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EFLM Connects National Societies of Clinical Chemistry and Laboratory Medicine and Creates a Platform for all European "Specialists in Laboratory Medicine"

**HOT TOPICS IN LABORATORY MEDICINE**

Liquid biopsy: an emerging hot topic in laboratory medicine to improve cancer management



by Prof. Francesco Salvatore M.D., Ph.D., Emeritus Professor of Human Biochemistry, University of Naples, Italy, and Scientific Coordinator of CEINGE-Biotecnologie Avanzate, Naples, Italy

Liquid biopsy is a relatively new term, but the real essence of its meaning is quite ancient in the field of Laboratory Medicine. Indeed, hemochromocytometric analysis to search for altered blood cells was one of the first tests used in the field of Medical Diagnostics, so that the hemochromocytometric test may be considered the first real

"liquid biopsy", and was one of the starting milestones of Laboratory Medicine mainly in the field of hematology and oncohematology [1].

To be continued on page 2

Foreword

by Harjit Pal Bhattoa, Editor EFLM EuroLabNews



In the current issue, under the Hot Topic column Prof. Francesco Salvatore discusses how liquid biopsy can improve cancer management. Gilbert Wieringa, Chair of the EFLM Profession Committee announces criteria for eligibility to join the EU Register for specialists in Laboratory Medicine, Nuthar Jassam, corresponding author, presents the new version of the EFLM syllabus for postgraduate education and training for Specialists in Laboratory Medicine and Ana-Maria Simundic (EFLM Working Group for Preanalytical Phase) announces the Joint EFLM-COLABIOCLI recommendation for venous blood sampling. MariaStella Graziani, Chair of the EFLM Communications Committee, provides an update on the EFLM publications list. The National Societies of Spain, Croatia, Romania and Serbia outline their latest professional activities and achievements. The 5th EFLM Conference on Preanalytical Phase and EuroMedLab are some of the exciting upcoming happenings in next year enlisted in the Calendar of Events.

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Among the tumor components that are shed into the circulation, which are the ones most likely to be clinically useful, the following three appear to have the greatest potential: circulating tumor cells, circulating tumor DNA, and tumor-derived exosomes (see also the Table). Evidence is increasingly appearing regarding the possibility of using these cells and cell components as markers of early diagnosis, recurrence and metastatic spreading, which will also serve to characterize tumor material at molecular level with a view to customized treatment [2,3,5]. Indeed, many cancer scientists are confident that the next 5-10 years will see major clinical advances in the fight against oncological diseases, particularly in three areas:

- Standardization of samples from patients affected by tumors, their conservation, transport to specialized analytical centers and storage in certified biobanks [7];
- Continuous improvements in technological approaches and methodologies in terms of increased analytical sensitivity and the detection of minute variations (e.g., in nucleic acid), between normal and tumor-derived material, which will help to fulfill the aims of precision medicine;
- Advances in sophisticated bioinformatic tools and methodologies that can help cancer scientists to identify novel gene pathogenic variations in this area.

Many studies have been devoted to the link between bloodborne tumor material and the presence or progression of cancer using one or more of the three most widely used potential markers mentioned above [8,9]. Many difficulties and uncertainties impede the identification of the effective source of tumor cell-derived markers, and of the quantities of this material, and thus also of the correlation between these markers and tumor origin, burden and disease progression. Thus far, markers have been approved for only a few scattered examples of specific tumor types and for therapy that has been considered effective in some patients. However, the time is now ripe to conduct further studies, to establish correlations and controlled conditions under which the various markers can be used on a larger scale in the clinical setting.

Circulating tumor cells and exosomes have also been evaluated with the aim of using them or cell-derived particles as tumor markers and/or markers of tumor progression in human subjects. Exosome DNA, RNA and protein have also attracted great attention in recent years as cell-to-cell messengers because of receptor-like molecules that may bind to circulating exosomes that contain these molecules. The exosomes are also an important tool with which to identify the very early presence of tumors [8,9]. Obviously, with time, liquid biopsy tests should gradually acquire the canonical characteristics of Laboratory Medicine, namely standardization, reproducibility, correct mutational analysis, high sensitivity and specificity, and should be validated in internal and external quality controls. However, the full potential of liquid biopsies has yet to be reached, but the positive results obtained so far have opened the door to a promising new multifaceted group of tumor markers, at present collectively designated "liquid biopsy".

Much later, when the test was extended to molecular aspects of nucleic acids (DNA and RNA) in terms of their quali-quantitative analyses, the diagnostic performance of oncohematological tests increasingly became more sensitive and, today, femtomole amounts of specific nucleic acid sequences are routinely identified for the benefit of leukemia and lymphoma patients [2]. Notably, these approaches also led to a new molecular classification of oncohematological diseases [3].

In 1997, we were among the first groups to produce evidence of the presence of RNA sequences in the blood of patients with solid tumors [4]; however, that was before the very apt eye-catching term "liquid biopsy" was coined. Indeed, the term appeared only a few years or so ago to describe a test done on a sample of blood to look for cells, cell particles and cell molecules from a solid tumor located in various tissues and organs of the body. Not surprisingly, pathologists, whose prime interest was solid tumor cells, soon integrated the molecular analysis of nucleic acids (previously within the exclusive realm of Laboratory Medicine) in their practice. I am convinced that is the skill and knowledge of the operator/physician, whatever their professional label, that will ensure the advantages of liquid biopsy are fully exploited rather than the expertise of the laboratory community.

Notably, large clinical trials are underway and various types of technologies (e.g., next-generation sequencing of nucleic acids, and other high productivity 'omics, analyses) are being used in the attempt to reach high diagnostic sensitivity in body fluids (mainly blood, but, not less importantly, also the more easily accessible saliva, breast milk etc.) [5].

Turning to the cellular and molecular markers that can be visualized, analyzed and investigated, the Table shows the markers now available together with their potential advantages in terms of human health. Since cancer is a genetically driven disorder, and precision medicine is a field in which the therapeutic approach is often targeted to DNA alterations, either to reverse or to cure them, the sequencing of tumor-derived DNA and RNA is very promising not only in terms of understanding the pathogenesis of cancer, but also in the early identification and monitoring of tumor-derived material thereby acting as biomarkers of the affected tissue or organ.

When a tumor is detected at a very early stage, it has been amply demonstrated that, in most cases, the prognosis is much better than when it is identified at a late stage. Therefore, one of the virtues of liquid biopsy is to identify tumor-associated cells and molecules within body fluids, primarily the blood, as soon as possible [6]. Obviously, this procedure must be accompanied by highly sensitive methodology that can capture even minute amounts of material. Consequently, nucleic acid sequences, which may be amplified also in case of tumor, are crucial for an early diagnosis [6].

Moreover, given its low invasivity, liquid biopsy, unlike needle biopsy, can easily be repeated and therefore used to monitor tumor progression, and consequent therapy [2].

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Table. Various types of tumor-derived cellular and molecular products resulting from a minimally invasive approach called "liquid biopsy", during the natural history of diseases (see 8,9).

Type of cell or molecular products extracted from body fluids	Advantages of liquid biopsy
<p>Tumor diagnosis</p> <ul style="list-style-type: none"> • Cells (normal or tumor-derived) • Circulating tumor cells (CTCs) • Cell particles (sub-cellular) • Micro-vesicles • Exosomes • Macro-oncoexosomes • Molecular markers • Circulating free DNA (cf DNA) • Circulating tumor DNA (ct DNA) • Circulating small-RNA (cs RNA, etc) • Circulating long non-coding RNA 	<ul style="list-style-type: none"> • Early detection of tumors <ul style="list-style-type: none"> - early recurrence - early metastasis • Prognostic information • Easy sequential monitoring • Planning treatment monitoring • Non-invasive technology • Identification of candidate therapy-associated mutations • Evaluation of tumor burden • Identification of molecular modifications before and during tumor development <ul style="list-style-type: none"> - identification of driver mutations - identification of predisposing mutations (germinal mutations and a priori evaluation of tumor risk development) • RNA-seq studies • Organ transplantation • Detection of infectious agents • Post trauma monitoring
<p>Prenatal diagnosis</p> <ul style="list-style-type: none"> • Maternal blood • Fetal DNA • Mutated fetal DNA to look for genetic disorders 	<p>Technological advantages</p> <ul style="list-style-type: none"> • Increased sensitivity and specificity of nucleic acid NGS and other products of 'omic sciences • Exosomes for cell-to-cell communication (DNA, RNA and protein transfer)

NGS, next-generation sequencing



NEWS FROM THE EFLM PROFESSION COMMITTEE

Extension of EU Register of Specialists in Laboratory Medicine to Europe

by Gilbert Wieringa, Chair EFLM Profession Committee

EFLM was delighted to announce at its General Meeting in Mannheim on 19th June 2018 that eligibility to join the Register is now open to all 40 countries in Europe with a national society affiliated to EFLM. In the absence of registration systems and regulatory frameworks the Register acts as a forerunner charter mark of professional status that already supports individuals in many countries. Holders of the title whether medical, scientific or pharmacy trained specialists are widely recognised as practitioners with the knowledge, skills and competence to lead and enhance laboratory's medicine's contribution to better health and best care. As an arbiter of high standards it supports equivalent, high quality education and training across Europe and helps raise the profile of laboratory medicine.

Established by EC4 in 1992 to add weight of argument to the case for recognition of Specialists in Laboratory Medicine under EU Directive 2013/55/EC (The Recognition of Professional Qualifications), the Register will continue to identify individuals from the 28 EU member states. Achieving recognition extends opportunities for specialists to practice in other EU countries without having 'compensation measures' imposed e.g. re-taking of local professional examinations

Applications from individuals in countries with an EFLM affiliated national society able to meet EFLM's *Equivalence of Standards* in education and training will be warmly welcomed. The Equivalence criteria are as follows:

- Minimum 9 (ideally 10) years academic (4/5 years) and specialist (4/5 years) training;
- Education and training to expectations set in the EFLM syllabus (ref)
- A Master's degree in Medicine, Pharmacy or Science;
- An EFLM Profession Committee recognised 'Equivalence of Standards' exit qualification;
- Evidence of participation in continuous professional development (CPD).

It requires curriculum content to include:

- General chemistry of at least 35%;
- General chemistry plus haematology of at least 65%;
- Flexibility as to the remaining 35%, including general chemistry, haematology, microbiology, and genetics and IVF in a proportion consistent with the requirements in the country of destination.

Steps to joining the Register

1. Evidence that a country can meet these standards should first be submitted by the EFLM-affiliated national society using the [Equivalence of Standards Evidence](#) proforma that is downloadable from the EFLM web site or obtainable from the EFLM Registrar (registrar@eflm.eu). Once recognised, this evidence provides the measure against which individual applications are assessed.
2. Individual applications are welcomed via the EFLM web site (<https://www.eflm.eu/site/page/a/1305>) and includes submission of a CV, a copy of the previously recognised exit qualification and evidence of participation in continuous professional development (CPD). Registration costs 10 Euros per year and may be renewed annually on assurance of continued participation in CPD. Alternatively, there is an option to take a 5 year registration. Registration certificates are issued electronically by the EFLM Office.
3. The preferred route is auto-registration by a national society. Auto-registration is enabled by submission of an Excel spread sheet to the EFLM Office of the names of individuals able to meet previously approved *Equivalence of Standards*. Enrolments are enacted on an annual base at the start of a calendar year. Responsibility for ensuring only bona fide individuals are registered lies with the national society but regular audit of the database is carried out by requesting CVs, copies of exit qualification certificates and evidence of participation in CPD on a small, randomly selected cohort.

Ref: The European Federation of Clinical Chemistry and Laboratory Medicine syllabus for post-graduate education and training for Specialists in Laboratory Medicine: version 5 - 2018. Clin Chem Lab Med 2018 Jun 5. doi: 10.1515/cclm-2018-0344.

NEWS FROM THE EFLM PROFESSION COMMITTEE

A new version of the EFLM syllabus for postgraduate education and training for Specialists in Laboratory Medicine has been released!

by Nuthar Jassam, Corresponding author of the Syllabus, Dept of Clinical Biochemistry, Harrogate and District Foundation Trust, Harrogate, UK

The 5th version of the EFLM syllabus was published in July 2018 in Clinical Chemistry and Laboratory Medicine. The published paper of the syllabus represents the long standing EFLM commitment to establish a harmonized curriculum. The concept of harmonisation of the syllabus for specialists in laboratory medicine goes back to the dawn of the EU with the aim to support building a flexible mobile workforce focused on the future need of the rapidly growing laboratory medicine practice. A previous EFLM publication showed that while the training, qualifications and scope of laboratory medicine practice may vary across EU member states, the overlap is also significant. The identification of a common ground between various

syllabuses in the EU allowed the opportunity to identify common elements that formed the nucleus for version 5 of the syllabus. A key driver has been to harmonise education and training principles and set standards of practice. This in turn helps catalysing more equitable delivery of laboratory medicine services within and across country borders and ensures greater patient safety.

The fifth version represents the European Federation of Clinical Chemistry and Laboratory Medicine's (EFLM) position statement for the education and training of medical practitioners, scientists and pharmacists practising at specialist level in laboratory medicine across Europe. It builds on the fourth (2012) by detailing the knowledge requirements in clinical biochemistry/immunology, haematology/blood transfusion, microbiology/ virology/infection prevention and control, cytogenetics/molecular genetics. Stronger prominence is given to the skills required in the latest advances in analytical techniques and the use of statistical evaluations; sections on leadership have been expanded to highlight the competencies required to provide services beyond the laboratory. The syllabus also describes the role of the trainee, trainer and the need for a teaching and learning programme and assessment system to support the training period. The development of soft skills and appropriate attitude to work autonomously as an independent practitioner is described under Professional and Leadership skills module.

Version 5 of the EFLM syllabus comes with a log book to help a trainee in laboratory medicine to keep a record of achieved skills and competencies. Both the syllabus and the log book can be found on the EFLM website under the Professional committee webpage, Education committee or under the Publications webpage.

NEWS FROM THE EFLM WORKING GROUP FOR PREANALYTICAL PHASE

Joint EFLM-COLABIOCLI Recommendation for venous blood sampling

by Ana-Maria Simundic, EFLM WG-PRE chair and EFLM President-Elect

EFLM WG-PRE proudly announces the recent publication of the first official EFLM Recommendation: Joint EFLM-COLABIOCLI Recommendation for venous blood sampling. This document provides a joint recommendation for venous blood sampling of the European Federation of Clinical Chemistry and Laboratory Medicine (EFLM) Working Group for Preanalytical Phase (WG-PRE) and Latin American Working Group for Preanalytical Phase (WG-PRE-LATAM) of the Latin America Confederation of Clinical Biochemistry (COLABIOCLI). It offers guidance on the requirements for ensuring that blood collection is a safe and patient-centred procedure and provides practical guidance on how to successfully overcome potential barriers and obstacles to its widespread implementation. Target audience for this recommendation are healthcare staff members directly involved in blood collection.

This document has been produced by EFLM WG-PRE and endorsed by the WG-PRE-LATAM following the identification of the critical preanalytical procedures involved in venous blood sampling and is, wherever possible, consistent with Clinical and Laboratory Standards Institute (CLSI) and World Health Organization (WHO) guidelines. Its first draft was circulated to EFLM members for public consultation, in October 2017. All EFLM National societies were invited to take part in the final stage of development of this document. Public consultation among EFLM National Society Members was open until the end of 2017. All comments received have been taken into account during the document revision. Revised version has been sent out for voting to all 40 EFLM and 21 COLABIOCLI members. Results were as follows: 33/40 EFLM members and 21/21 COLABIOCLI members have voted in favor of this document, 2 EFLM members voted against and 5 EFLM members abstained from voting. Hence, this document has now been officially endorsed by EFLM and COLABIOCLI and is to be considered an official EFLM and COLABIOCLI statement. The authors wish to thank to all who have endorsed and supported this Recommendation.

Joint EFLM-COLABIOCLI Recommendation for venous blood sampling has been recently published in CCLM (Clin Chem Lab Med. 2018 Jul 13. doi: 10.1515/cclm-2018-0602), the official Journal of EFLM. Recommendation (PDF) as well as some useful tools (educational video, posters and PPT, checklist for audits, knowledge test) may be freely downloaded from the EFLM website (under Resources / Educational Material). We encourage professionals throughout Europe and Latin America to adopt and implement this recommendation to improve the quality of blood collection practices and increase patient and workers safety.

On behalf of the authors of this Recommendation.





UPCOMING EFLM EVENTS



5th EFLM Conference on Preanalytic Phase

Preanalytic challenges - time for solutions

Zagreb (Croatia) 22-23 March 2019



After the meetings in Parma (2011), Zagreb (2013), Porto (2015) and Amsterdam (2017), with great pleasure, on behalf of the conference organizers, you are invited to the 5th EFLM Conference on Preanalytical Phase, to be held on 22-23 March 2019 in Zagreb (Croatia).

The conference is organized by the European Federation of Clinical Chemistry and Laboratory Medicine (EFLM) and supported by BD Life Sciences, Preanalytical Systems. The focus of the conference is the quality of the preanalytical phase of the laboratory work. It is the largest such conference in Europe, which brings together more than 600 participants every second year.

Chair of Conference Scientific and Organizing Committee is Prof. Dr. Ana-Maria Simundic who is also Chair of WG-PRE (Working Group on Preanalytical Phase). The conference programme has been tailored by the scientific committee to deliver up-to-date knowledge in the field and create an open forum for interactive discussions. Your feedback during the previous meetings has guided us in the selection of the topics of this one.

Our guiding principle was to be different, pragmatic, practical and interactive, to address challenges, to raise questions and offer answers.

We offer you an excellent programme, renowned speakers, lots of practical tools and tips. Come to Zagreb and learn from the best!

On-line registrations will open on 1 September, 2018. The detailed scientific programme will be available from October 2018. The deadline for abstract submission is December 1, 2018.

Please save the date and mark your calendars for this interesting scientific conference in the beautiful city of Zagreb. We are looking forward to your attendance!

>> <http://www.preanalytical-phase.org> <<

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Updates of the EFLM Publication list

by Maria Stella Graziani, Chair of the Communication Committee

The more recent EFLM papers are mostly related to the Harmonisation activities of the Federation.

A special issue of Clinical Chemistry and Laboratory Medicine is planned for the second half of this year; EFLM contributed to the issue with 4 papers reporting about the important and endless activities of the Federation in this field. They are:

An overview of EFLM harmonization activities in Europe

Kilpatrick ES, and Sandberg S

DOI 10.1515/cclm-2018-0098

Summarizing the many activities of the Federation in the recent years, emphasizing the EFLM role in harmonizing the Laboratory Medicine practice in Europe

The EFLM strategy for harmonization of the preanalytical phase

Lippi G, Simundic AM, on behalf of the European Federation for Clinical

Chemistry and Laboratory Medicine (EFLM) Working Group for Preanalytical Phase (WG-PRE)

DOI 10.1515/cclm-2017-0277

Describing the activity of this enthusiastic EFLM WG during the years

Harmonization initiatives in the generation, reporting and application of biological variation data

Aarsand AK, Røraas T, Bartlett WA, Coşkun A, Carobene A, Fernandez-Calle P, Jonker N, Díaz-Garzón J, Braga F, Sandberg S, on behalf of the European Federation of Clinical Chemistry and Laboratory Medicine (EFLM) Working Group on Biological Variation

DOI 10.1515/cclm-2018-0058

Describing the pivotal research work of this EFLM WG to deliver a more harmonized practice in the generation, reporting and application of Biological Variation data

Harmonization of accreditation to ISO15189

Thelen MHM, Huisman W

DOI 10.1515/cclm-2017-0820

Reporting about the role this standard has gained as the harmonized quality standard that is not affected by borders between scientific fields nor between nations.

Another important contribution is a joint document between EFLM and the European Atherosclerosis Society.

Quantifying Atherogenic Lipoproteins: Current and Future Challenges in the Era of Personalized Medicine and VLDL Cholesterol. A Consensus Statement from EAS and EFLM.

Langlois MR, Chapman MJ, Cobbaert C, Mora S, Remaley AT, Ros E,

Watts GF, Borén J, Baum H, Bruckert E, Catapano A,

Descamps OS, von Eckardstein A, Kamstrup PR, Kolovou G,

Kronenberg F, Langsted A, Pulkki K, Rifai N, Sypniewska G, Wiklund O,

Nordestgaard BG, for the European Atherosclerosis Society (EAS) and the European Federation

of Clinical Chemistry and Laboratory Medicine (EFLM) Joint Consensus Initiative.

DOI 10.1373/clinchem.2018.287037

The paper is aimed to provide recommendations to optimize atherogenic lipoprotein quantification for cardiovascular risk management. The main recommendations (related both to clinical and laboratory aspects) listed in the consensus document are: a) to monitor a single patient with LDL cholesterol measurement utilizing the same method (measured or calculated); b) to use the non-HDL cholesterol as secondary treatment target in patient with mild to moderate hypertriglyceridemia; c) laboratories should report non-HDL cholesterol in all standard lipid panels.

Finally, the most recent paper by the EFLM WG on Biological Variation

EuBIVAS: Within- and Between-Subject Biological Variation Data for Electrolytes, Lipids, Urea, Uric Acid, Total Protein, Total Bilirubin, Direct Bilirubin, and Glucose

Aarsand AK, Díaz-Garzón J, Fernandez-Calle P, Guerra E, Locatelli M, Bartlett WA, Sandberg S, Røraas T, Ceriotti F, Sølvik UØ, Sverresdotter Sylte M, Coşkun A, Serteser M, Unsal I, Tosato F, Plebani M, Jonker N, Barla G, Carobene A; European Federation of Clinical Chemistry and Laboratory Medicine Working Group on Biological Variation.

The European Federation of Clinical Chemistry and Laboratory Medicine European Biological

Variation Study (EuBIVAS) delivers revised and more exacting analytical performance specifications and reference change values for commonly used clinically important measurands, thus having direct relevance to diagnostics manufacturers, service providers, clinical users, and ultimately patients.



SEQC^{ML}

Sociedad Española de Medicina de Laboratorio

NEWS FROM EFLM NATIONAL SOCIETIES

News from the Spanish Society of Laboratory Medicine (SEQC^{ML})

Project backed scientifically by the Spanish Society of Laboratory Medicine (SEQC^{ML})

The website Lab Tests Online (LTO) brings the work of clinical laboratory professionals closer to the Spanish public

- **The initiative aims to offer information about clinical analyses to the general public**
- **Adapted to Spain by an Editorial Committee, it includes information on some 1,200 tests, news, and other resources**
- **LTO ES (www.labtestsonline.es) exceeds 300,000 monthly users from all Spanish-speaking countries**

Madrid, May 7, 2018 - The Internet has made available to the entire world a great deal of information on any subject, including health. The problem now is to distinguish serious and reliable information from unverified data. Lab Tests Online (LTO) was created with this objective in mind, and is a website that offers rigorous and quality information in the specific field of medical tests. It is an initiative backed in Spain by the Spanish Society of Laboratory Medicine (SEQC^{ML}), which was charged with developing the version of this site for Spanish-speaking countries, LTO ES (www.labtestsonline.es). LTO ES has the WMA (Accredited Medical Web) seal and follows the principles of the HON Code (Health on Internet Foundation).

"In today's society, people are increasingly concerned about their health and seek out information on how to stay healthy longer," explains Dr. Marià Cortés, director of the Editorial Board of LTO ES. She notes that, with this in mind, the tool was designed to help provide better understanding of the work performed by clinical laboratory professionals. The website is aimed at the general public, but it can also be useful for health professionals. "The clinical laboratory is usually unknown to the general public, despite the fact that around 70-75% of medical decisions are made taking laboratory data into account," says Dr. Cortés.

Thus, Dr. Cortés believes that LTO can be a great help in the interpretation of laboratory tests. "Knowing what is analyzed, what it is used for, how the result is interpreted, etc. ... can help users understand better the report they receive from the laboratory and why the included tests were requested", she explains. "We also believe that it can be a practical source of information for general practitioners, especially for more specialized laboratory tests," adds the specialist.

The LTO ES website includes information on around 1,200 tests and is constantly updated. The site allows access to the information by searching for the name of the test or the associated physiological condition. It also offers an information section. "We try to maintain a periodic frequency of publication of health news related to the clinical laboratory that is aimed at the general public, so that they can become aware of the importance of the laboratory in the overall context of health care," says Dr. Cortés.

In 2017 the website was visited by more than 3.7 million users, with an average of 310,500 visits per month; this usage data is four times higher than in 2014. Although the website is managed in Spain and adapted to its specificities, a significant number of visits come from other Spanish-speaking countries. In fact, Spain is the country with the largest audience (28.14%), followed by Mexico (20.98%).

11 years of LTO ES

Lab Tests Online (LTO) began as an initiative of the American Association for Clinical Chemistry (AACC) at a time when the Internet was beginning to become popular, in 2001. Starting the following year, the Spanish Federation of Health Technology (FENIN) and the Spanish Society of Laboratory Medicine (SEQC^{ML}) tried to reach an agreement with the AACC to develop a Spanish version of this website. An agreement was not reached until 2006, and was signed between the AACC and the European Diagnostic Manufacturers Association (EDMA), allowing the Scientific Societies of European countries to translate the content of the website, adapting it to the specific circumstances of each country.

This is how Lab Tests Online began in Spain, Germany, France, Italy, and Greece, with a common content management system managed by Engitel. The Spanish version of Lab Tests Online first appeared in March 2007. "For its development, we had a large team of laboratory medicine professionals who, under the tutelage of the Editorial Committee, were in charge of translating the content of the American website and adapting it to the characteristics of our country", explains Dr. Maite Panadero, member of the editorial committee of LTO ES.

Over the past 11 years, LTO ES has been enriched by the progressive incorporation of the American website's content. In recent years, in addition, its presence in social networks has been enhanced by the publication of new items prepared in Spain, and related to various aspects of health or disease prevention, which were published on the LTO ES website and shared on different social networks. This, according to Dr. Panadero, is aimed at attracting a younger audience.

In addition, the doctor notes that the website has recently been migrated to the American website's management system, which was in the redesign phase. This has not only improved the management of the website but also its design. "The current www.labtestsonline.es not only looks much more attractive, but is also more user-friendly and simple to use; it is also 'responsive', that is, adaptable to all types of devices."

The SEQC^{ML}

The Spanish Society of Laboratory Medicine (SEQC^{ML}) - founded in 1976 - now includes more than 2,500 professionals and has as its main objective to bring together all interested scientists in the field of the Clinical Laboratory, to promote the dissemination of scientific and technical publications, to organize meetings, courses, and congresses of national and international character, and to cooperate with other Scientific Societies. Likewise, the Society aims to contribute to the study and recommendation of standardized methods and establish guidelines and recommendations for training in the field of Laboratory Medicine.

For more information: www.seqc.es

9th Congress of the Croatian Society of Medical Biochemistry and Laboratory medicine

The 9th Congress of the Croatian Society for Medical Biochemistry and Laboratory Medicine (CSMBLM) with international participation was held from the 9th to the 12th of May, 2018 in Zagreb, 25 years after the first historical national congress.

During the three congress days 25 distinguished national and international lecturers presented the latest achievements and advances in the laboratory diagnosis and harmonization in hemostasis, laboratory diagnostics of chronic diseases, molecular diagnosis, new biomarkers, extravascular fluid diagnostic tests, and laboratory management. Professor Srdjan Djurovic from the Oslo University Hospital presented his Psychiatric Molecular Genetics Group project, in which induced pluripotent stem cells are used for detecting specific biomarkers associated with severe psychiatric disorders. Dr. Gilbert Wieringa presented the current efforts to harmonize the common educational framework of laboratory medicine specialists in the European Union. A special focus of the congress was on ensuring quality control in all segments of laboratory medicine. The president of the EFLM, Professor Michael Neumaier presented researches conducted for assurance of sample quality and integrity for biochemical and molecular testing. Dr. Piet Meijer, director of the ECAT foundation (External Quality Control of Diagnostic Assays and Tests), gave a lecture on biological variability in hemostasis and the consequent impact on analytical performance specifications, with an emphasis on quality assurance, aiming to achieve better diagnostic and therapeutic patient's outcome. An especially stimulating plenary lecture on whether we are ready for the laboratory medicine in the future was given by Professor Ana-Maria Šimundić.

The scientific program also offered some innovative content. For the first time 6 Meet the expert interactive sessions were organized in the less formal environment each congress day before the morning Symposia. The basic idea was to organize small groups of participants with specific interest, which had the opportunity to ask and discuss specific problems with the experts working in selected specialized fields of medical biochemistry and laboratory medicine. Moreover, all participants had access to the official congress mobile application where they could ask questions, participate in discussions and view all posters. E-posters were also available on touch-screens around the exhibition hall.

One of the novelties was the presentation of the results and guidelines provided by CSMBLM Committee for the scientific professional development. In the pre-congress symposium the Committee presented all published national guidelines as a result of investigation provided by specific working groups in last three years. Published national guidelines are the result of a significant effort in harmonizing laboratory practices in Croatia.

A total of 230 participants attended the congress and presented their own work with 132 posters and poster abstracts. Among them 51 were presented during 6 distinct Oral poster presentation sessions. For the first time on a national congress 8 students of medical biochemistry presented their abstracts in a Students' Oral poster presentation session. All symposium and poster abstracts are available in a supplement of *Biochemia Medica* (<http://www.biochemia-medica.com/node/916>).

Numerous sponsored industrial workshops and large accompanying exhibition of our 24 industrial partners provided up-to-date information on achievements regarding the latest laboratory equipment, reagents and accessories. We thank our partners for offering scholarships for 22 authors of poster abstracts for attending the Congress.





NEWS FROM EFLM NATIONAL SOCIETIES

"*Biochemia Medica*" official journal of Croatian Society for Medical biochemistry and laboratory Medicine celebrates its new IF 3.654

by Daria Pasalic, *Biochemia Medica* Editor-in-Chief

This year CSMBLM celebrates the 65th anniversary. Therefore the national congress was a perfect opportunity to acknowledge scientists and colleagues for their outstanding contributions in the field of medical biochemistry and laboratory medicine. The Lifetime Achievement Award was awarded to Professor Slavica Dodig, whose impressive biography and lifetime work is a testament to her dedication and unparalleled expertise in the field of immunology and laboratory medicine. Marijana Fišer Herman Accolade was received by Professor Renata Zadro, for her scientific and educational work, and the development of medical biochemistry in general. Ibrahim Ruždić Accolade was awarded to Professor Zlatica Flegar-Meštrić, for promotion of medical-biochemical sciences in the clinical laboratory diagnostics as an integral part of health care. Finally, the annual award for scientific work was received by Jasna Leniček Krleža, PhD.

Overall, the congress scientific programme and organization was a great success according to the participants' feedback and we are looking forward to our 10th jubilee congress in 2021.



Croatian Society of Medical Biochemistry and Laboratory Medicine CSMBLM would like to share great news with EFLM community. *Biochemia Medica*, the journal published by CSMBLM continues to improve its quality. **According to the recently released Clarivate Analytics JOURNAL CITATION REPORTS, the IF for 2017 for *Biochemia Medica* is 3.653.**

Biochemia Medica is ranked sixth (6/30) within the Q1 of the JCR MEDICAL LABORATORY TECHNOLOGY category journals and is for five consecutive years, the first ranked Croatian journal, across all scientific disciplines, with the highest impact factor in Croatia¹.

Biochemia Medica was established in 1991 as a Gazette of Croatian Society for Medical Biochemistry and was in essence, for many years only a national journal, published in Croatian with a limited audience. In 2006 Journal was taken over by the new Editor-in-chief and new Editorial board. The journal front cover, content and format were redesigned² and it was soon indexed in EMBASE/Excerpta Medica and Scopus citations databases³. Two years later (2008) *Biochemia Medica* became indexed in Science Citation Index Expanded and Journal Citation Reports/Science Edition⁴.

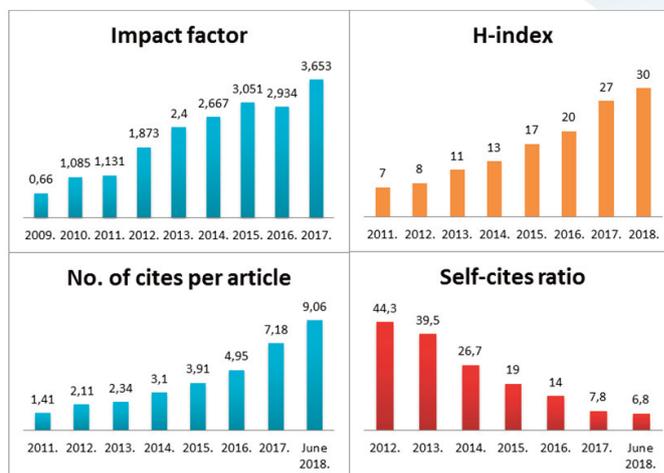
The first impact factor received for 2009 was 0.660⁵. That was the result of the huge efforts led by Editors in-Chief, Elizabeta Topić and Dubravka Čvorišćec, as well as Ana-Maria-Šimundić who was the Assistant editor, at that time. In 2010, the Journal launched a new web page and online submission system⁶, while in 2011 Ana-Maria Šimundić became the new Editor-in Chief⁷ and remained on that position until October 2017. Her mandate was marked with significant efforts to improve the Journal quality, attract high quality submissions and make the journal internationally recognizable⁸. Therefore special thanks go to her, because during her mandate (until then) *Biochemia Medica* showed the substantial progress in the editorial quality, by improving the quality of submissions, peer-review procedure and, editorial policies. During her mandate, *Biochemia Medica* got indexed in Medline (2012) PubMed and Current Contents (2015) bibliographic database and was focused on implementing highest Research Integrity standards and policies⁹. In 2012, *Biochemia Medica* has appointed its first Research Integrity Editor, to be the gatekeeper of the journal integrity¹⁰. In 2013 a new section was launched: Research integrity corner and Journal has started with a regular detection of plagiarism of all submissions, by licenced professional software (originally Cross Check, later iThenticate)¹¹.

The best way to express what happened over last decade with the journal is to show the journal statistics from JCR and *SC imago*. Those numbers say more than words. (Figure 1)

These numbers are also the results of very hard voluntary work of all editors: assistant editors, research integrity editor, technical editors because they sustained and improved the quality of the editorial work. Without their enthusiasm and effort all this would not be possible. Additionally, our reviewers and their efforts, expertise and knowledge invested in reviewing manuscripts submitted to "Biochemia Medica", helped a lot to the editorial activities and increase in quality. Finally, our authors and their high quality submissions and cooperation with editors have also contributed to this success.

We look forward for new articles submitted by EFLM members and officers and international laboratory medicine community, especially in the field of research integrity, biostatistics, extra-analytical phase, quality control as well for new diagnostic biomarkers.

I wish to express my sincere thanks to all who contributed to this great success!



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NEWS FROM EFLM NATIONAL SOCIETIES

2nd Congress of the Romanian Association of Laboratory Medicine Bucharest 09-12 May 2018



by Dr. Ioana Brudașcă, RALM president

The 2nd Romanian Association of Laboratory Medicine (RALM) Congress was held between 09-12 May 2018 in Bucharest. The congress was organized under the auspices of IFCC and EFLM and in collaboration with the Romanian Society of Microbiology, the Romanian Society of Hematology and the Universities of Medicine and Pharmacy of Bucharest, Târgu Mures, Cluj Napoca, Iași, Timisoara.

The congress was attended by over 650 participants (medical doctors, scientists and lab technicians working in medical laboratories). Four speakers from abroad were invited to the congress: prof. Mauro Panteghini (Italy), prof. Evi Lianidou (Greece), prof. Janos Kappelmayer (Hungary) and prof. William Au (China). Most of the Romanian speakers were teachers at the medical faculties of Bucharest, Cluj Napoca, Târgu Mureș, Timisoara, Iași. The lectures of the keynote speakers provided up to date information about various aspects (high sensitivity troponin, liquid biopsy, laboratory monitoring of direct oral anticoagulants, clinical value of genetic testing, inflammatory cytokines, etc).

As in Romania laboratory medicine encompasses a large area of subspecialties, the scientific programme covered themes in clinical chemistry, microbiology, hematology, genetics, molecular biology, immunology, presented in 41 posters, 17 short oral communications and 22 plenary reports. The posters and the slides for the oral presentations were written in English. Many of the presentations focused on continuous professional development for laboratory professionals, quality assessment, standardization, technology, instrumentation and method evaluation, performance criteria of laboratory tests, showing the interest of the participants in the improvement of our professional activity.

During the discussions that followed the presentations, the participants had the opportunity to share their experience and to identify solutions for the scientific or technical issues they are confronted to in their everyday practice.

As our RALM is very interested in motivating young laboratory professionals, many communications and posters were presented by young colleagues, most of them PhD fellows. Two awards were granted, one for the best poster, and one for professional activity. RALM also initiated this year an internal grant competition for young scientists, consisting in 3000 euros.



NEWS FROM EFLM NATIONAL SOCIETIES

XXI Serbian Congress of Medical Biochemistry and Laboratory Medicine and 14th EFLM Symposium For Balkan Region

by Dr. Snežana Jovičić, Society of Medical Biochemists of Serbia

Four applications were submitted, which were evaluated by experts, and the winner of the competition (Dr. Adina Hutanu from the University of Medicine and Pharmacy of Târgu Mureș) was announced at the General Assembly.

Conference abstracts were published in a supplement of Romanian Journal of Laboratory Medicine.

As our profession is in a permanent partnership with the clinical diagnostic industry, during the congress an exhibition of equipment, reagents, supplies, software was organized by 20 companies. There were also 13 workshops organized by IVD providers, which were an excellent opportunity for the development and transfer of technical innovations to clinical laboratory professionals.

The scientific quality and the diversity of the presentations, the excellent organization, as well as the attracting social programme fully contributed to the success of this scientific and professional event.

The biannual Serbian Congress of Medical Biochemistry and Laboratory Medicine with international participation was held in Belgrade 23 – 25th May. It was organized for the 21st time by the Society of Medical Biochemists of Serbia (SMBS) and University of Belgrade Faculty of Pharmacy, under the auspices of the IFCC, EFLM and Balkan Clinical Laboratory Federation (BCLF), as well as the Ministry of Education, Science, and Technological Development and Ministry of Health of Republic of Serbia. During the opening ceremony, participants were welcomed by the president of the congress' Scientific Board, Prof. Nataša Bogavac-Stanojević, and also greeted by the Dean of the University of Belgrade Faculty of Pharmacy, Prof. Zorica Vujić, as well as the president of the Pharmaceutical Association of Serbia, Prof. Vesna Matović.

Traditionally, on this occasion SMBS handed the Award of the Foundation "Magistra Milica Marković", presented to medical biochemists or laboratories for promoting the technological and organizational work principles of clinical laboratories, improving the quality of laboratory services, and for promoting the profession. This year's award went to the Community Health Center Laboratory in Vršac and its Head, Dr. Jon Čoban.

Also, SMBS acknowledges special contribution to the promotion of medical biochemistry science and profession with Honorary Diploma. This year's laureate was Petnica Science Center, located near the town of Valjevo, in western Serbia, a unique independent institution dedicated to development of scientific culture, scientific literacy, education and culture, primary among high school and university students, as well as training of teachers in novel techniques, methods, and contents in the field of science and technology. The Director of Petnica Science Center, Mr. Vigor Majić, also received an Honorary Diploma for his lifelong work and endeavours in this esteemed and unique institution in the world. Also, Mr. Majić opened the working part of the Congress with his plenary lecture entitled "Where are they? – Fermi Paradox and the Art of Losing Gifted Students".

The working part of the Congress has started with the 14th EFLM Symposium for Balkan Region.

Prof. Ana-Maria Šimundić, President Elect of the EFLM, opened the Symposium with the perspective on the past, present and future of laboratory medicine. This year's Symposium had a running title "Neighboring Countries: the Same Professional Aim", and it was dedicated in its first part, to the laboratory medicine achievements in neighboring countries of this region – organization of external quality control in laboratory medicine in Bosnia and Herzegovina (Prof. Jozo Ćorić), the results of iodine intake survey in Republic of Macedonia in a 10 years gap (Dr. Sonja Kuzmanovska), experience with interferences in laboratory assays in Montenegro (Dr. Najdana Gligorović-Barhanović), survey on heavy metals and trace elements



From top left corner: Prof. Evi Lianidou (GR), Prof. Janos Kappelmayer (HU), Prof. Mauro Panteghini (IT) and the RALM President Dr. Ioana Brudasca.

in human breast milk in Turkey (Dr. Aysegül Çebi), survey on the role of adipose tissue in maintenance of energy homeostasis in Republic of Srpska, Bosnia and Herzegovina (Dr. Dragana Puhalo Sladoje). Prof. Evgenija Homšak presented the EFLM project "EFLMLABX", whose aim is exchanging practice in laboratory medicine throughout Europe. Finally, Prof. Zorica Šumarac presented the recommendations of the EFLM Working Group on Preanalytical Phase for venous blood sampling.

The first session of the Congress was dedicated to novel trends in laboratory medicine – opportunities, challenges, and perspectives in advanced lipid and oxidative-stress status testing (Prof. Jelena Vekić), applications of six sigma and economy methods in clinical laboratory (Prof. Nataša Bogavac-Stanojević), the potential of quantitative PCR in laboratory medicine (Prof. Miron Sopić), the role of novel biomarkers in inflammatory lung diseases (Dr. Jasmina Ivanišević), and qualitative characteristics of high density lipoproteins in children with chronic renal disease (Dr. Danijela Ristovski-Kornic). Patient-oriented approach in the evaluation of analytical quality in medical laboratories was the topic of the second session, where the new concept in quality management in medical laboratories focused on irregular (individual) analytical errors was presented (Prof. Svetlana Ignjatović), with the examples of clinical cases in endocrinology related to irregular analytical errors (Prof. Miloš Žarković), and the causes of these errors were presented and elaborated – biotin (Dr. Vera Lukić) and antibodies (Dr. Neda Milinković). The third session dealt with the role of laboratory medicine in personalized medicine – the technique of new generation sequencing (Prof. Sonja Pavlović), the significance of studying micro RNA (Prof. Barbara Ostanek), the role of pharmacogenomics in cancer management (Prof. Marija Hiljadnikova Bajro), and the role of gene polymorphisms for adipocytokines in the risk for colorectal cancer development (Prof. Ana Ninić). Factors and risk assessment of metabolic and endocrine disorders were the topic of the final session, presenting the integral endocrinological approach in gestational diabetes management (Prof. Đuro Macut), risk assessment of exposure to endocrine disrupting chemicals (Prof. Biljana Antonijević), European guidelines for risk assessment in food safety (Prof. Ivan Stanković), and telomere length as biomarker of aging, environmental and lifestyle influences (Prof. Jelena Kotur-Stevuljević).

The second part of the 14th EFLM Symposium for Balkan Region wrapped the whole event, with the two-part session entitled "Forum of Young Researchers", in which PhD candidates at the Department of Medical Biochemistry University of Belgrade Faculty of Pharmacy presented their research. The presentations covered topics from the association of polymorphism of matriptase-2 and HFE mutations with hepcidin and iron status in preterminal and terminal renal failure (Miljan Savković), the role of resistin gene expression and its concentration in coronary heart disease (Dr. Jelena Munjas), the role of genetic factors in resistance to clopidogrel therapy (Dr. Dragana Bačković), the relationship between serum biomarkers of vitamin B12 status and morphometric parameters of leukocytes in patients at increased risk of deficiency (Dragana Totošković). In the second part, the connection of cholesterol homeostasis and cardiometabolic risk was presented (Tamara Gojković), followed with the research on PON1 activity distribution among HDL subclasses in renal pathology (Milica Miljković), qualitative and quantitative characteristics of high-density lipoproteins in non-alcoholic fatty liver disease (Jelena Janać), and closing with the qualitative analysis of LDL and HDL cholesterol in colorectal cancer development risk assessment (Milica Stevanović).

This year's Congress and Symposium had over 250 registered participants from Serbia, Bosnia and Herzegovina, Macedonia, Montenegro, and Turkey. The poster session was very vibrant, with the significant participation of students of medical biochemistry of the Faculty of Pharmacy University of Belgrade, with presentation of their scientific projects. With the inspiring discussions that the lectures provoked, and exchange of experience, we may say that expectations were met and even overcome.



From left to right: Prof. Zorica Šumarac (president of SMBS), Prof. Nataša Bogavac-Stanojević (president of the Scientific Board of the XXI Congress), laureate of the Honorary Diploma Mr. Vigor Majić (director of Petnica Science Center), Prof. Nada Majkić-Singh (executive director of SMBS), Mr. Nikola Božić (program director of Petnica Science Center), Dr. Snežana Jovičić (president of the Organisational Board of the XXI Congress)

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Padova (IT) <http://www.lccongressi.it/laboratorymedicine2018/>

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Labormedizin 2018 - 15th Annual Meeting of DGKL

Mannheim, Germany

www.dgkl2018.de

13 November 2018

Workshop on Alzheimer's Disease "Making the point"

For more information:

pragueworkshop2018@cbttravel.cz

Prague, Czech Rep.

30 September - 3 October 2018

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Santorini, Greece

www.santoriniconference.org

27 November 2018

Preanalytical mysteries EFLM webinar

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<https://elearning.eflm.eu>



3-5 October 2018

26th Meeting of Balkan Clinical Laboratory Federation and the 6th National Congress of the Macedonian Society for Medical Biochemistry and Laboratory Medicine

Skopje, Macedonia

<http://www.bclf.info/index.htm>

29 November 2018

12th International Scientific CIRME Meeting "Standardization in Laboratory Medicine and Patient Safety"

Milan (IT)

<http://users.unimi.it/cirme/home/>

4-6 October 2018

9th Russian Conference on Clinical Hemostasiology and Hemorheology

St Petersburg, Russia

<http://coith2018.com/en/main>

7-8 December 2018

JBP 2018 - Journees de Biologie Praticienne

Paris (FR)

mf.gaudeau.toussaint@gmail.com

10-13 October 2018

5th EFLM-UEMS Joint Congress Laboratory Medicine at the clinical interface

Antalya, Turkey

<http://eflm-uems-antalya2018.org/>



7-8 February 2019

International Congress on Quality in Laboratory Medicine

Helsinki, Finland

<https://www.labquality.fi/en>

11-13 October 2018

16th EEKX-KB National Congress of Clinical Chemistry

Paris (FR)

<http://www.eekx-kb.gr/>

22-23 March 2019

5th EFLM Conference on Preanalytical Phase – supported by BD

Zagabria, Croatia

<http://www.preanalytical-phase.org/>



16-17 October 2018

2^{èmes} Journées Francophones de Biologie Médicale

Paris (FR)

www.jfbm.fr

19-23 May 2019

EuroMedLab 2019

23rd IFCC-EFLM European Congress of Clinical Chemistry and Laboratory Medicine

Barcelona, Spain

<http://www.euromedlab2019barcelona.org>



18-19 October 2018

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Zagreb, Croatia

www.eqalm.org

9-12 June 2020

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www.nfkk2020.no (soon available)

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