to cervical cancer, preventive methods for its occurrence, by filling out a survey comprising 5 questions. According to the acquired results, the majority of respondents considered the cervical cancer a serious health problem, regarding which they have no knowledge about prevention methods, being aware at the same time that they do not have enough information about vaccination, although they considered it ineffective as a method of prophylaxis. Beginning of sexual education is considered appropriate around the age between 14 and 16 years old.

P1.9. THE ROLE OF BIOMARKERS IN ACUTE CORONARY SYNDROMES ASSOCIATED WITH ARTERIAL HYPERTENSION

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Aims: To evaluate in patients with non ST elevation acute coronary syndrome (ACS) the correlations between arterial hypertension, oxidative stress, platelets hyperactivity, endothelial dysfunction and prognosis.

Methods: 240 patients (pts), with ACS were divided in 2 groups: Group HTA (128 pts) with ACS and arterial hypertension; Group non HTA (112 pts) with ACS without arterial hypertension. Biomarkers for platelets hyperactivity - ADPtest=Adenosine diphosphate test; ASPItest=Aspirin test (by Multiplate®), endothelial dysfunction. (von Willebrand factor activity, flow mediated dilatation), oxidative stress (Total antioxidant status, Myeloperoxidase) and major acute cardiovascular events (MACE) were evaluated for 2 years of follow up. Statistic analysis: multiple regressions, chi square test.

Results: In patients with ACS and HTA a significantly increased incidence of: cardiovascular death ($p<0.05$), acute myocardial infarction($p<0.025$), stroke($p<0.05$), low left ventricle ejection fraction($p<0.05$), high global wall motion score index($p<0.05$), low Total antioxidant status value, high Myeloperoxidase MPO IgG ELISA titres, high ASPItest value, high Von Willebrand factor activity, low Flow mediated dilatation - $p<0.05$ - were observed at 2 years of follow up in comparison with group with ACS without HTA.

Conclusions: In patients with ACS and HTA a significantly increased incidence of: cardiovascular death, acute myocardial infarction, stroke, low left ventricle ejection fraction, high global wall motion score index, high oxidative stress, platelets hyperactivity and endothelial dysfunction were observed at 2 years of follow up in comparison with group with ACS without HTA.

**P.1.10. DEVELOPMENT OF IN VITRO ASSAYS
FOR THE EVALUATION OF
GASTROINTESTINAL DIGESTION AND
ABSORPTION OF BIOPOLYMERS**

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The approval of new molecules as food additives/processing aids requires a big effort in term of budget due to the high cost of toxicological studies, and in particular those performed in animals. The possibility to apply in the first stages, *in vitro* tests seems quite useful, strategic and ethic since it allows the reduction of studies performed in animals.

In this study, an *in vitro* model has been set up in order to evaluate the gastrointestinal digestion and the relative absorption of new molecules proposed in organic winemaking. In particular, a model of human gastrointestinal digestion was developed by using a sequential proteolytic attack by pepsin and pancreatin. The digestion process was evaluated by spectrophotometric and chromatographic methods. The absorption of the molecules through intestinal barrier and the effect on its integrity was assessed using differentiated CaCo-2 cells by TEER (trans-epithelial electrical resistance).

The experimental approaches, described here, were developed in the framework of the European project STABIWINE (Use of biopolymers for sustainable stabilization of quality wines). The results showed the suitability of the methods developed for the assessment of the digestion and absorption of molecules, including biopolymers used in winemaking.

Acknowledgments: The research has received funding from the European Community's Seventh Framework Programme under Grant Agreement n° 314903. It has been carried out within the STABIWINE project (www.stabiwine.eu). This paper does not necessarily reflect the Commission views or its future policy on this area.

**P.1.11. LACTOSE INTOLERANCE - ONLINE
MEDIA OVERVIEW**

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People were concerned about the products they use in food and the impact that they have on their health.

Lactose intolerance to milk and milk-derived foods, is one of the most common forms of food intolerance and also the most important by its nutritional consequences.

This paper aims to present the relationship milk-digestive system in pathological situations: lactose intolerance and allergy to cow milk protein, using scientific literature and also data indicated in online media concerning this topic.

Online media is one of the important source of information for people, and sometimes the level of knowledge presented are insufficient or inadequate presented by people how have no medical-related background.

P.1.12. TELEMEDICINE USES IN PHARMACOLOGY AND DRUG INTAKE

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Developments of the new technologies bring new options to patients beyond the space of traditional medical visit and are a promising tool in supporting the pharmacotherapy. Before implementation in daily medical practice these have to be scientifically evaluated for their effectiveness. The aim of present paper is to reveal the present uses and challenges associated with e-health technologies in drug prescription and use. Available data on methods, systems, tools and technologies used in drug prescribing and administration, in improving compliance to treatment and correct intake in chronic treatment, in supplying feed-back information to treating physician and their impact in various clinical situations are reviewed.

E-technologies may facilitate the translation of the medical professionals' role from that of medical authority to that of medical guide in a patient centered model of health care. Training programs in telemedicine for medical students are needed in order to facilitate the successful applicability of these e-strategies, but also for designing telemedicine flexible and user-friendly software which would allow people with the lowest level of knowledge and skills to use them.

Research is needed to identify factors influencing the potential beneficial effect and to establish the best strategies for implementation.

Acknowledgement

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P.1.13. CELIAC DISEASE - ONLINE MEDIA INFORMATION

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This paper raises the issue of gluten intolerance, considering the multitude of food on the market that contains traces of gluten or gluten. Celiac disease (celiac disease) is intolerance to gluten that occurs with a frequency of about 1/100 people, especially in individuals genetically predisposed.

The paper aims to analyze the level of information on the subject of celiac disease and the accuracy of the information provided on this disease population by online media.

Study on analysis of media articles online about celiac disease was conducted on 25-28 March 2015. It was used as keywords "celiac disease", and the search engine "Google.ro". 50 articles were selected according to the order of appearance on the page and publishing them in 2014 and were added to the database Excel. Selected articles from online media were systematized in the database and studied by type of publication page, image presence, author, the main theme, tone of the article, etc.

**P.1.14. INCREASING EFFECT OF ESSENTIAL OIL
FROM *MYRICA RUBRA* LEAVES ON
ANTIPROLIFERATIVE AND PRO-OXIDATIVE
ACTIVITY OF DOXORUBICIN IN CaCo2 CANCER
CELLS**

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Introduction: Chinese bayberry (*Myrica rubra* Sieb. et Zucc) is a subtropical Asian fruit tree with traditional use in folk medicines. The essential oil from leaves of *Myrica rubra* (MRO) was prepared using hydrodistillation. Essential oils are concentrated natural plant products rich for volatile aroma compounds mainly mono- and sesquiterpenoids. The aim of our present study was to test the effect of MRO on efficacy of cytostatic drug doxorubicin (DOX) in cancer and non-cancerous cells. **Materials and Methods:** 1)*Materials:* The MRO was prepared using hydrodistillation. Human intestinal cancer CaCo2 cell line and rat isolated hepatocytes as a model of non-cancerous cells were used. 2)*Methods:* The cells were exposed to MRO, DOX and MRO+ DOX combination in various concentrations for 24, 48 and 72 hours. In the end of experiments, the viability and number of cells were assayed using MTT and Neutral Red Uptake tests. To assess generation of reactive oxygen species in cancer cells or in hepatocytes, measurement of 2',7'-dichlorodihydrofluorescein-diacetate (H2DCF-DA) oxidation was used. **Results:** The results showed significant potentiation of DOX antiproliferative and pro-oxidative effects in cancer CaCo2 cells. On the other hand, MRO did not affect DOX toxicity and DOX-mediated ROS formation in isolated hepatocytes.

Acknowledgement: This work was funded by Czech Science Foundation, Centre of Excellence No. P303/12/G163

P.1.15. TOTAL ANTIOXIDANT CAPACITY IN CHILDREN WITH MITOCHONDRIAL DYSFUNCTION

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The range of clinical manifestations that occur in patients with mitochondrial disease is as broad as possible, but global development disorder and epileptic encephalopathy are common. Increased oxidative stress has been reported to contribute to the pathogenesis of these manifestations of mitochondrial dysfunction. The interferences between oxidative stress and mitochondrial dysfunction are already suggested in the literature, but should be further clarified.

We have investigated the impact of this oxidant overload on the level of plasma total antioxidant capacity (TEAC) and antioxidant gap (GAP) in three groups of children (age less than 10 years): group I made of 25 subjects with global development disorder, Group II- 22 subjects with epileptic encephalopathy, Group III- 20 control subjects.

We have identified the following statistically significant differences for both parameters: TEAC, Group I (1.040 ± 0.038 mmol/l) vs Group III (1.567 ± 0.048 mmol/l) ($p < 0.001$), Group II (0.964 ± 0.033 mmol/l) vs Group III ($p < 0.001$); GAP Group I (0.451 ± 0.036 mmol/l) vs Group III (9.854 ± 0.049 mmol/l) ($p < 0.001$), Group II (0.412 ± 0.034 mmol/l) vs Group III ($p < 0.001$); No significant differences between Group I and Group II were found.

In conclusion, children suffering of development disorder and epileptic encephalopathy have decreased TEAC and GAP values when compared with controls.

These results may be interpreted in the context of mitochondrial inefficiency, which promotes the production of excess reactive oxygen species, consuming antioxidants, and results in further cell damage and aggravation of mitochondrial dysfunction.

**P.1.16. TELEMEDICINE – A NEW AND ORIGINAL
WAY TO FULFILL THE REQUIREMENTS OF A
COMPLETE TRAINING AND CERTIFICATION IN
PLASTIC SURGERY, AVOIDING THE
DEVELOPMENT TO THE RESIDENTS OF THE
BURN-OUT SYNDROME**

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In Romania, the system of training of resident doctors in the plastic surgery field, carried out in the manner determined by the decision makers of the educational medical system, has led to an uneven training of future specialists.

The simplest solution would be picking up a model of training and evaluation of the resident doctors, both with international validated results. Unfortunately, these models are different in the world, being specific to each country. For the Romanian system a strategic change in three steps would be effective to obtain a certain standardization of theoretical and practical training of the residents. Despite some objective factors which are opposing to obtain such standardization, using the telemedicine is a viable solution, not very expensive, as deployment and inward processing vehicle. Telemedicine could be the fastest and effective way to reorganize the residency period, by some methods grouped in the framework of a specific strategy, consisting in the creation and using of a dedicated e-learning multi-centric platform. Telemedicine could become also a way to avoid the development to the residents of the burn-out syndrome generated by those residents who are fully aware of the risks to which they will be exposed by the incomplete training, after obtaining the quality specialist, manifested by possible accusations of malpractice. The vast majority of the factors determinants of the burn-out syndrome may be cancelled by involving the telemedicine in the re-organization of the residency period in plastic surgery.

P.1.17. TELEMEDICINE IN THE EXPLORATION OF URINARY SYSTEM

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Introduction: Urine analysis is the starting point in the diagnosis of a large number of the urinary tract diseases. Telemedicine allows virtual transmission of data from laboratory to the clinician, making it possible the achievement of accurate and rapid etiologic diagnosis.

Objective: The study objective is to use telemedicine for evaluating the urinary system function.

Material and methods: The study was retrospective, on a sample of 54 cases, with different age and pathology. The subjects brought their urine samples to a laboratory from Constanta and then were sent to the Physiology Department within the "Ovidius" University from Constanta for analysis. The results were sent by telemedicine to an urologist and a nephrologist in order to achieve a clinical diagnostic.

Results: From the study group, 39% subjects were healthy and 61% had symptoms associated to the urinary system. Most patients were female (70%) and was the most affected age was 18- 38 years (43%). From the patients, 64% presented pathological changes in the urine sample.

Conclusion: Our study sustains the fact that telemedicine allows diagnosis optimisation by the possibility of transmitting digital information through interdisciplinary, both in the country and abroad.

P.1.18. THE USE OF TELEMEDICINE IN THE CERVICAL REGION PATHOLOGY

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Introduction: Computer Tomography (CT) examination is a peak imaging method for exploring the body, including the cervical region. Transmission of images by telemedicine offers a quickly diagnosis, allowing the achievement of a proper treatment scheme for the patient. This allows the reduction of material and financial resources both for the patient and the medical system.

Objective: The objective of the study is the use of telemedicine in achieving the diagnosis from the distance for patients with symptoms of cervical region, evaluated by CT.

Material and methods: In this study we comprised 26 patients who were evaluated by CT for different symptoms of the neck. Imaging data obtained were transmitted for evaluation to 2 radiologists by telemedicine. Patients received also by telemedicine the results of the two specialists and indications for subsequent assessments to other medical specialties.

Results: The study group comprised 65% women and 35% men. After the CT scan we obtained the following results: 19% were healthy, 62% had loco regional lymph nodes, 19% presented thyroid nodules, 31% had tumour formations and 12% presented other radiological changes.

Conclusion: Telemedicine can be successfully used in the correct and efficient assessment of patients with symptoms of the cervical region.

P.1.19. CONSIDERATIONS REGARDING THE PATHOGENIC ROLE, FREQUENCY AND DISTRIBUTION OF MULTIRESTANT BACTERIA IN HOSPITALIZED PATIENTS

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The increase of the bacterial resistance to antibiotics due to the misuse of these drugs in agriculture, human and veterinary medicine, and the fast spread of the resistant strains from the healthcare units into communities represent an actual worldwide serious concern. The aim of our retrospective study consisted in the evaluation of the frequency of isolation of multiresistant bacteria, infections spectrum and distribution of these strains in the wards of a multidisciplinary hospital from Brasov, Romania.

There were analyzed various samples prelevated from the hospitalized patients during 2014. From the 584 isolated *Staphylococcus aureus* strains, 36.99% were MRSA (Methicillin-Resistant *Staphylococcus aureus*). These strains were isolated more frequently from the Surgical ward (29.6%), from Dermatology (23.1%) and Intensive Care Unit (14.8%) and have been more frequently etiologically implicated in wounds infections (41.2%), varicose ulcers infections (20.4%), lower respiratory tract infections (10.2%) and visceral abscess (7.9%). From the 2130 Enterobacteriaceae isolates, 25.54% were ESBL (Extended Spectrum Beta-lactamases) producing strains. This mechanism was present more often in *Escherichia coli* (43.2%) and *Klebsiella* species (42.3%). These multiresistant strains were isolated more frequently from surgical wards (especially from Urology and General Surgery) but, in case of some species (*Klebsiella* species, *Escherichia coli*), there have been also isolated relatively high percentage of ESBL strains also from medical wards.

**P.1.20. EVALUATION IN DYNAMICS OF
ENTEROBACTER SPECIES ANTIBIOTIC
RESISTANCE IN PATIENTS HOSPITALIZED IN
BRASOV COUNTY HOSPITAL
BETWEEN 2011-2012**

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The study was retrospective and included 259 Enterobacter spp. strains isolated from the prelevates of the patients hospitalized in the Clinical County Emergency Hospital Braşov during 2 years (1.01.2011-31.12.2012).

The aims of this study were to analyze the spectrum of infections caused by Enterobacter spp. and the assessment of the resistant strains isolated from the prelevates of the hospitalized patients. The etiological spectrum of infections produced by Enterobacter species was large, these germs being most frequent implicated in urinary tract infections and wound infections. The resistance of Enterobacter spp. to beta-lactams was high, especially to ampicillin. The level of resistance to quinolones was relatively high, but the role of these antibiotics is still important in the therapy of Enterobacter spp. infections. The resistance to aminoglycosides and sulfonamides was different, being higher in case of gentamicin. The sensitivity of Enterobacter spp. to carbapenems and colistin was high, these antibiotics representing the therapeutical solution even in infections produced by Enterobacter ESBL-producing strains. The selection of resistant strains for these antibiotics is however worrying.

The obtained results sustain the need of implementing coherent strategies for the monitoring of the occurrence and spread of the resistance phenomenon.

**P.1.21. SALIVA MONITORING -POINT OF VIEW
OF NURSING STUDENTS**

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Saliva can be used in future scientific research and medical diagnosis, because it is a fluid complex that is useful for the determination of diseases and easy to allow their evaluation by making periodic screening.

The paper had as objective to determine the level of information on this new method of using saliva in medical diagnosis using a questionnaire study applied to two groups of students (students of medicine and nursing specialization and to a third group of potential patients (from Brasov and Sibiu).

The study was conducted during October 2014 – March 2015.

The obtained information has been evaluated and some differences between groups were found and presented in this work.

**P.1.22. CYSTEINE AND TRYPTOPHAN
DETECTION USING ELECTROCHEMICAL
METHODS**

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Cysteine is a sulphur-containing amino acid that contributes to the sulfhydryl group in the glutathione. It is essential in skin formation, hair and nails regeneration and protection of the body from the effects of the alcohol, cigarette smoke, pollution, radiations and toxins.

Found in different food sources (chocolate, milk, yogurt, cottage cheese, red meat, eggs, fish, sesame, chickpeas, sunflower seeds, pumpkin seeds, bananas), tryptophan is an amino acid used to produce serotonin, melatonin and niacin.

Cysteine and tryptophan are disease markers, so our new optimized electrochemical method (differential pulse voltammetry) for their detection could be useful for example in aging, chronic inflammatory diseases, HIV infections.

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**P.1.23. CONTRIBUTIONS OF FLOW
CYTOMETRY - INTRACELLULAR pH
DETERMINATION**

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Flow cytometry is a technology which may quickly analyze very small samples and, at the same time, multiple cellular properties such as size, granularity, surface and intracellular antigens, and the quantity of DNA.

Flow cytometry allows an increased sensitivity in the detection of neoplastic cells and increases the accuracy of diagnosis and classification of leukemias, lymphomas and lymphoproliferative diseases as monitoring minimal residual disease.

Flow cytometric analysis could indicate intracellular pH, an important parameter that could be modified during several biological processes, such as cell signaling and the initiation of mitosis.

P.1.24. DOPAMINE DETECTION USING ELECTROCHEMICAL METHODS

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Dopamine is a catecholamine neurotransmitter. It plays a significant physiological role as an extracellular chemical messenger for renal and hormonal systems. Some neurological disorders, such as schizophrenia and Parkinson's disease, are due to a deficiency of dopamine.

Direct quantification of the dopamine concentration by an electrochemical method is difficult because of the fouling effect on the surface of the electrodes due to the accumulation of oxidized product, and also because of interferences.

Differential pulse voltammetry and amperometry were used to quantify dopamine, using different pH values for future application in medicine and food analysis.

**P.1.25. GLUTEN INTOLERANCE - KNOWLEDGE
IN RURAL AND URBAN AREA OF BRASOV**

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Gluten intolerance (celiac disease) is an autoimmune disorder of the small intestine by a reaction to gliadin, a prolamine (gluten protein) found in wheat, and similar proteins.

The paper had as object of determining the level of knowledge gluten intolerance among two groups of people in Braşov and Covasna, rural and urban residents.

The questionnaire was applied in Braşov and Covasna, during May 2014 to April 2015.

The nurse has an important role in terms of educating patient's concerning gluten intolerance by providing information about this disease, diet, mental and physical preparation of the patient attending to necessary investigations.

**P.1.26. HISTOLOGICAL AND ENZYMATIC
CHANGES IN LAB MICES AFTER CADMIUM
ADMINISTRATION**

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The purpose of this study is to characterize and to present some health effects of cadmium in animal body. In this sense, we have monitored structural changes in various organs and serum acetylcholinesterase enzymatic activity in laboratory animals injected with CdI₂.

An experimental study was conducted on 3 groups of mice compared with controls. Group A received a single big dose - 21 µmol cadmium iodide/kg body weight, group B- single low dose - 0.14 µmols of cadmium iodide/kg body weight and group C- small double dose -fractionated at 1 week 2 x 0.14 µmol CdI₂/kg mice. From each batch were collected pieces of liver, kidney, brain, lung. From the last batch (C) is was collected also blood in order to have data about serum AChE enzyme activity, compared with that measured in the control group. The fragments of organs taken - from the control and mice injected with cadmium iodide-microscopic samples were made which were subsequently viewed and interpreted with the optical microscope.

There was observed an inhibition of serum cholinesterase activity in the presence of cadmium, where for group C a decrease of approximately four times of enzymatic activity, in comparison with the control group, was obtained.

Histological changes occurred in mice injected with high doses of cadmium iodide, lesions consisting in dystrophies, necrosis and vascular stasis. These findings help us understand better the effects of cadmium at various levels in the human body.

P.1.27. EFFECTS OF LEAD ON LAB ANIMALS AFTER ADMINISTRATION OF LEAD ACETATE

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Study objectives were to analyze the behaviour of certain enzymes (serum acetylcholinesterase and SGPT) in the presence of lead and studying the histological changes that occur in various organs in the presence of lead acetate in animals.

Selected for the study were three groups of mice which were treated with different doses of lead acetate, compared with a control group. From each batch were collected fragments of organs-liver, kidney, lung, brain-and from the last batch also blood. The organ fragments were prepared for microscopic view and then interpreted with the optical microscope.

Enzymatic analysis showed a strong inhibition of serum AChE and increased SGPT levels in the presence of lead acetate.

Histological changes consisted of cellular dystrophy (liver and kidney), edema (brain) and vascular stasis (lung).The histological modifications depended on the dose that was administrated. The bigger the dose, the deeper the change was observed.

Identification of enzymatic or histological changes resulting after administration of heavy metal in mice may contribute in understanding the effects of lead on the human body.

P.1.28. ANTIOXIDANTS - GENERAL KNOWLEDGE OF YOUNG PEOPLE

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Antioxidants are widely used in food supplements and have been investigated for the prevention of diseases such as cancer and coronary heart disease.

Based on the information theoretical literature on antioxidants and their benefits to this, it developed a questionnaire with 38 questions with simple variables or multiple responses based on information - personal considerations, thus realizing an extensive analysis of the topic.

Questionnaires were administered to students from Faculty of Medicine (specialization in nursing and clinical laboratory) and from Faculty of Electrical Engineering and Computer Science, Transilvania University of Brasov, Romania.

The conclusions of this study are presented in this work The results indicated different level of knowledge of these two groups and for some topics related sources of antioxidants, health benefits both groups indicated the lack of information.

**P.1.29. ELECTROPHORESIS - AS IMPORTANT
DIAGNOSIS TOOL**

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Practical methods for the electrophoretic separation of proteins in various biological fluids may be carried out on filter paper, agarose gel, sheets of cellulose acetate or polyacrylamide gel.

Serum protein electrophoresis is suitable for detection, diagnosis and monitoring of the evolution of diseases, especially where the values of total protein and albumin are altered (chronic inflammation, acute inflammation, nephrotic syndrome, cirrhosis of the liver, monoclonal gammopathies).

Special new added values could be obtained using bi-dimensional electrophoresis.

P1.30. DYSRHYTHMIA IN PEDIATRIC AGE

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Introduction: Arrhythmias and leadership in pediatric age is less a problem than adult rare and therefore make up a peculiar pathology, difficult to diagnose and to treat.

The aim of our study was to determine the incidence of arrhythmia and carrying the baby for a period of 5 years, the most common forms and their association with pathological conditions.

Methods: There were 65 subjects enrolled in the study, boys and girls between the ages of 0 and 17 years old, coming from urban and rural clinics hospitalized in Children's Hospital in January 2010 - December 2014. There has been a retrospective analysis of medical records of processing data.

Results: The incidence of cardiac dysrhythmia was low, 0.11%, consistent with the literature. Most cases occurred in infants and young children, 35 cases (53.84%) and were correlated with symptoms characteristic of this age group: sepsis, fever, dehydration and severe cardiac malformations; 3 cases of newborns had paroxysmal supraventricular tachycardia (TPSV) without any organic substrate (heart abnormality, infection). In the age group 5-12 years were 10 cases and in the 12-17 groups were 20 cases of cardiac dysrhythmia due to voluntary intoxication purpose suicidal. The most common rhythm disorders were 57 cases (87.69%) compared to conduction disturbances were decreased in number, 8 cases (12.30%). Heart rhythm disorders were represented in almost equal proportions sinus tachycardia (18 cases), premature supraventricular (20 cases) and TPSV (16 cases); conduction disturbances were found in 8 cases (atrioventricular block grade I and grade II).

Conclusions: Cardiac dysrhythmias are rare in children, in most cases are secondary to pathological conditions such as: infectious fever, sepsis, poisoning exogenous, congenital heart defects and have good performance if you apply the correct management of the underlying disease.

P.1.31. SMOKING AND ALCOHOL CONSUMPTION IN CHILDREN – HOW DANDEROUS IS?

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Introduction: Tobacco and alcohol consumption is epidemic all over the world and represent a medical and social problem. The evolution in last decades had shown that teenagers are constantly affected by this problem.

The purpose of our study was to provide information about tobacco and alcohol consumption among adolescents, the knowledge of the adverse health effects of these substances, as well as, information on drug use attitude mentioned.

Material and method: In order to achieve this paper, we used a prospective method, based on applying questionnaires. The study was conducted between November-December 2013 in 5 high schools in Brasov, on a sample of 551 children aged between 11 and 18 years, boys and girls, selected random.

Results: The study revealed that the use of alcohol was more common practice then tobacco use among adolescents and the prevalence of these behaviors had increased with age. The combination of the two drugs is common. The policy of prevention and advising was not so successful, did not have a significant influence in teenager decision about consumption. These habits were considered “fancy” and mandatory for teenage groups. Children had also poor knowledge about the diseases connected with smoking and alcohol use.

Conclusions: Our findings had demonstrated that we have to improve the policy of prevention of tobacco and alcohol consumption in teenagers. It is also necessary to give proper information, including medical one, to advice children and to identify the risk at this age.

P.1.32. ANTIBIOGRAM MANAGEMENT

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The emergence of antimicrobial resistance is a global problem that has been felt both in the community setting as well as within hospitals. Overuse of antimicrobials in both of these settings has contributed to the problem. It has been suggested that 20 –50% of antibiotic usage in the community is inappropriate, e.g. for viral upper respiratory infections.

Implementation of an antibiotic management programme resulted in substantial reductions in both broad-spectrum and total antimicrobial consumption without having a significant impact on antibiotic susceptibilities of common Gram-negative microorganisms within the institution.

The purpose of the programme was to reduce use of broad-spectrum antibiotics by monitoring the use of these agents, and providing recommendations for streamlining or discontinuing antibiotics once culture data and diagnostic studies were available for review.

**P.1.33. MILK INTOLERANCE - KNOWLEDGE IN
RURAL AND URBAN AREA OF BRASOV**

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Lactose intolerance is the inability of small intestine to digest lactose, a sugar found in milk and to a lesser extent dairy products, causing side effects. It is due to a lactase deficiency, or hypolactasia. The paper had as object of determining the level of knowledge lactose intolerance among two groups of people in Brasov, rural and urban residents

Specific questionnaires were prepared and send (100 persons/group). Some major differences were obtained between groups and it raises the importance of nurses in terms of educating patients lactose intolerance by providing information about this disease, diet and mental and physical preparation of the patient attending physician with the necessary investigations.

P.1.34. ANTIBACTERIAL ACTIVITY OF ESSENTIAL OILS OF THYME

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Plants have been used in ancient times for the protection against infectious diseases.

Plants from the genus *Thymus* are important medicinal herbs. *Thymus vulgaris* (Common thyme) is a member of lamiaceae family, rich in active substances such as thymol, carvacrol, p-cymene and terpinene.

Fresh *Thymus* species and their processed products have been widely used as flavorings since ancient times. During the last few decades, *Thymus vulgaris* is used as an antispasmodic, antiseptic, and natural antimicrobial agent.

In this study, antibacterial activities of the oils were tested on *Escherichia coli*, and *Staphylococcus aureus*.

Antibacterial activity of the *Thymus vulgaris* was evaluated using disk diffusion technique. In the experiment were used 4 dilutions of *Thymus vulgaris*.

The present study indicates clearly that essential oils from *Thymus* species have an antibacterial effect.

The results indicated that extracts of has shown antibacterial activity; the inhibition zones (IZ) values were 6.0 to 25 mm in diameter.

P.1.35. DICLOFENACUM INDUCE CHANGE IN OXIDATIVE STRESS

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Diclofenac sodium is a non-steroidal antiinflammatory drug, with analgesic and antipyretic properties which can inhibit free radicals. Analytical methods have been developed for the quantitative determination of sodium diclofenac, in pharmaceutical samples: liquid chromatography, gas chromatography, and nuclear magnetic resonance spectroscopy. Potentiometric sensors have been developed for drugs determination.

The major objectives of this work were focused on three aspects - firstly, we studied the behavior of carbon biosensors at different concentrations of paracetamol to pH 4 and ph 8. Still, it was studied the potentiometric variations in the presence of hydrogen peroxide. In the end, it was studied the variations of carbon biosensors in a mix of diclofenac and hydrogen peroxide.

The voltammetric carbon biosensors revealed interferences from diclofenac and with hydrogen peroxide.

Starting from these experiments we aim to develop electroanalytical methods for the detection of diclofenac and hydrogen peroxidein pharmaceutical products.

P.1.36. REMOTE MONITORING OF IMPLANTABLE DEVICES

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The number of patients with implanted pacemakers, cardioverter/defibrillators (ICD), implantable loop recorders, and devices for cardiac resynchronisation therapy (CRT) continues to grow. These complex devices (CIED) also require regular follow-up to ascertain technical integrity. Consequently, more patients require regular follow-up of these devices.

Evolving medical technologies, using cardiac implantable devices (CIEDs) with capabilities for remote monitoring, permit evaluation of multiple parameters of cardiovascular physiology and risk, including cardiac rhythm, device function, blood pressure values, the presence of myocardial ischaemia, and the degree of compensation of congestive heart failure.

Remote monitoring systems also allowed a significant shortening of the post-procedural hospitalization, while preserving a safety level similar to that associated with standard patient care.

The present paper will review the current available technologies for remote monitoring of such devices, the advantages of these techniques, and the results of the most important published clinical trials.

**P.1.37. THE EXPERIENCE OF IMPLEMENTING
TELEMEDICINE IN PROFESSIONAL
COMMUNICATION AND SIMULATION IN
POSTGRADUATE EDUCATION IN PERINATAL
MEDICINE SYSTEM IN MOLDOVA**

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By implementation of consultative telemedical system in perinatology centers are created and developed the interdisciplinary network of telediagnosis that aimed to improve the quality of the medical services, to decrease the cost of medical exams and to improve the quality of life.

In Republic of Moldova telemedicine system is implemented in four pilot centers and has more than one purpose. The medical exam of the severe neonatal and obstetrical on an Ipath platform allows the presentation of cases in a short and narrative way and where is possible to show the baby on the notebook by web cam. Thanks to the tele-exams of the patients from the level two centers, there was a 30% decrease in transferring these patients in a level three center. In the same time another benefit is the “teleradiology” compartment, which involved describing of the radiology scans by the radiologist from a level three center.

2. Integrative Environmental Sciences

*New Trends in Sensing- Monitoring- Telediagnosis for Life Sciences,
Brasov, Romania – September 3-5, 2015*

KN.2.1. ARE BIOSENSORS SUITABLE TOOLS FOR MONITORING POLLUTANTS IN AQUATIC ENVIRONMENTS?

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Toxic substances menacing to the humans, agriculture, livestock and wildlife may contaminate the aquatic resources and portable water system such as heavy metals, toxins, environmental pollutants. In the last decades, the liberation of industrial effluents containing new xenobiotics compounds such as pharmaceuticals, endocrine disruptors, surfactants, industrial additives to water resources has become a serious concern. The worldwide different regulatory authorities has set the regulatory standards for these contaminants but the permissible limits are in very low concentration i.e. pg/L or ng/kg. In consideration of toxicity and ubiquity of these compounds, the development of fast, sensitive and reliable detection methods are of immense need. Several conventional methods have been employed for detection and screening of these contaminants such as HPLC, GC, LC-MS. However, the associated drawbacks of time-consuming sample extraction and clean up limits their applicability. The present state of art suggests the evidence of several screening and biosensing methods for detection of these xeno-compounds. Currently, we will present and discuss some results with their advantages and drawbacks. Hereby, we conclude that in future the monitoring of contaminants will be based on biosensing methods, measuring the global effect of various pollutants or the use of multiple array biosensors combined equipped with software.

KN.2.2. USING PERIODIC ACTUATION FOR FAST SENSITIVE QUANTITATION OF TARGET CELLS

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An advanced analytical platform for quantitation of target cells, suitable for point of care assays is presented. It is based on a robust technology able to amplify the signal to noise ratio providing fast and sensitive detection of target (pathogenic) cells. Based on a *lab on a chip* approach, the system uses a custom made AC electrical impedance analyzer to measure the oscillations of magnetically labelled cells when applying a periodic magnetic field. The concentration of pathogenic *Escherichia coli* O157:H7, chosen as bacterial model was determined based on the amplitude of the electrical impedance oscillations at a selected AC frequency, caused by the oscillations of (clusters of) magnetically labelled cells.

The analytical platform provides a limit of detection of 100 cells/mL and has a fast analysis time (less than 1h). The approach is highly specific since the clusters of magnetically labelled cells are yielded by sample incubation with affinity-coated magnetic beads (AMB), thus yielding a negligible signal when analysing non-target cells. Since the specificity of the assay comes from the AMB and not from the sensing electrodes, the platform eliminates sensitive issues concerning regeneration and sensor functionalization or stability.

The platform is suitable for quantitation of a wide variety of target cells (including cell mixtures) within complex liquid media and is amenable for high throughput analysis. It has simple and compact design being adaptable for portability and automated operation.

Acknowledgements

This work was supported by the Romanian National Authority for Scientific Research, CNDS – UEFISCDI, through projects PN II-ID-PCCE-2011-2-0075 and PN-II-RU-PD-2012-3-0467.

O.2.1. DEVELOPMENT OF POWERFUL BIO-ANALYTICAL TOOLS FOR THE DETECTION OF AQUATIC TOXINS

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The past decades have witnessed a strongly water quality degradation due to an increase of effluent discharges from human activities. The response of aquatic system to this addition of artificial substances is the "bloom", a great increase of phytoplankton. Unfortunately, some species are known to produce potent toxins responsible for human and animal poisoning and closure of contaminated areas. In order to limit the health risks and economical losses, the European Commission has fixed toxicity thresholds and official methods analysis for each toxin type. However, detection methods used are expensive and time consuming so it is necessary to develop fast, reliable and adaptable techniques on the field.

In this context, the laboratory BAE, specialized in the development of alternative bio-analytical methods, such as biosensors and miniaturized bioassays, propose to develop inexpensive bio-tools to detect in real time the most toxic and common aquatic toxins: microcystins (MCs) and okadaic acid (OA). Firstly, enzymatic assays were developed based on the inhibition of the commercial and genetically modified proteins phosphatase (PPs), specific targets of the OA and MCs. The challenge was to stabilize the enzymes by entrapment in different matrix gel on plastic or conducting support and select appropriate substrates. Efficient bioassays and electrochemical biosensors have been performed and validated to detect toxins in real samples. Subsequently, fluidic and static immunologic tests were designed. Such simple use assays demonstrated an excellent sensitivity. Finally, biosensors that use aptamers as molecular recognition elements were envisaged. Indeed, aptamers exhibit many advantages such high affinity, specificity, chemical stability, and cost effective compared to classical enzyme and antibody. The initial tests were encouraging, allowing the detection of low quantity of toxin in total accordance with regularity limit value.

O.2.2. ASSESSMENT OF AMBIENT GAMMA DOSE RATES IN TRANSYLVANIA REGION BY TL METHOD: PRELIMINARY RESULTS

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Thermoluminescent dosimeters based on LiF doped with Mg, Cu and P have been applied for measuring radiation doses in different fields such as clinical usage (diagnostic procedures, radiotherapy, interventional cardiology), space studies and environmental radioactivity with interest in natural gamma background measurements. Natural radioactivity varies from one location to another over the world with some areas where the level is significantly higher than the average; hence it is necessary to assess the right value for annual total radiation dose. For this purpose, alongside with the goal of computing accurate effective doses of exposure for the population, mapping terrestrial γ -dose rates has been performed in many countries around the world. In 2000, the Romanian National Commission for Nuclear Activities Control has limited public dose to 1 mSv/year above the natural background according to the Basic Safety Standards and ICRP 60 recommendations. Therefore, more sensitive dosimeters with lower detection limit are required in order to comply with this new public dose limit and LiF: Mg, Cu, P is capable to measure such low doses. This thermoluminescent material is attractive for assessment of low radiation doses due to its dosimetric characteristics such as ultra-high sensitivity, long-term information storage, easy handling, simple readout, good reproducibility, negligible fading, good linearity (1 μ Gy – 10 Gy) and tissue equivalence.

The current study aims to obtain gamma dose rates for Transylvania region with the ultimate goal of achieving a high resolution map of gamma dose rates for this area. In order to fulfill this purpose, almost 450 ultrasensitive LiF: Mg, Cu, P dosimeters (code MCP-N and MCP-7 produced by TLD Poland) were used, in the form of 4.5 mm diameter and 0.9 mm thickness pellets. The dosimeters have been placed in 127 different locations from Cluj and Alba County between April 2013 and November 2014, by dividing the territory in cells of 10X10 km, thus covering about 127.000 km². The exposure time ranged from 3 weeks to 4 months. The values obtained for the environmental gamma dose rates ranged from 41 \pm 2 to 150 \pm 7 nGy/h, with an average value of 78 \pm 2 nGy/h, being in agreement with the 2008 UNSCEAR Report. The present study presents preliminary results for Transylvania region having the main goal to obtain a high resolution map of gamma dose rates. Performing this kind of measurements is one of the obligations of our country as a European Union member state.

**P.2.1. CONTROL OF PERFORMANCE OF DAIRY
FACTORY WASTEWATER TREATMENT PLANT
BY MULTIVARIATE ANALYSIS OF
BIOLUMINESCENCE DATA**

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Process Control involves measurement and monitoring of numerous chemical and physical variables and it also requires fast, affordable, executable *in situ* analytical techniques.

A bioluminescent bacteria-based inhibition assay has been chosen in an attempt to solve the problem of controlling the chemical treatment of the wastewater coming from a food plant dedicated to the production of milk derivatives. Samples were collected from the flotation, oxidation, and exit tanks of the treatment plant.

All samples were tested both for their acute and chronic toxic effects, in order to evaluate the suitability of this assay in checking the plant efficiency. The results obtained by this technique were compared to those obtained by the measurement of the off-line control variables (COD, pH, concentration of NH_4^+ , NO_3^- , NO_2^- and phosphates).

Since a large amount of data, depending on many variables and on numerous samples, has been produced a multivariate analysis has been applied. Models have been created by using Principal Component Analysis, one of the most employed methods of data exploration used in chemometrics for performing calculations and interpretation of the results obtained as output (scores plot or graph of the samples, loadings plot or graph of the variables).

**P.2.2. ASSESSMENT OF RISK AREAS
POLLUTED BY MICROPARTICLES AND
NANOPARTICLES**

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From its source, material particles can be natural (volcanoes, dust storms, fires pastures and forests, vegetation lifeless marine aerosols) or products of human activity (burning fossil fuels in vehicles and power resulting from industrial processes).

After sizes, there may be particles floating matter (SPM), suspended particles of respirable (RSP–diameter <10µm), fine particles (diameter <2.5 µm), ultrafine particles (diameter <100 nm), soot (adsorption of benzopyrene - a carcinogen).

People who leave in polluted areas with micro and nanoparticles are predisposed to have different health problems as asthma, lung cancer, cardiovascular problems, respiratory diseases, birth defects and premature death.

P.2.3. FLOW CYTOMETRY OF NUCLEATED RED BLOOD CELLS USED AS MONITORING TECHNIQUE FOR AQUATIC RISK ASSESSMENT

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Anthropogenic factors led to a significant enhancement of pollutants in aquatic environment and for several years, chemicals analysis has been commonly employed. These techniques cannot detect and quantify many environmental phenomena such as bioavailability, bioaccumulation and synergistic effects. For these reasons, many investigations for evaluating the effects of xenobiotic on organisms use *in vitro* or *in vivo* bioassays. The bioassays give a global response for all chemicals present in the environment and these represent one of the best ways to estimate the risk assessment of pollutants in environment for monitoring. To assess aquatic pollution degree or for assessing cytotoxicity or ecotoxicity of pollutants, we developed a new experimental cell system based on the apoptosis of nucleated erythrocytes from fishes and batrachians which are directly exposed to pollutants absorbed by different ways. Despite their structural simplicity, the erythrocytes of lower vertebrates preserve nucleus and mitochondria, both the sensors of the programmed cell death machinery to develop an apoptosis phenomenon. Apoptosis/necrosis discriminated by FITC-annexin-V labeling/PI and cellular viability measured with calcein-AM method by flow cytometric analysis of nucleated erythrocytes, *in vitro* or *in vivo*, constitutes a good tool for assessment and biomonitoring of aquatic pollution and safety of fresh fish products determination.

P.2.4. RISK AND BENEFITS OF X RAYS IN MEDICINE

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Usage of X rays is a very effective way of looking at fractured bones, to examine different organs and identify health problems. Using X-ray can highlight a lung infection, such as pneumonia.

They are successfully used during specific surgical therapeutic procedures (coronary angioplasty), to help guide equipment to the area being treated.

The risk of harmful effects from having X-rays and related scans needs also to be taken into account, even they have a lot of advantages: fast, painless, non-invasive, don't require any special preparation (except when contrast media is used).

**P.2.5. THE RELATIONSHIP BETWEEN
ENVIRONMENTAL FACTORS AND
PULMONARY CHRONIC DISEASES**

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Particulate matters are involved as possible environmental factors that determine pulmonary chronic diseases. Depending on their size, larger particles could be filtered in the nose and throat mucus and cilia. PM10 particles could go down to the bronchi and lungs and PM2.5 particles pass through gas exchange region of the lung. Ultrafine particles -PM0.1 (diameter <100 nm) - enter the body, get into the bloodstream, accumulate in sensitive target (bone, lymph nodes, spleen, heart, brain, central nervous system).

Ultrafine particles (UFP) shows increased risks associated with air pollution health areas (DPM – Diesel PM), causing pulmonary inflammation, chronic obstructive lung disease, asthma exacerbation and increased risk of cancer.

**P.2.6. MANAGEMENT OF ENVIRONMENTAL
FACTORS FOR CHRONIC DISEASE
PREVENTION**

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Specific measures need to be performed by all people in charge with public health surveillance in order to prevent chronic diseases and their risk factors.

Several studies identified directions to be followed for prevention of chronic disease: epidemiological studies and surveillance using (tele)monitoring, correlated environmental approaches, health care system interventions, and links for community with clinical responsible.

It is important to underline and to sustain the health care network also at individual level, but also at general level through appropriate policies and environments that promote health.

Health care professionals, voluntary and professional organizations, the private sector, governmental agencies, and academic institutions need to be involved as key factors in order to initiate/continue/have results in prevention of chronic disease due to environmental factors.

P.2.7. THE IMPACT OF ENVIRONMENTAL FACTORS ON PUBLIC HEALTH

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The world is in a continuous progress, in a continuous development so that with the increasing urbanization process, technology, industry and transport development, the pollution of the environment is increasing proportional to the speed of development and modernization of the world.

Nowadays, the environmental pollution and its effects on public health is a global concern.

Environmental factors could be considered: food system/diet, fossil fuels, socio-economic stress, chemicals, and built environment/transportation. These factors could interfere through different mechanisms (inflammation, disrupting insulin signalling, oxidative stress) to alter physiological function of living bodies and to favourite chronic diseases (diabetes, obesity, abnormal lipids, metabolic syndrome, cardiovascular disease, respiratory disease...).

P.2.8. THE ULTRAVIOLET RADIATION EFFECTS ON BIOLOGICAL SYSTEMS

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Both with good and damaging effects for the body, ultraviolet radiation is considered one of the main factors that induce skin cancer, when exposed excessively to it, especially with no protection. On the other side, the vitamin D endogenous production becomes impossible in the absence of the contact with UV radiation, considering the exogenous input of the vitamin is not significant.

In order to analyse the level of information regarding the risks following the exposure to the ultraviolet radiation, a questionnaire was addressed to two groups: first one represented by the medicine students in the first year of studying, at the Transilvania University of Brasov, and the second one represented by the people who go to the local swimming pool in Campina town, in Prahova county (who don't have medical information more than the general population, but are exposed constantly to natural ultraviolet radiation at the swimming pool).

The purpose of this research was to determine if the questioned population is well informed about general information regarding ultraviolet radiation, the circumstances in which the exposure becomes dangerous, about the harmful effects and the means of protection, if they are aware about them and if they use any.

The questions have been formulated in conformity with medical articles and official reports, asking general information about the nature of ultraviolet rays, their beneficial and harmful effects, protection, important signs and symptoms of melanoma and non-melanoma skin cancer, the use of sun beds, and if the respondents have ever been officially informed about the ultraviolet radiation risks and correct ways to protect them.

P.2.9. MICROWAVES - POSITIVE AND NEGATIVE IMPLICATIONS IN HUMANS LIFE

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Since decades people have tried to make life easier. Because of this, nowadays we are surrounded by wireless technologies and many of these are using microwave radiation.

Microwaves are electromagnetic waves with higher frequencies than those of radio waves and lower than those of infrared band. In the electromagnetic spectrum their frequencies occupy the portion between 300 MHz to 300 GHz and their wavelengths are from 1 meter to 0.1 centimeter.

This widespread source of energy is used in various fields, from communication (cell phones) to agricultural and forestry related industries, RADAR systems, TV broadcasting via satellites, thermal heating (microwave oven) and medicine. In medicine, microwaves are used both as diagnostic application (breast tumor detection, endoscopy of the small intestine) and therapeutic application (ablation of renal tumors, colorectal cancer, lung tumors, treatment for axillary hyperhidrosis, prostate hyperplasia, heart and other tissue ablation, angioplasty).

During last years there has been increasing public concern on the potential health risks of this nonionizing electromagnetic radiation. Because of this, there are many studies available at the moment about the thermal and non-thermal effect of the microwaves on human body and food quality.

Because of this, it should be useful the aim of this paper, to study the level of knowledge about this subject on two groups of students: engineering students and medicine students, in order to improve the teaching methods and to develop new learning methods.

This work also shows the opinion of online media regarding this subject and its frequent mistakes.

**P.2.10. EVALUATION OF
ACETYLCHOLINESTERASE INHIBITORS
PRESSURE IN GROUNDWATER SAMPLES AT
NON ANTHROPIZED AND ANTHROPIZED
AREAS OF MARANHÃO STATE, BRAZIL**

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The objective of this work was to test and implement a new portable device for the detection of acetylcholinesterase inhibitors (AChEI), an inhibitory molecule playing a significant role in the nervous system. Herein, we employ the use of a fabricated device by Ecole des Mines d'Alès and recombinant acetylcholinesterase produced by a BAE laboratory in UPVD. A campaign was organized for collection of water and soil samples in the South region of Maranhão (Brazil).

The system was optimized considering the high humidity and temperature condition in Maranhão. Under optimized condition, a good limit of detection (LOD) 0.01 ppb and a linear range between 0.01 to 1 ppb were achieved. We have a good determination of paraoxon until 10 ppb. Toxicity of water samples of an anthropized area of Maranhão was further evaluated using the AChE assay. The same water samples were analyzed by gas chromatography- mass spectroscopy (GC-MS) for determination of chemical composition of samples.

This work allows, developing a new portable device for onsite analysis of samples. In the present campaign, the tested water samples were negative and did not showed the presence of AChEI. The second campaign will take place in upcoming year in agriculture farms.

**P.2.11. RADIOFREQUENCY
ELECTROMAGNETIC FIELDS - EFFECTS ON
HUMAN BODIES**

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The interest to improve comfort and quality of life raise the number of non-ionizing radiation from the electromagnetic and microwave radio. With the development of these technologies have increased interest and population specialists on identifying and assessing the risk that such radiation can have.

The level of radiation is not constant over time and depends on traffic communication, which in turn depends on the time of day.

Low-frequency magnetic fields induce circulating currents within the human body, causing possible stimulation of nerves and muscles or affect other biological processes.

Increasing the risk of childhood leukemia, headaches, depression, lethargy, sleeping disorders, and even convulsions and epileptic seizures could be associated with electromagnetic field exposure.

P.2.12. SEASONAL VARIATIONS OF ORGANIC SUBSTANCES IN SURFACE WATER SOURCE IN UKRAINE

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In Ukraine 80 % of drinking water is carried out from the Dnieper basin water. This water contains a wide range of organic substances both natural and anthropogenic origin and the concentration of dissolved organic carbon (DOC) is ranged between 9 and 18.8 mg/L. DOC changes in Dnieper river water is caused by seasonal effects. Reduction of organic matter in spring is connected with floods and a maximum summer characteristics is connected with the decrease of underground water exchange and active growth of phytoplankton and zooplankton.

Main reason, why it is necessary to remove organic substances, is reduction of disinfection by-products (DBPs) formation. DBPs can cause spontaneous abortions, bladder cancer and birth defects. Dnieper water treatment plant uses chlorination as a disinfection stage. Chlorination DBPs with high genotoxicity such as chloroform and 3-chloroethylene have been detected in treated water. Concentration of chloroform is ranged between 5 and 61 µg/L during the year and 3-chloroethylene concentration doesn't exceed 10 µg/L. The higher DOC is observed in raw water the higher DBPs concentration is detected in treated water. Existence of the differences among water samples can also be related to changes of quality composition of raw water organic matter at different seasons.

3. New Sensors for Food Control and Forestry

**KN.3.1. THE DESTINY OF POMEGRANATE
(*PUNICA GRANATUM L.*) ANTHOCYANINS
DURING *IN VITRO* DIGESTION**

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It is well known that pomegranate fruits (*Punica granatum*L.) and their juice are a rich source of bioactive compounds with antioxidative properties, among which anthocyanins are the most abundant. These molecules are responsible for the fruits' brilliant red colour and many studies suggested their health benefits. To follow the destiny of these molecules during digestion and their bioavailability we evaluated the changes in total anthocyanins (TA), total phenolics (TP) (Folin–Ciocalteu) and antioxidant capacity (AOC) (chemiluminescence assay) in pomegranate juice using *in vitro* gastrointestinal digestion model, which involved the sequential use of pepsin and pancreatic enzymes in combination with bile salts to simulate the stomach and small intestine, respectively. The identification and quantification of particular anthocyanins was performed by HPLC-DAD system. The results show that TP and AOP were not reduced during both digestion phases, whereas TA were unchanged only during the acidic stomach phase, but were considerably lowered (up to 78%) during the small intestine phase, which was further confirmed by HPLC-DAD analyses. The amount of all selected anthocyanins was unchanged during the stomach digestion phase, but was significantly lowered during the small intestine phase. Only pelargonidin-3,5-diglucoside remained intact during both phases of *in vitro* digestion, whereas delphinidin-3-glucoside and delphinidin-3,5-diglucoside were completely degraded during 2-hours intestine phase.

KN.3.2. NATURAL COMPOUNDS WITH TOXIC PROPERTIES: OLD AND NEW APPROACHES TO FACE THE PROBLEM

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Two main problems must be faced when natural toxic compounds are considered: 1) The quantitation of these molecules in complex matrices; 2) The identification of biomarkers for fast diagnosis in emergency.

In this presentation two examples will be described; for the first case a new HPLC-UV-fluorescence procedure was developed to measure active amines in *Citrus aurantium* L. (bitter orange). The most abundant amines of *C. aurantium* (having adrenergic activity) are octopamine, synephrine, tyramine, N-methyl-tyramine and hordenine. Their presence in food supplements is regulated by national/international rules, so that their identification and quantification is an important step in the quality control of products containing bitter orange, as such or as an extract.

About biomarkers, we developed a method to detect 4'-O-methylpyridoxine (MPN), which is associated with the consumption of *Ginkgo biloba* seeds. The seeds of *Ginkgo biloba* are commonly eaten in Japan, Korea and China, but it is important to know that they can be responsible for poisoning, especially in young children. The poisoning can be easily identified by searching for MPN both in blood and urine. To allow a suitable identification of MPN, an optimized and validated HPLC method with fluorimetric detection was set up.

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KN.3.3. A NEW E-TONGUE FOR THE DISCRIMINATION OF RED WINES BASED ON THEIR PHENOLIC COMPOSITION

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Polyphenolic compounds in wines are powerful antioxidants, able to inactivate reactive oxygen species and key contributors to wines' organoleptic properties. Discrimination of wines based on their phenolic composition-for the purpose of authentication, determination of frauds, geographical origin, age etc, typically relies on chromatographic methods or on various optical or electrochemical methods, coupled with chemometrics for data analysis. This work describes the development of a new e-tongue for wine discrimination and its application for analysis of red wines from Valea Calugareasca vineyard, chosen due to their high antioxidant capacity. The e-tongue consists in a set of 5 electrochemical sensors based on screen-printed carbon electrodes, comprising one unmodified electrode and 4 sensors modified respectively with a polymer (polypyrrol doped with ferrocyanide), nanoparticles (platinum, respectively ceria) and with cobalt phalocyanine. Typical electrochemical oxidation curves in the range from 0 to 1.2 V vs. Ag/AgCl have been established for each sensor using a standard mixture of antioxidants, by square wave voltammetry, differential pulse voltammetry and cyclic voltammetry. Additionally, eight red wines from the 2012 harvest, namely Pinot Noir, Feteasca Neagra, Burgund Mare, Negru Aromat, Cabernet Sauvignon, Merlot and Negru Vartos have been analysed with the e-tongue. The wines had a content in total phenolic compounds between 1.44 and 2.85 g/L gallic acid and a total antioxidant capacity of 10.2-23.1 mM Trolox, as assessed by the Folin Ciocalteu and the Trolox Equivalent Antioxidant Capacity method, respectively. For the unmodified electrodes, the intensity of the main oxidation peak at around 0.5 V vs Ag/AgCl correlated well with the total phenolic compounds and the total antioxidant capacity. Data extracted from current-potential curves acquired with the e-tongue was analysed using Principal Components Analysis. This analysis allowed differentiating the variety of interest, Negru Aromat from the other red wines.

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KN.3.4. FOOD SUPPLEMENTS ON THE ROMANIAN MARKET AND THE TARGET POPULATION

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Food supplements as concentrated sources of nutrients are widely sold in Romania in supermarkets, special health stores and pharmacies. Their number is growing from one year to another

In the framework of the National Health Programme the market of food supplements is monitored by the National Institute of Public Health belonging to the Ministry of Health.

In the year 2014 the specialists identified and categorized at national level 1458 food supplements. According to the ingredients in their composition most of the food supplements were mixed, i.e. beside vitamins a minerals they contained also physiologically and nutritionally active substances.

Regarding the target population among the identified food supplements 642 were for children, 363 for sportsmen, 289 for all categories of population and 164 for pregnant women.

Food supplements intended for the use of children and pregnant females were analyzed also for their content in food additives and were not found non-conformities.

O.3.1. BIOSENSOR BASED ON HYBRID LANGMUIR-BLODGETT THIN FILMS FOR DETECTION OF TYRAMINE IN FOODS

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In this study, the incorporation of tyrosinase (Ty) in mixed Langmuir films of arachidic acid (AA) and dysprosium bis-phtalocyanine (DyPc₂) was studied. Methodical experiments were carried out to improve the enzyme adsorption from the aqueous subphase at the interface. Indium tin oxide coated glass slides were modified with the three-component Langmuir-Blodgett (LB) films to produce a biosensor. Enzyme immobilization was proven through UV-Vis spectroscopy, Fourier transformed infrared absorption spectroscopy, and atomic force microscopy. The spectrum for the AA-DyPc₂/Ty LB film was shown the characteristic peaks of all three components confirming that Ty was transferred onto the solid support along with the matrix material. The response of the biosensor was tested in tyramine solution. The mediator effect of the DyPc₂ was confirmed by comparing the response of the LB films of Ty with and without the mediator. DyPc₂ was increased the amperometric signal by ca. 30 times. A sensitivity of $1.48 \mu\text{A} \times \mu\text{M}^{-1} \times \text{cm}^{-2}$ was achieved for tyramine in food samples.

Acknowledgments: This work was supported by a grant of the Romanian National Authority for Scientific Research, CNCS - UEFISCDI, project number PN-II-ID-PCE-2011-3-0255.

O.3.2. EFFECTS OF SOME COMBINED TREATMENTS OF PVY INFECTED POTATO PLANTLETS CV. ROCLAS

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Potato virus diseases affect strongly the farmer's income. Elimination of PVY from potato supply is essential for seed potato production. This is the reason because in this study, the efficiency of some techniques (chemotherapy, electrotherapy) in decreasing the infection level of PVY infected plants and producing virus-free plants was evaluated. At the same time, the behaviour of the treated plants and their chlorophyll and anthocyanin content were estimated. Plantlets (variety Roclas) obtained from PVY (necrotic strains) infected materials (mechanically inoculated) were used in the experiments. Electrotherapy was applied in several variants: the infected plantlets were exposed to either 40, 50 or 100 mA, for 5, 10 and 20 minutes, washed, divided into single node cuttings and multiplied *in vitro*. Chemotherapy was undertaken with ribavirin (RBV) and oseltamivir (OSMV) (RBV 40 mg/L + OSMV 40mg/L). *Solanum tuberosum* L. plantlets regenerated were removed from the culture medium, acclimated in green house. The survivor plants were indexed (DAS ELISA). The variant leading to highest rates virus elimination and plant regeneration was estimate using the Therapy Efficiency Index (TEI). Monitoring the vegetative state of healthy regenerated plant was done by estimation the chlorophyll content of leaf (portable device SPAD 502 Chlorophyll Meter) and the anthocyanin content of leaf (portable device ACM 200 plus, Anthocyanin Chlorophyll Meter). Electrotherapy (100 mA, 10minutes) applied to infected plantlets, chemotherapy (RBV40mg/L OSMV40mg/L) led to the highest rate of virus eradication, the maximum values of the therapy efficiency. This study revealed that applying this combined therapy could have beneficial effects on PVY elimination from potato plant tissues.

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O.3.3. NEW PARADIGM IN MEDICINAL PLANT RESEARCH: THE ROLE OF THE ETHNOPHARMACOPHORE DESCRIPTORS IN BOTANICAL BIOPROSPECTING

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More and more scientists stress out that it is important to bridge the gap between traditional medicinal plant knowledge and “western” biomedical knowledge, if we are to search for therapeutic solutions into ethnomedical systems (e.g. Ayurveda) and to conserve biodiversity. Linking traditional knowledge with biomedical science is difficult, because we often do not understand how medicinal plants are selected, conceptualized, and used in ethnomedicine.

Ayurveda is an example of a coherent traditional system which have a precise algorithm for medicinal plant selection, based on several ethnopharmacophore descriptors (e.g. taste or *rasa*, qualities or *gunas* such as hot-cold, wet-dry, light-heavy, etc) whose knowledge endowed the user to adequately choose the optimal medicinal plant for treatment of a certain pathology. The study of the intrinsic logic of ayurvedic pharmacology might help us to find a universal methodology that might be applied for the estimation of the ethnopharmacological activities and selection of all types of medicinal plants, no matter which geographical area they belong to.

We shall briefly present the basic concepts specific to the ayurvedic pharmacology (*dravia guna vijnana*) using an integrative approach and language, that might be accessible to professionals coming from modern sciences, who are newcomers into the traditional medicine area, so that they could benefit into their research from this new type of approach.

We also presume that the use of ethnopharmacophore descriptors combined with the reverse pharmacology approach would accelerate the medicinal plant bioprospecting for novel biologically active compounds.

O.3.4. STUDIES ON CONSUMER PERCEPTION FROM ROMANIA ON FOOD PRODUCTS LABELING

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Knowledge and understanding of consumers' behavior has a vital importance for policy makers in setting food policies, legislation in the field of development and research divisions in society.

Studying how people think about food and food production, how purchases or obtain necessary food, their own attitude towards health are entirely parts of multidisciplinary research that intersect both the social sciences and natural represent consumers synthetic science.

Consumer behaviour is the result of the relation between actuates marketing and consumer response to them.

Along marketing stimulus it should be considered other stimuli that do not fall within them, because they put their mark on how consumers will react.

The marketing stimulus that include product, price, place and promotion outlets for the product in question, plus other stimulus such as the cultural, political, technological and economic factors; whole range of stimulus come to meet and determine customer response in terms of product choice, brand and purchased quantity.

The purpose of labelling is to give consumers the necessary information, sufficient, verifiable and easily comparable, so as to enable them to choose a product which meets their requirements in terms of their financial needs and possibilities and to know the possible risks to which may be subjected.

Labelling may greatly change how a consumer perceives a product. By providing information to consumers, nutrition labels have the potential to help achieve public health objectives.

This work contains elements of the study carried out under the project FP7-People -2012- IRSES no. 318,946 entitled Nutritional Labelling Study in Black Sea Region Countries, held in January 2013 to December 2015.

O.3.5. STUDIES ON PERCEPTION OF EASTERN EUROPEAN CONSUMERS ON FOOD PRODUCT LABELING

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Current concerns manifested in the European Union related to food safety and security, and traceability of food products has generated a specific legislation on their quality by specific regulations for the following categories:

- Nutritional labelling;
- Protected designation of origin (PDO),
- Traditional Speciality Guaranteed (TSG),
- Protected Geographical Indication (PGI).

The increasing complexity of economic life, led to the need to know the mechanism of human economic behaviour, which is becoming longer and more complicated, requiring separate study of both intrinsic components: human behaviour as producer of goods and services and its consumer behaviour.

This paper contains the results of a study conducted within the project FP7- PEOPLE-2012-IRSES- 318,946-Nutritional Labelling in Black Sea Region Countries study.

The study follows a comparative analysis of the preferences and consumer awareness in relation to the food products of the countries around the Black Sea, namely Romania, Bulgaria, Ukraine, Russia, Moldova.

O.3.6. ELECTROCHEMICAL STUDIES ON ANTRAQUINONIC DYES

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The wastewater from textile industry is classified as the most polluting of all the industrial sectors. For the depollution of these waste waters the dye degradation is compulsory.

For the present study, two dyes, which have similar chemical structure, with an anthraquinone moiety as chromophore, but have different tinctorial properties were chosen. The first one is a reactive dye, namely C.I. Reactive Blue 19 (*RB 19*, CAS 2580-17-1) and the other one is an acid dye C.I. Acid Blue 62 (*AB62*, CAS 4368-56-3).. The influence of pH value on these compounds electrooxidation was analyzed.

The kinetic parameters of the combined electrochemical and enzymatic degradation, such as apparent Michaelis-Menten constant (K_m^{app}) and I_{max} , were determined by means of amperometric measurements, using a glassy carbon electrode (GCE) as working electrode.

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O.3.7. STUDIES ON NUTRITION LABELING OF FOOD PRODUCTS IN ROMANIA

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The main aim of food product labelling is to guaranty full and complete information's for consumers, regarding the composition of products, to protect their health and safety.

The food product label was conceived to help consumers in choosing right and healthy products, or adequate ingredients for their diet.

Unfortunately, in most cases, only people with health problems are reading the nutritional label.

The European Union (EU) improves its regulations regarding food product labelling, in a way that is easier for the consumer, with readable and essential information's. From public health considerations, the new regulations are made to protect against allergens.

The project FP7-PEOPLE-2012-IRSES 318946 - NUTRILAB is a multidisciplinary and comparative Joint Exchange Programme with the mission to identify and examine how nutritional labelling in European countries and out of Europe fulfils the actual legislation requirement. Starting in January 2013, with duration of 36 months, this project has the following aims:

- Bring together, review and analyze current research on consumer understanding of claims, and also labelling where this would inform our knowledge of consumer understanding of claims;
- Gather information on how consumer understanding of claims varies across different population groups, to gain insight into the understanding of the average consumer;
- Draw conclusions from existing research to see whether there are areas where further information would be useful, and to inform the direction that any additional research conducted in future could take.

In this paper it is presented shortly the research methodology for 678 products from meat and meat products, milk and milk products, canned food and sweets, analyzed in supermarkets from Brasov, Romania. The paper also contains results from experimental investigations and conclusions, from labelling point of view.

**O.3.8. STUDIES ON THE BIOLOGICAL VALUE
OF CINNAMON ESSENTIAL OIL FOR
CAPITALIZATION IN FOOD PRODUCTS AND
NUTRITIONAL SUPPLEMENTS**

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The present work is highlighted particular biological activity of the essential oil of cinnamon and its main components. First study was conducted a study using gas chromatography on the chemical composition of the oil of cinnamon, highlighting the percentage in major components: cinnamaldehyde, coumarin and eugenol.

Determination of antimicrobial activity was performed on three significant bacteria -Escherichia coli, Pseudomonas aeruginosa and Proteus mirabilis - using the diffusion method.

In this study we have obtained new data on the ability of the essential oil of cinnamon and its compounds to inhibit bacterial growth therein.

This study offers the possibility of new interpretations and capitalization of experimental results that can bring significant benefits to the food industry, the pharmaceutical and cosmetic default human health.

In the future we aim to continue this study, performing antifungal and antiviral evaluation of the essential oil of cinnamon and its main compounds and the possibility to be used for biofilm formation.

P.3.1. TOTAL ASCORBIC ACID CONTENT IN 10 VARIETIES OF POTATO DIFFERENT RESISTENT TO PVY NECROTIC STRAINS

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Potato, the third most consumed staple food providing basic nutrition to many people globally. Obtaining good quality for this vegetable imposes the improvement of identification's techniques of pathogen agents, knowing the biochemical composition, especially the components that could affect its health status. The goal of this research was to evaluate the ascorbic acid content of 10 potato samples (varieties with different resistance to potato virus Y) and the behavior of these samples to the PVY necrotic strains. The potato varieties tested were Christian, Roclas, Productiv (roumanian varieties) and Carrera, Red Fantasy, Jelly, Desire, Bellarosa, Red Lady, Hermes (foreign varieties). The ascorbic acid content was analyzed using a spectrophotometric method (L ascorbic acid test kit, Megazyme Ltd., Bray, Ireland), the highest content of vitamin C was founded in tubers from the most sensitive variety Hermes (740mg kg⁻¹ DW) and the lowest values presented the tubers from varieties Christian and Riviera (very resistant to necrotic PVY inoculation). Results showed a significant difference between the total vitamin C content of the tubers from the varieties tested (cultivars with different behaviour to inoculation with necrotic strain of potato virus Y).

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P.3.2. FOOD SUPPLEMENTS - ALTERNATIVES FOR BODY WEIGHT LOSS

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Some complementary practices are currently used for body weight reduction: usage of food supplements, homeopathy, acupuncture, hypnosis.

Comparative with drugs for body weight loss, food supplements are easy to obtain from different networks (herbal stores, supermarkets, internet market). Their entrance in the market is sometimes easier than the drug requirements. For only a limited number of food supplements are indicated clinical trials in order to demonstrate their benefit.

The level of knowledge of people consuming food supplements is sometimes poor, also because of the level of scientific-based information released in media (TV/journals/internet).

This study aims to extract and to underline some data from online data available for the topic of food supplements used of body weight reduction.

P.3.3.ANTIOXIDANT ACTIVITY AND PHENOLIC COMPOUNDS CHARACTERIZATION OF TROPEA RED ONION

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Tropea red onion (*Allium cepa* L.), a typical Italian variety that is cultivated in specific areas of Calabria was characterised by chemotype analyses. Tropea red onion samples and commercial cultivars of different coloured onions were evaluated. The total antioxidant activity was measured using photochemiluminescence method. The Photochem[®] was designed for the analysis of the antioxidant capacity of lipid and water-soluble substances. The key feature of the method is the photochemical excitation of the molecules; by optical exposure of a photosensitizer substance added in standardized volumes to the measurement batch, measurement radicals (superoxide anion radicals) are being generated. Calibration of the device with a standard allows quantification in equivalent units of the standard. The measured antioxidative capacity of the sample may then be specified in equivalent units of the used calibration substance. Ascorbic acid used for the standard calibration curve from 0 to 3 nM. The quantification of main and characteristic polyphenols as quercetin-3,4'-O-diglucoside and quercetin-4'-O-monoglucoside were carried out by capillary electrophoresis. Both methods were very interesting because of their very short measuring times. The difference in antioxidant activity and quercetin contents between Tropea red onion commercial and the original Tropea samples suggested that the composition did not depend only on particular genetic characters but was probably connected to the pedological soil and climate features.

P.3.4. THIN LAYER SEPARATION OF MYCOTOXINS FROM GLYCYRRHIZA GLABRA

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Alcoholic (MeOH and EtOH) and aqueous extracts containing NaHCO₃ (1.18g/100 mL) of *Glycyrrhiza glabra* were obtained by processing 1 g of vegetal powder and 10 mL solvent under sonication at room temperature. The extracts were spiked with standard solution of ochratoxin A (OTA) and aflatoxin B2 (AB2). Thin layer chromatography was carried out on HPTLC Silicagel plates using the mixture of Ethyl acetate – Toluene – Formic acid (30:2.5:0.5, v/v) as mobile phase. Good separation of mycotoxins was achieved in the mentioned chromatographic conditions ($R_{f,OTA}=0.70$, $R_{f,AB2}=0.25$). The chromatogram of alcoholic extracts showed in the area of OTA the presence of own compounds, therefore OTA couldn't be determined. AB2 can be determined without any further purification. By analyzing the spiked aqueous extract of *Glycyrrhiza glabra* both mycotoxins could be determined.

Acknowledgments: The research leading to these results has received partial funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 245199. It has been carried out within the PlantLIBRA project (website: www.plantlibra.eu). This report does not necessarily reflect the Commission views or its future policy on this area.

P.3.5. VITAMIN D - IMPLICATIONS IN A HEALTHY DEVELOPMENT

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It is difficult to meet vitamin D requirements from the diet as few foods contain adequate amounts of vitamin D.

The vitamin D is known to influence the acquisition of bone mineral in utero of pregnant women. Some changes in women's calcium homeostasis during pregnancy facilitate calcium supply for bone mineralization in the rapidly growing fetal skeleton. Maternal vitamin D insufficiency during pregnancy has consequences for the offspring's bone health in laterlife.

Research studies indicated that vitamin D may help reduce the risk of dental caries in infants and younger children.

Media (TV/newsletters/internet) are sometimes abundant in information concerning vitamin D.

This study tries to analyse the level of knowledge provided by online media concerning vitamin D.

P.3.6. CORRELATION BETWEEN ANTHOCYANINS PIGMENTS FROM PURPLE POTATO LEAVES AND TUBER

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Currently, there is a remarkable global interest to identify antioxidant compounds from plants. In the last decade research activities have focused on anthocyanin from fruits and potato because it is a water-soluble pigment that can be used as food dye in different products, but also on bioactive properties (with implications for human health). Selection of potato varieties with high content of anthocyanin is a priority. For selecting varieties it is aimed to identify quick and cheap methods used directly in the field during vegetation.

This paper presents preliminary results on the determination of anthocyanin in potato leaves (Blue-Congo and Blue-Violet of Gălăneşti varieties) by two different methods. As controls were used Romanian varieties Christian (red peel / white pulp) and Roclas (white peel and pulp). The total anthocyanins content from potato leaves was compared with the content from potato tuber in order to find a relation that will be useful to identify, directly in the field, the potato variety rich in these pigments. Anthocyanin content was determined in the field using ACM 200 plus (Anthocyanin Content Meter) and in the laboratory using the soaking in 1% acidified methanol.

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P.3.7. VITAMIN C - IMPLICATIONS IN HUMAN AND ANIMAL HEALTH

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Widespread in green plants, especially fruit and vegetables, the highest concentrations of vitamin C are found in citrus fruits, underbrush, strawberries, kiwi, tomatoes, peppers, broccoli. Ascorbic acid is an important antioxidant, it has the property of being water soluble, may act as both intracellular and extracellular in order to protect the body against free radicals and pollutants. Several controversies were related to the action of vitamin C and the dosage. The topic is also now very interesting for investigators and EFSA (European Food Safety Association) that launched open consultations on dietary reference values for vitamin C. The document proposed dietary reference values for ascorbic acid for different ages (adults, infants and children), and different status of women (pregnant and lactating women)

P.3.8. VITAMIN A - IMPORTANT ROLE IN HUMAN DEVELOPMENT

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Vitamin A (retinol) is an essential nutrient needed in small amounts by humans for the normal visual system; maintenance of epithelial cellular integrity, reproduction, and immune function.

Vitamin A has important roles in embryonic development, organ formation.

A deficit of vitamin A can affect also iron metabolism when deficiencies of both nutrients coexist.

A healthy diet could be balanced with food supplementation and physical exercises in order to have an appropriate human body development.

P.3.9. BIOCHEMICAL FINGERPRINTING FOR THE AUTHENTICATION OF MEDICINAL AND AROMATIC PLANTS

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The investigation and direct evaluation of the security problems arising from the increased consumption of herbal food supplements have been taken into consideration. The current authentication of the products is done by high performance biochemical fingerprinting allowing also the identification of new metabolic markers for the correct authentication of the herbal ingredients. We are considering the application of high performance thin layer chromatography for the identification of medicinal plant species, powders, extracts and other complex products. The experimental protocol aims to investigate some medicinal species requiring an extensive phytochemical characterization and their standardization by chromatographic methods to ensure the collection of sufficient data to obtain "functional fingerprints" as an equivalent of the phytochemical constitution. The studies have been performed on *Hypericum* species due to its importance for the herbal supplements industry but also for their many traditional uses. Based on the obtained data and on their interpretation, the establishment of a protocol/method is takes into account the correct identification of medicinal species and derived herbal products.

Acknowledgments: The research leading to these results has received funding from the Romanian - EEA Research Programme operated by the MECS-ANCSI PO under the EEA Financial Mechanism 2009-2014 and Project Contract No 2SEE/2014.

**P.3.10. MOLECULAR AUTHENTICATION
THROUGH DNA BARCODING OF COMPLEX
HERBAL FOOD SUPPLEMENTS FOR SAFETY
AND EFFICACY**

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The herbal food supplements are under considerable pressure of adulteration through fraudulent substitution and the use of unlabeled fillers with potential negative effects on consumer’s health. As such, reliable but cost-effective methods of authentication of these products are needed. A collaborative research project - PhytoAuthent - was designed to address, investigate and evaluate the safety concerns posed to consumers by herbal food supplements containing one or more plant species (e.g. *Echinacea sp.*, *Hypericum perforatum*, *Gentiana lutea*, *Veronica sp.*, and *Dactylorhiza maculata*). We will gather information, test, develop and apply, in real life case scenarios, innovative molecular methodologies for plant authentication in herbal products. We will make use of molecular methods, including DNA barcoding (Sanger sequencing) but with emphasis on second-generation high throughput sequencing (HTS), i.e. metabarcoding by Next Generation Sequencing (NGS). The project aims to develop DNA barcoding systems for identification of species and their substitutes/fillers in the selected plant cases.

Acknowledgments: The research leading to these results has received funding from the Romanian - EEA Research Programme operated by the MECS-ANCSI PO under the EEA Financial Mechanism 2009-2014 and Project Contract No 2SEE/2014.

P.3.11. MONITORING CROP GROWTH AND DEVELOPMENT THROUGH THE USE OF CLIMATE INFORMATION FROM AUTOMATIC WEATHER STATIONS

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Continuous tracking of phyto-climate conditions has become very important to areas like improved management of crops and promotion of precision farming. However, it has remained difficult to get correct interpretation of their influence on the growth and development of plants and crops.

This paper presents a computational model of browsing phenological phases of plant growth and potato crop phyto-climate using data from automatic weather station. The model is based on monitoring data destined for the phyto-climate (minimum and maximum air temperature, soil temperature, solar radiation, the relative humidity of the air, soil moisture dynamics, wind speed and direction, evapotranspiration potential, etc.) and accumulation over time.

The amount of useful temperature degrees (8 - 28 degrees C) is essential to the physiology of plant growth and production accumulation. The dynamics of accumulation of degrees of temperature in conjunction with the main phenological phases covers potato. It suggests the possible use of this information in decision support systems related precision crop management (phased fertilization, disease and pest control, irrigation, weather and more accurate production optimal timing of harvest).

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P.3.12. OCHRATOXIN DETECTION USING ELECTROCHEMICAL AND IMMUNOCHEMICAL METHODS

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Ochratoxin A (OTA) is one of the most common naturally occurring mycotoxins and is found in a variety of grain crops such as barley, corn, wheat, rye and oats. In the past OTA, was found and analyzed in different food and beverages (e.g. beer). OTA is considered a serious health hazard to humans as it possesses nephrotoxic, hepatotoxic, teratogenic, carcinogenic, and immunotoxic properties. Based on data found on the scientific literature, immunoaffinity columns, molecular imprinting polymers and aptamer columns were tested for cleaning possibilities of samples containing OTA. The results were compared for standards and spiked samples. Obtained analytical results indicated possibilities to extract OTA and to clean the sample, increasing on that ways to level of OTA in samples before their analysis in real samples

Acknowledgments: The research leading to these results has received partial funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 245199. It has been carried out within the PlantLIBRA project (website: www.plantlibra.eu). This report does not necessarily reflect the Commission views or its future policy on this area.

P.3.12. THE INFLUENCE OF EXPERIMENTAL CONDITIONS ON ANTIOXIDANTS DURING IN VITRO DIGESTION OF POMEGRANATE JUICE

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Simulated gastro-intestinal digestion is widely used in many fields of food and nutritional sciences to evaluate the bioavailability of various nutrients, originating from different sources. As so, the stability of antioxidants from pomegranate juice was assessed using an *in vitro* digestion system that simulated the physiochemical changes that occur in the upper gastrointestinal tract (stomach and small intestine). The antioxidant capacity (AOC) of pomegranate juice was evaluated by chemiluminescence assay, total anthocyanins (TA) by pH differential method, and total phenolics (TP) by Folin–Ciocalteu assay. AOC and TP were not lowered during *in vitro* digestion conditions in a simulated stomach and small intestine phase, regardless the pepsin activity. TA were practically unchanged only during the acidic (pH 2) stomach phase, but were considerably lowered during the small intestine phase (up to 78%). Pepsin activity affected the TA in both digestion phases, higher pepsin activity leading to lower TA. By HPLC-DAD analysis, we followed the amount of particular anthocyanins during *in vitro* digestion model in the presence and absence of digestion enzymes (pepsin, pancreatin). The presence of digestion enzymes only slightly lowered the amounts of particular anthocyanins, whereas it seems that the biggest decrease of anthocyanins' levels can be attributed solely to the pH changes, particularly in the small intestine phase being performed at pH 5.3.

**P.3.13. THE IMPROVEMENT OF THE
EFFICIENCY OF USING THE DATA OBTAINED
FROM SOIL AND CROP VEGETATION STATUS
SENSORS BY AUTOMATING ACQUISITION,
STORE AND PROCESS OPERATIONS**

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The technological progress of recent offers opportunities for real-time measurement of production parameters (climate, soil and crop conditions).

The high variability of the data, require finding the possibility to automate the data management (acquisition, organization, processing and interpretation). Following the data acquisition from sensors was performed several operations involving repeat the specific sequences of statistical analyses. The purpose of this paper is to develop a support application to facilitate the repeat processes.

For an efficient data processing which is acquired using soil and crop vegetation status sensors, the support application must perform several conditions:

- Running easily the specific precision farming statistical procedures (standard deviation, variation coefficient, mean, minimum, maximum, Duncan test, analysis of variance);
- The spatial interpolation of the data based on geo-referenced data;
- The soil resources maps obtaining;
- Finally the production estimation.

Acknowledgments: The paper was partial finance from the PN-II-PT-PCCA-2013-4-1629 project.

**P.3.15. LEVEL OF POPULAR KNOWLEDGE
ABOUT THE TOXICITY OF MYCOTOXINS IN
ITALY AND BIOSENSING DETECTION OF
AFLATOXIN B1**

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Mycotoxins are secondary metabolites produced by toxigenic fungi that contaminate food and feed chain.

Mycotoxin contamination can occur in all agricultural commodities in the field and/or during storage, if conditions are favourable to fungal growth.

The mycotoxin problem is particularly relevant for human and animal health. In our study we wanted to understand what the Italian population knows about aflatoxins and the possible effects/toxicological risk.

Furthermore an innovative electrochemical analytical method (EIS) is used for the determination of aflatoxin B1 in liquorice.

Acknowledgments: The research leading to these results has received partial funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 245199. It has been carried out within the PlantLIBRA project (website: www.plantlibra.eu). This report does not necessarily reflect the Commission views or its future policy on this area.

4. New Trends in Engineering Sciences applied in Life Sciences

KN.4.1. CONTINUOUS MONITORING OF IODINE RELEASE DURING BIOFILM INHIBITION PROCESS USING INTERDIGITATED PLATINUM ELECTRODES

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The kinetics of iodine formation was continuously monitored at 37 °C with the aid of interdigitated platinum electrodes and biamperometry as analytical technique for several days. Different designs of electrodes with various electrode areas and geometric dimensions were tested with respect to the sensitivity and repeatability of current measurements. The effect of iodine on the inhibition and/or eradication of the *in vitro* microbial biofilm were then evaluated. The electrochemical monitoring of efficacy in eradication of biofilm was performed on the modified Lubbock biofilm model that was prepared from the blend of five bacteria strains: *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Enterococcus faecalis*, *Escherichia coli*, and *Streptococcus agalactiae*.

Acknowledgments: The work was supported by the Technology Agency of the Czech Republic (project TA03011029).

KN.4.2. ENHANCED FLUORESCENCE DETECTION BASED ON SIMPLE ELECTRONIC DEVICES

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The nowadays biosensors integrate in the same chip the biological receptors (enzymes, antibodies) with an active device as transducer. Recently, some glucose biosensor based on glucose oxidase (GOX) receptor entrapped on self-assembling of multiwall carbon nanotubes or nanostructured TiO₂, was reported. The biodetectors with labelled antibodies falls in the optical category, exploiting a fluorescence effect. The advantages of fluorescence-based systems are extreme sensitivity and lack of damage to the host system. Our proposed workflow is based on simple electronic devices and exploits the flexibility found in modern mobile phones.

For the processing phase, a matrix of 6 x 2 samples, each consisting of 3 x 3 markers, with different concentrations will be required, with photos of the prepared samples exhibiting fluorescence being recorder. The image processing algorithm involves applying the following steps, using a Matlab implementation: (i) Invert; (ii) Select areas of measurement; (iii) Measure the intensity value using histogram analysis; (iv) Interpolate a 4-parameter logistic curve through the measured points. The high resolution on gray scale is required for making possible step 4 of the algorithm, high depth being crucial for proper determination of the logistic curve's parameters.

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**KN.4.3. BUILDING THE SOFTWARE FOR A
BEHAVIORAL MONITORING SYSTEM
FOR ELDERLY**

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A very important research field today is related to understanding better the effects of longevity and chronic diseases on elderly's activity levels and behaviours. The evolution of technologies in producing and developing of sensors can help these endeavours and can offer the perfect tools to monitor the activity of elderly with minimal intrusiveness. By placing several sensors inside people's houses, collecting the data they provide and analyse it, researchers can gain a valuable insight into the behaviour of elderly. These analysis can be used further to anticipate elderly needs and can be the basis of novelty services that aim at improving the quality of life for elderly.

This paper presents the IT&C components of a monitoring system for the activity of elderly inside the kitchen.

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**KN.4.4. PRELIMINARY RESULTS RELATED TO
THE MELOTHERAPY EFFECTS ANALYSIS
USING THE BIORADIO AND LABVIEW
ANALYSES**

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We can find many definitions of Melotherapy but one of them define it like "the use of interventions to accomplish individual goals within a therapeutic relationship by a professional who has completed an approved music therapy program", definition provided by the American Music Therapy Association.

Therefore, with this reason in mind, inside the Creativity Laboratory Centre for Valorisation and Transfer of Competences of Transilvania University of Brasov, we try to teach how one therapist (who will finish the MASTER of Melotherapy organised by the university) can estimate and measure qualitatively, and in future quantitatively, the effects of this special therapy – not a new one but one with actual new results.

At the university we acquired two BioRadio systems <https://glneurotech.com/bioradio> - proved to be great devices – well developed for Research and Education and with a large offer of control software's. We selected to do all the development using: BioRadio Lab Course software and LabVIEW (Laboratory Virtual Instrumentation Engineering Workbench from National Instruments USA). All the measurements and data analyses were done in the Creativity Laboratory during the MASTER courses and laboratories and reflect the preliminary works dedicated to detect the effects of Melotherapy, using the two new and powerful technologies: BioRadio combined with LabVIEW applications.

**O.4.1. DEVELOPING A TABLET APPLICATION
FOR STIMULATING THE SOCIAL
ENGAGEMENT
OF ELDERLY**

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The advances registered in the medical field allow people today to live longer, but this creates new problems, at a psychological level, related to social interaction of elderly. The diminution of physical activity due to advanced age and chronic diseases can negatively affect the spirit of the elderly and the retiring from social life. The paper presents the process of creating an application for tablets that aims to create a virtual social network between its users, the main goal being to keep them involved and determine them to interact and engage in social activities.

The application is built around a recipe database, food being a common point that all people can relate to. A set of services were identified as being useful for elderly and that provide the right tools to empower the elderly to achieve an active, rewarding life. Also, to increase the accessibility and to collect additional information about the user's well-being, speech recognition software and voice synthesis can be used to complete the interface.

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O.4.2. SPECTRAL CHARACTERISTICS OF THE SINGING VOICE WITH APPLICABILITY IN MUSIC THERAPY

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There is no need for formal vocal training to sing, all humans have this ability. Thus, the quality of singing could be enhanced by training. Research studies point the role of singing on treating speech-motor abnormalities associated with various neurological conditions as well as on ameliorating speech deficits related to stuttering, Parkinson's disease, acquired brain lesions, and autism. This paper examines, first, the spectral characteristics of the singing voice, and second, the effects of human voice not only on the subject who is doing the singing, but also on the subjects, possible patients, who benefit from music therapy. It is a step further in pointing out the contribution of the singing voice to treating disorders of one self or another, therefore to improving the quality of life.

The recording and the analyzing was done inside the Creativity Laboratory Center for Valorisation and Transfer of Competences of University “Transylvania” of Brasov using a BioRadio device and LabVIEW software.

O.4.3. INFORMATION THEORY APPLIED TO MELOTHERAPY

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Information theory is a branch of applied mathematics and electrical engineering that deals with the quantification of information. This theory has developed by focusing on the data communication line. It was initiated in 1928 by Ralph Hartley through theoretical treatment of telecommunication issues. Over time, the information theory has found applications in fields of study that involve data analysis and data exploitation (neurobiology, evolution, genetics, ecology, quantum computers, thermodynamics, statistics, computer science, physics. For example: invention of CDs, Internet development, modern studies of linguistics and human perception, knowledge of the cosmos, etc).

The information theory features applications in quantum physics, which shows the duality: field (intangible) versus corpuscle (material). The immaterial quantum field consists of waves (vibrations), which are everywhere, in the universe, outside of time and space. In certain circumstances, it can structure itself in material corpuscles (particles) that have limited existence in time and space (they are the elements of the material world). The field is the information medium and the particles are the support of the material. Any particle in the universe vibrates on a certain frequency accompanied by a wave called psi wave, which has informational role and which serves as the support that allows the transfer of information in the entire Universe. Each molecule in a cell vibrates and each cell is defined in informational terms by the vibration spectrum of all molecules composing it. In its turn, each organ is associated with a vibration spectrum of all cells composing its structure. Every living body is defined in terms of information and is organized by the vibration spectrum of all its component organs.

The modern medical treatments have the solution of quantum medicine – a complementary and alternative therapy. In this new perspective, the individual is a field of energy and information interacting through cybernetic feedback loops with an external field of energy and information.

From the perspective of quantum medicine, healing comes only from within.

O.4.4. HARDWARE AND SOFTWARE SYSTEM FOR VARIABLE AND REGISTER AUTOMATIC MONITORING IN EMBEDDED SYSTEMS

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This paper aims at delivering applications that incorporate the principles of the monitor real-time data logging applications.

Information obtained through monitoring can be used to:

- analyse the situation of initial project
- determine whether involved resources are used appropriately
- identify the problems they face and possible solutions
- ensure that all activities are carried out properly and on time

The basic idea of this project is to have incorporated a mechanism (software module) in another project (hardware module), (could be an existing host project), and being able to recognize the history of inputs, and store them in a Flash memory to a specified event.

These inputs are selected from a predefined interface of software applications designed for general-purpose computers (desktop) that generates *a.c* file and *a.h* file that represents software module that monitors and stores and registers variable recurrence chosen size and history. These files (software module) must be integrated and compiled in the project and subsequently obtained executable code must be downloaded into the system that is intended to be monitored. The software takes as input the project *.map* file host, where to find information about the name and address of project variables, namely *a.h* file where to find information about the registry of the host microcontroller. Also on the PC over the data stored in the host system through a serial data link (RS232) which are displayed graphically and exported in *.csv* files for analysis with other programs.

O.4.5. PHYSICIAN FINDER WITH ANDROID

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During the last years mobile applications became more popular and the general demand today on the market is that any web application must be developed and available on mobile phone. The architecture of a mobile application is easier to understand and minimizes the client's knowledge, regarding how to use it.

The application *AndroidFinder* is developed for each user to find in a specific geographical area the physician affiliated to a professional association, available at that moment and able to treat his specific disease.

The user must select the town in which he wants to search for the physician. He selects the available physician and he can check the on line information about him, as Curriculum Vitae, his activity, scientific background, other patients' feed-back.

The user can send an e-Mail or can call the physician in order request for a medical check-up. The physician sends him a response to confirm an immediate consultation and make the appointment.

This application is usefully because at any time the user can find in each town a physician that can treat his disease or can make a professional orientation to the most appropriate medical facility.

It is important to have a mobile equipped with android system and this software application to increase the accessibility of primary care services of health system.

**P.4.1. INTELLIGENT SYSTEMS
RECONFIGURABLE -MODERN SUPPORT FOR
APPROACH OF SPECTRAL AND
ELECTROCHEMICAL ANALYSIS IN LIFE
SCIENCES**

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In the current context of technical developments, particularly in the areas of electronics and IT, techniques for remote data transmission (GSM, GPRS, wireless, Internet), cloud services (IoT - Internet of Things), were developed in the past years various scientific applications interdisciplinary type. Using modern techniques that are based on collaborations multi / interdisciplinary (analytical chemistry, biochemistry, biophysics, nutrition, food safety, electronics, automatics) possible feedback processes and real-time results with direct impact on the life sciences applied.

Starting from the idea of miniaturization and wireless communications or via the Internet, in this paper are proposed the development and implementation of functional systems to replace equipment for medical laboratory analyses (big and bulky equipment requiring continuous connection to a PC) in aim to reduce analysis time or during the intervention in case of medical processes, in the food industry or related environmental monitoring.

**P.4.2. MACHINE LEARNING FOR BIOMEDICAL
KNOWLEDGE-BASED SYSTEMS**

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In the last years various machine learning techniques have been proposed by the researchers in order to develop efficient biomedical knowledge-based systems. Machine learning offers a robust computational intelligence methods, techniques, and algorithms that can help solving problems in a variety of medical and bioinformatics domains. This paper presents some of the machine learning approaches for developing biomedical knowledge-based systems. The paper covers the following techniques: (a) case-based reasoning; (b) intelligent data mining; (c) rough sets; (d) genetic algorithms; and (e) ontological engineering. Examples of the research performed by the author and his associates for developing knowledge-based systems for cancer, heart, brain tumor, thrombosis diseases as well as protein structure and human gene are discussed.

P.4.3. CHITIN DEPOLYMERIZATION: MEDICAL APPLICATIONS

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Chitin, a $\beta(1-4)$ linked N-acetyl-D-glucosamine polysaccharide, has come to the forefront of biomaterial research as a novel material, being studied for its great biocompatibility and biodegradability properties as well as its great mechanical properties. Potential biomedical application includes surgical threads for sutures and wound-healing materials. The developments of these applications are affected by the chitin molecular weight, as such commercial grade chitin requires depolymerization. This work it was achieved using a 2 GeV deuteron beam to induce a depolymerization from 6.8 to 5.4×10^9 g/mole.

P.4.4. THIN FILM COATINGS FOR IMPLANTS AND PROSTHESES APPLICATIONS

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The performance of biomaterials in biological systems is of critical importance for the development of biomedical implants and tissue engineering. To this day, numerous materials were and still are successfully used in the human body, such as metallic materials (alloys of titanium, tantalum, stainless steel, etc.) ceramic based materials (aluminum oxide, zirconia, calcium phosphates, and indirectly, due to the high affinity of the respective metal towards oxygen, titanium oxide or tantalum oxide), and polymer based materials.

Using a coating as the interface between the bulk material and the biologic environment is one of the solutions which can lead to better bioresponse, improved mechanical characteristics and lower overall cost, compared to the same material as the coating, but used in bulk form. In this paper, an overview on the type and characteristics of several metallic coatings will be presented, with emphasis on the advantages or drawbacks reported for the particular type of material.

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P.4.5. BIOACTIVITY AND BIOLOGICAL STUDIES ON THIN FILMS OF IMPLANT COVERING

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The present work investigates, in situ, the in vitro bioactivity of a new glass-polymer-antibiotic nanostructure as a function of immersion time in a simulated body fluid using FTIR and UV-VIS spectroscopy. We also investigated after immersion cells adhesion and the cytoskeleton organization of synthesized structures, by fluorescence microscopy. The results show that synthetic material reacts in the presence of body fluids, whereby they enhance the body's ability to regenerate tissue and heal itself. This is accomplished by attracting essential biological elements produced by the body for healing and holding them in the defect site while natural healing occurs.

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P.4.6. INVESTIGATION OF THEHYDROXYAPATITE COATINGS ENRICHED WITH Ti

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In the paper, the hydroxyapatite coatings enriched with Ti were prepared as a possible candidate for biomedical application especially for implantable devices that are in direct contact to the bone. The hydroxyapatite coatings with different Ti content were prepared by RF magnetron sputtering method on Ti6Al4V alloy using pure HAP and TiO₂ targets. The content of Ti was modified by changing the RF power fed on TiO₂ target.

The presence of Ti into the hydroxyapatite structure reduces the crystallinity, decreases the dissolution rate, and increases the mechanical, anticorrosive and biological properties. Crystallite size of the coating was decreased by increasing RF power. Hardness, modulus and roughness were increased considerably at the higher RF power. All coatings TiO₂ enriched hydroxyapatite were found to induce osteoblasts proliferation, suggesting that the actin cytoskeleton of osteosarcoma cell growth on the investigated surfaces consisted of regular fiber distribution in the cytoplasm and almost continuous peripheral actin fibers at the cell-cell junctions, indicating a good biocompatibility.

Based on these results, TiO₂ addition into hydroxyapatite structure has good biocompatibility and bioactivity, being a promising material for implants and bone substitutes.

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P.4.7. SURFACE MODIFICATION OF METALLIC BIOMATERIALS USED AS MEDICAL IMPLANTS AND PROSTHESES

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In this work some of the challenges and different approaches regarding biocompatible materials for application in medicine, used medical implants, are presented. Modern medicine, with the help of Material Science, allows, to a point, the replacement of a missing biological structure, as metal hips, shoulders and joints, among others. The rapid integration, biocompatibility and endurance of medical implants are influenced by the surface characteristics of the replacement part.

Different surface treatments (chemical etching, microabrasion, microbial biomachining, to name a few) can be used to alter the surface characteristics of medical (implantable) devices. Surface chemistry and topography are two key factors for adhesion of proteins and cells, and thus specific surface features would influence the growth and proliferation of cells. The adverse responses to the materials used in implants generally lead to the development of new materials, but also of new surface modification techniques, which can inhibit some, if not all, of these responses. Herein, a review of surface modification techniques, along with their methodology and effects on the material performance, which can be applied to medical implants and prostheses, is provided.

P.4.8. THE PERSONAL ASSISTANT, A SUBJECTIVE LOGISTIC PROBLEM

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The subject of present work refers to the possibility of a personal assistant (PA) software design. This application has the goal to assist the user in a daily activity planner.

It is important to underline from the beginning that we imagine this product like an intelligent one i.e. a product which will permanently develop itself by means of the user feedback. So the PA will be a personalized product improved continuously in order to ensure better results.

A short scenario will explain our concept. Imagine that for a particular day you intend to perform a set of activities. Some of them have a fix schedule (a theater, or a doctor appointment etc.) others have the possibility to be planed freely. Having such a goal you can consult the PA which according to the daily state of the town and the knowledge about your personal comfort will suggest you a particular solution. This solution can be a debate subject between you and your PA. This stage will improve the solution and will offer the possibility of improving the PA.

We will underline that the originality of our proposal consist on the fact that the PA is a personalized system i.e. a subjective logistic problem solution. This means that the knowledge about preferences of the user is dynamically developed during the mentioned debate.

P.4.9. INTELLIGENT SOLUTIONS FOR INTEGRATION OF TECHNICAL SERVICES TO A HOSPITAL

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In Europe, buildings account for 40% of total energy consumption. Hospitals, in particular, have high energy requirements and therefore have enormous potential for process optimization and energy saving. In hospitals, electricity is generated using a variety of energy sources (oil, gas, coal and renewables) and is used in various parts of the building as heat (heating and ventilation), cold (air conditioning, cold rooms and operations halls) and electricity (operation of medical and technical systems, building equipment, lighting, elevators, etc.). Experience shows that a more efficient control of these consumers can reduce total energy consumption in a typical European hospital by up to 20%.

Important energy costs, installation and maintenance can be significantly reduced by using proposed intelligent management systems, integrated buildings in applications such as heating, ventilation, air conditioning and lighting.

**P.4.10. ANTIFUNGIC PROPERTIES OF
SPUTTERED HYDROXYAPATITE COATING
DOPED WITH Ag**

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The main goal of the paper is to obtain osteoconductive and antibacterial coatings in order to enhance the osteoconductive capability and the resistance to the bacteria of the Ti6Al4V alloy. For this paper, hydroxyapatite coatings enriched with SiC and Ag were prepared and investigated. SiC was added to enhance film hardness and corrosion resistance, while by Ag addition it was foreseen the improvement of the antibacterial properties. The coatings, with different Ag contents, were deposited on Ti6Al4V alloy substrates by co-sputtering of hydroxyapatite, SiC and Ag targets, using a magnetron sputtering system. The films were characterized in terms of elemental and phase composition, texture, morphology, hardness, corrosion resistance and antifungic activity (Candida), by EDS, XRD, FTIR, SEM and AFM techniques, nanoindentation, electrochemical tests. The influence of the Ag content on the film properties was also analyzed.

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**P.4.11. MATRIX-ASSISTED PULSED LASER
EVAPORATION OF LIGNIN ADDITION TO SIMPLE
AND SILVER-DOPED HYDROXYAPATITE THIN
FILMS: STRUCTURAL AND BIOLOGICAL
EVALUATION**

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Hydroxyapatite (HA) is the most suitable biocompatible material for bone implant coatings. In order to combat its major obstacle-brittleness, research focused on developing composites with various biopolymers. We report on thin films deposition of Ag doped HA combined with a natural biopolymer organosolv lignin (Lig) (Ag:HA-Lig) by Matrix assisted pulsed laser evaporation (MAPLE) method. Solid cryogenic targets Ag:HA-Lig composite dispersions and its counterpart without Ag (HA-Lig) were prepared for evaporation using a KrF* ($\lambda = 248$ nm, $\tau_{FWHM}=25$ ns) excimer laser source. The expelled material was assembled onto TiO₂/Ti or silicon wafers and subjected to physical-chemical investigations. The microbiological assessment showed that the newly assembled surfaces exhibited an inhibitory activity both in the initial steps of biofilm forming, and on mature bacterial and fungal biofilm development. The intensity of the antibiofilm activity was boosted by the presence of Lig and/or Ag, in the case of *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Candida famata* biofilms. The obtained surfaces exhibited a very low cytotoxicity toward tested human mesenchymal stem cells. Those surfaces could be promising candidates for fabricating implantable biomaterials with increased biocompatibility and resistance to microbial colonization and further biofilm development.

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P.4.12. MONTE CARLO DOSE CALCULATIONS IN INTRAOPERATIVE RADIATION THERAPY

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Intraoperative Radiation Therapy (IORT) is a specialized treatment modality of cancer which consists in the direct delivery of a high-level radiation dose ($\sim 20\text{Gy}$) to the residual tumour or to the tumour bed while the target area is exposed during surgery, after the removal of a neoplastic mass. IORT involves a minimal exposure to healthy tissue which can be displaced or shielded during irradiation. The IORT electron accelerators are equipped with dedicated electron applicators that have a major contribution to the energy degradation and the spatial/angular distributions of the electrons at the patient surface. Consequently, IORT dose distributions in the patient/phantom differ from those obtained using classical radiotherapy methods. This work is focused on Monte Carlo dose calculations in homogeneous/inhomogeneous phantoms for clinical dosimetry of IORT beams. Such calculations are needed for an accurate determination of the dosimetric characteristics of the clinical beams used in IORT.

**P.4.13. EVALUATION OF
THE SOLAR CHARGER POSSIBILITIES
IN VERY FAST CHARGING OF
SUPERCAPACITORS**

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The aim of this work is to study the possibility to very fast charge of supercapacitors using a high current obtained from a solar cell illuminated with concentrated solar radiation. These supercapacitors with capacities of hundreds or even thousands of Farads can be charged very fast and then discharge slowly in order to use the energy in a practical situation, such as a real life model in which large group of supercapacitors is charged in 10 seconds and could provide energy all day after that for a portable device like mobile robots or light electrical vehicles. If necessary concentrated light stations are positioned in proper area (like Negev Desert) they can provide free energy after initial investments.

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P.4.14. BEHAVIOUR OF SOLAR CELLS STUDY IN HIGH CONCENTRATED SOLAR RADIATION

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In this work we analysed the behaviour in concentrated sunlight of both mc-Si solar cells commercial available and solar cells based on the CdS/CdTe heterojunction prepared in our laboratory. At high concentration of solar radiation, a temperature around 1000 °C is reached and we had to build a special remote controlled robotic device that allows us to perform the measurement.

Measurements of the I-V characteristic were taken at 700-900 suns for each type of solar cell, with and without interference filters (wavelengths between 460 nm and 795 nm) and they give us important information about the parameters of the solar cells in concentrated sunlight and tell us about which types of solar cells are suitable for work in extreme conditions.

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**Life Sciences - focus for pre-university
and university education**

LS.1. REFORMING HOW PHYSICS IS TAUGHT IN ROMANIA – A PROJECT ENDORSED BY THE ROMANIAN PHYSICAL SOCIETY

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The Romanian Physical Society has been involved in a project initiated in 2011 with the aim to change the way physics is taught throughout secondary education. The key concept of the new approach is inquiry-based learning, which stresses that students are active participants in the process of learning. Students are assisted by the teacher to discover the laws of physics and to understand the new concepts, after performing experiments and observations.

During its different stages, the project has produced a methodological guide for the teachers as well as the psychopedagogical foundation of the new approach and has already trained to use the new methods over 1300 teachers. Moreover, various materials have been prepared to assist teachers in using the new approach: short videos presenting experiments and demonstrations with common, everyday objects, guidelines regarding class management, higher complexity tasks for students with high intellectual potential, items for student evaluation for a part of the learning units etc. Numerous examples of such materials have been uploaded on the webpage of the project at www.srfizica.ro/rpfip.

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LS.2. INTERNATIONAL PROJECT
ONLINE-LABS4ALL

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The aim of this project is to develop IT components adapted and reusable to facilitate the integration of laboratory equipment as required pupils / students without strictly referring to the experimental nature / field (physics, chemistry, biology, engineering, automation, IT, etc) more rather creating an opportunity for any experimental device to be addressed without any restriction on the World Wide Web.

The project involves the development of appropriate interfaces of "Plug-play Share" for global integration and highly successful laboratories online and includes, in addition to schools from Austria (FH Kärnten Eng & IT, HTL Villach, HTL Wolfsberg, HTL Klagenfurt), partners of the scientific program (MIT USA, Queensland University of Technology Sydney -Australia and University-Australia) and three high-schools from European system (Kranj Technical School, and Solskj Center Celje, both from Slovenia and CNI "G. Moisil" Brasov, Romania).

LS.3. PERSONALIZED IMMUNOTHERAPY USING CHICKEN IMMUNOGLOBULIN (IGY). CASE HISTORY

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The IgY technology relies upon a simple and natural process called “passive transfer of immunity”. This idea can be connected with the personalized medicine concept, allowing patients to be treated and monitored more precisely and effectively.

In this work we report for the first time a new immunotherapy method using chicken immunoglobulins (IgY) with specificity for a particular antigen isolated from the patient itself.

The patient enrolled in this study was a 76 year old woman diagnosed with Psoriasis vulgaris since 2001. The skin disease had significantly affected the quality of life of the patient for all most 14 years. Relevant skin tissue samples from different areas of the body were collected at the Victor Babes clinical hospital. The microbiological laboratory test reveals skin infections caused by antibiotic resistant strains of *Acinetobacterbaumannii* and *Staphylococcus aureus*. The pathological material isolated from the woman’s body was inactivated with formaldehyde and used to prepare a personalized immunogen. Further, three specific pathogen free (SPF) laying hens have been immunized. The in vitro efficiency of the IgY extracted from the personalized eggs was assayed using ELISA test. The evaluated IgY solution was used to prepare a sterile biological product containing 2.5 mg/mL of total immunoglobulin. The patient treatment consists of topical administration of IgY solution four times a day for 3 months and the consumption of one unprocessed personalized egg per day on the entire period of therapy, under medical observation.

The physical condition of the patient has been significantly improved after the treatment, including its mentally state. “After 14 year I can socialize like a normal human being and I have a normal skin”, said the patient.