



SOMED NEWSLETTER

Society for Microbial Ecology and Disease

SUMMER

2007

PRESIDENT'S MESSAGE

Dear members, colleagues and friends,

Our XXX International Congress on Microbial Ecology and Diseases to be held in Rome, September 16-18, jointly with the 4th Probiotics, Prebiotics and New Foods, is less than six weeks away.

SOMED 2007 will address key topics covering:

- Antibiotics and alterations in intestinal flora
- Microbial ecology and human health
- Functional food preparations: evidence based claims on functionality, technological issues, safety and efficacy
- Health promoting effects of probiotics: understanding of mechanisms
- Interactions of the oral and gut microbiota with the immune system
- Microbial biofilms and human infections
- Physiological effects of probiotics on microflora

The Program of the joint meeting include 9 invited lectures, 20 major symposia with more than 90 invited/selected speakers, 4 oral sessions and 2 poster sessions.

A number of SOMED members has been actively involved in the Congress sessions.

About 300 participants not only from a number of countries belonging to the European Union but also from Australia,

Brazil, Canada, Chile, Japan, Russia, Tunisia, USA and Venezuela will be welcomed in Rome.

The joint meeting has been accredited by the Italian Ministry of Health in the framework of the CME (Continuing Medical Education) Program obtaining a score of 15.

On the webpage:

www.probiotics-prebiotics-newfood.org

you can find all the information on the scientific, educational and social aspects of the joint meeting.

An updated SOMED Membership Directory is under construction and it will be established in the appropriate section of the new webpage (www.somed.nu) by the end of this year.

I'm looking forward to meeting as many as possible SOMED members in Rome and I would like to encourage colleagues interested in microbial ecology in health and disease to join the Society also in order to get all the benefits of being a SOMED member.

Information on future meetings, courses, books and other publications as well as short commentaries on hot topics in the field of microbial ecology will be welcomed to my e-mail address (gianfranco.donelli@iss.it) in order to be included in the next issues of the SOMED Newsletter.

Gianfranco Donelli
SOMED President

FORTHCOMING EVENTS

YLFA 3rd Workshop

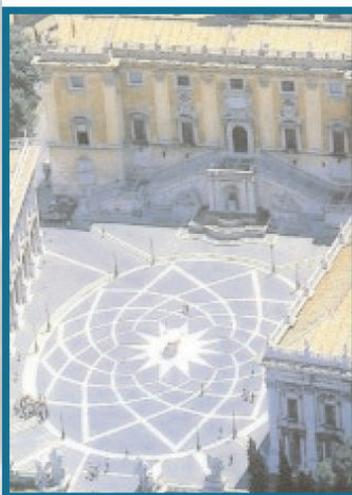


in parallel with

4th Probiotics, Prebiotics & New Foods
jointly with
XXX International Congress on Microbial
Ecology and Disease (SOMED)

PROBIOTIC FERMENTED MILKS AND PUBLIC HEALTH

R o m e
September
18th, 2007



The workshop will be chaired by Dr. Romano Marabelli, Ministry of Health, Italy **and will be held in Rome on September 18th at Università Urbaniana**, Terminal Gianicolo, Via Urbano VIII, Rome, Italy.

All the updated information and the scientific program are available at the website www.emec-roma.com/YLFA2007

There is no registration fee for the representatives of public administrations or for the persons of Universities.

The registration fee for a company is EUR120 (three registrations). If you are interested, please send the three names of people who will attend the meeting at the following address: m.bosi@emec-roma.com.

EMBO-FEMS-LEOPOLDINA Symposium
“*Escherichia coli* - Facets of a Versatile Pathogen”
on the Occasion of the
150th Birthday of Theodor Escherich (1857 – 1911)



The aim of the symposium is to bring together scientists working on the molecular biology and pathogenesis of *Escherichia coli*, as well as on clinical aspects. Following introductory talks given by eminent scientists, lectures on Genomics and Physiology, Commensalism and Pathogenesis, Virulence Factors and Host-Pathogen Interactions will be presented. A poster presentation and a session that is devoted to young scientists complete the programme.

A limited number of FEMS fellowships is available to particularly help young scientists to participate.

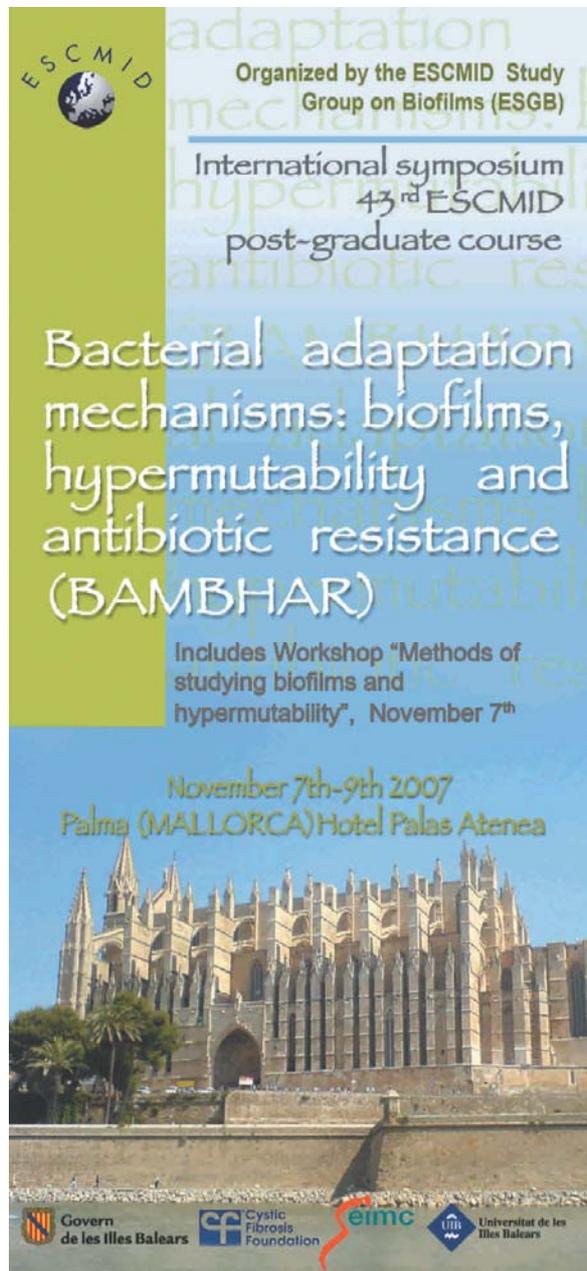
Please visit the meeting's website at:
www.ecoli2007.uni-wuerzburg.de/

Bacterial adaptation mechanisms: biofilms, hypermutability and antibiotic resistance

43rd ESCMID Postgraduate Technical Workshop and Symposium

7 – 9 November 2007

Palma de Mallorca, Spain



The Workshop focuses on “Methods of Studying Biofilms and Hypermutability” (7 November 2007) and is followed by a two-day International Symposium (8–9 November).

As an initiative from the ESCMID Study Group on Biofilms (ESGB), this Post-Graduate Course and International Symposium has a multidisciplinary perspective and aims at analyzing the strategies developed by microorganisms for the adaptation (persistence) during host-pathogen interactions in human infections.

Particularly, the symposium will focus on the interplay between the development of biofilms, hypermutation and antibiotic resistance as major bacterial strategies for the development of chronic or persistent infections, such as those occurring in patients suffering from cystic fibrosis. For this purpose the Organizing Committee is honored that some of the most prestigious experts on the different areas of this complex research field participate at this symposium.

Their contribution renders this symposium the key scenario for the flow of knowledge between basic and clinical research, which is certainly necessary for the understanding and management of persistent bacterial infections. This symposium should therefore be of major interest for basic microbiology researchers, clinical microbiologist and infectious diseases clinicians.

Organised by the ESCMID Study Group on Biofilms (ESGB).

Executive Committee ESCMID Study Group on Biofilms

Chairman: Niels Høiby (Denmark)

Vice-Chairman: Ute Römling (Sweden)

Secretary: Søren Molin (Denmark)

Treasurer and web-site manager: Craig Williams (United Kingdom)

Holger Rohde (Germany)

Gianfranco Donelli (Italy)

Contact person

Prof Niels Hoiby

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For online registration, please visit the ESCMID webpage www.escmid.org

THE 4TH INTERNATIONAL YAKULT SYMPOSIUM

THE GUT, IMMUNE MODULATION AND PROBIOTICS



November 22nd-23rd, 2007
Palazzo della Gran Guardia
Verona, Italy

Due to advances in the understanding on the function of the gut microbiota and the role of diet in modulating its composition and activity, light has been shed on the potential of probiotics in the improvement of sub-optimal health states of various diseases and thus the maintenance of health.

In recent years, the application of probiotics in health maintenance has rapidly gained worldwide interest.

In particular, the argument whether dietary factors such as probiotics are involved in reduction of cancer (re)occurrence and immune-related disease is attracting much public attention. In this context, the forthcoming international symposium organized by Yakult will examine recent scientific developments in probiotic research, with emphasis on the evidence for possible benefits with regard to immune modulation and cancer risk reduction/prevention. Recent findings from clinical, immunological and epidemiological studies will be presented for discussion following comprehensive overviews of this exciting area of science.

For information please contact:

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Phone: +39-02831281

Fax: +39-89415949

Website: www.yakultsymposium.com

E-mail: info@yakultsymposium.com

XVII Lancefield International Symposium on Streptococci and Streptococcal Diseases (XVII LISSSD)

22 – 26 June 2008

Porto Heli, Greece



The XVII Lancefield International Symposium for Streptococci and Streptococcal Diseases (LISSSD) is the most prestigious meeting dedicated to streptococcal diseases such as rheumatic fever, glomerulonephritis, toxic shock and other invasive diseases, pneumonia, childhood meningitis and dental caries caused by the genus *Streptococcus*. Streptococci cause a wide spectrum of diseases in humans and animals; therefore, the Symposium is very popular among general clinicians and dentists, specialists such as cardiologists, nephrologists, paediatricians, epidemiologists, infectious disease specialists, scientists and veterinary colleagues.

Established professionals and students will also attend the Symposium.

The LISSSD is held every three years and the next meeting (the XII in the series) will be held at the Porto Heli Conference Centre, a brand new conference complex in the beautiful Peloponnese in Greece during 22-26 June 2008. This is the first time the Symposium will be held in Greece and only the second time ever hosted in the Southern Mediterranean. The beautiful surroundings of the Peloponnese, the history and the

antiquities of the country where science and philosophy began make this an ideal location. The National University of Athens and the Health Protection Agency Centre for Infections in London are both honoured and privileged to have the opportunity to co-host this important event.

Please register your email address on the website to receive updates. The call for abstracts will commence in October 2007 with a submission deadline of 20 December. A list of session topics can be found on the website: www.lancefield2008.gr.

9th European Congress of Chemotherapy and Infection
jointly with
16th Mediterranean Congress of Chemotherapy
8 – 11 November 2008
Istanbul, Turkey



It is our pleasure and privilege to invite you to participate in the 9th European Congress of Chemotherapy and Infection and the 16th Mediterranean Congress of Chemotherapy, which will be jointly held in Istanbul, Turkey, November 8-11, 2008.

With its rich atmosphere of culture and science, Istanbul is an appropriate location for this prestigious Congress. It is easy to reach from all points in Europe and we hope that it will also attract scientists from Eastern Europe and the Mediterranean basin as well as from other areas.

The Congress is being organized by FESCI (Federation of European Societies for Chemotherapy and for Infection), The Mediterranean Society of Chemotherapy, the Turkish Society of Chemotherapy and Turkish Society of Microbiology, and is under the auspices of the ISC (International Society of Chemotherapy). This Congress will include all topics on microbiology and infectious diseases, including basic experimental and clinical aspects. Recent developments in molecular and genetic fields concerning bacteria, viruses, fungi and immunity will also be considered. And of course, diseases prevalent in various parts of Europe and the Mediterranean area will be included as topics. The Congress will also include recent progress in cancer therapy (especially targeted and biological therapies).

A social program will enable you to enjoy Istanbul's wonders.

We look forward to welcoming you to the fascinating city of Istanbul and this promising and stimulating joint Congress.

For information please contact:
KONGRESIST International Convention Management Inc.

Cumhuriyet Cad. 295 Daire 15
Harbiye 34373 Istanbul - Turkey

Phone: +90 (212) 231 2772

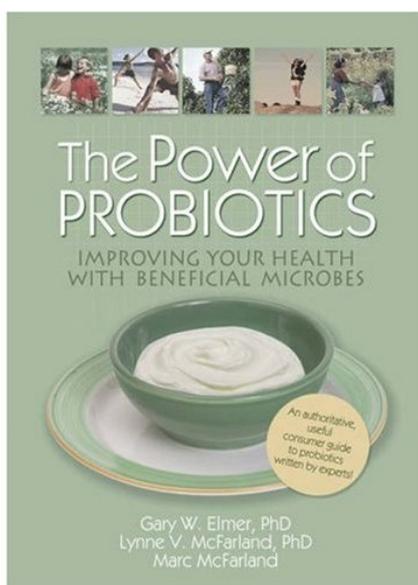
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MEDIA NEWS

Announcing a new book release!!!



The Haworth Press
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www.haworthpress.com

The authors:

Gary W. Elmer, PhD is a Professor at the department of Medicinal Chemistry, School of Pharmacy and **Lynne V. McFarland**, PhD is an Affiliate Associate Professor at the department of Medicinal Chemistry, School of Pharmacy and a graduate of the Dept. of Epidemiology; UW Seattle, WA. Dr. Elmer and Dr. McFarland have been involved in probiotic research for over 20 years. **Marc McFarland** is a writer for a patient-oriented column about prosthetics and was a reporter for United Press International.

Book Description

There are hundreds of products on the market called “probiotics”, but most people do not know exactly what they are and what they are good for. Information from the internet is conflicting and confusing. You need to get information you can trust to make the right decisions about probiotics.

“The Power of Probiotics” is a consumer-friendly guide to the selection and use of probiotics that have been proven effective in the prevention and treatment of human diseases. This jargon-free reference resource provides practical advice on how and when to use probiotics and how to select the best commercially available products, based on usefulness, quality, and safety, to lower the risk of disease and maintain a positive health image. The book offers objective information on evaluating product claims, making sense of regulations and labeling, and sorting through manufacturing and marketing issues.

“The Power of Probiotics” presents an expert review of the scientific evidence for probiotics, illustrated with summary tables and diagrams for quick reference. Each chapter starts with a series of Frequently Asked Questions with clear and concise answers before moving into more in-depth analysis from the book’s authors, who combine more than 20 years of research from the patient clinic and the bench laboratory with extensive experience in writing and translating medical articles for consumer-oriented publications. This unique book presents definitions and descriptions of probiotics and a history of their uses, a review of medical conditions prevented and/or treated by probiotics, available products (with brand names), uses with other medications, and risks and side effects.

COMMENTARIES

Molecular mechanisms for regulation in expression of bacterial genes required for acute versus chronic infection

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What is a key event for bacteria to determine the direction of infections; acute versus chronic infections? Recent papers suggest that bacteria can choose a strategy, causing either an acute infection, growing and spreading rapidly in the host, or a chronic biofilm infection.

Goodman et al. (1) identified a gene in *Pseudomonas aeruginosa* whose mutation induced biofilm formation, and this gene was designated as *retS*. The *retS* gene encodes a 946 amino acid polypeptide similar in sequence and domain organization to the sensor kinase/response regulator hybrid family of signal transduction proteins. Mutation in *retS* led to hyperadhesion to mammalian cells and loss of cytotoxicity due to a block in expression of type III secretion system (TTSS) and its effectors. In addition, mutation of *retS* attenuates the virulence of *P. aeruginosa* in a murine pneumonia model. Suppressor analyses of distinct PAK *retS* phenotypes implicates the GacS/GacA/rsmZ regulatory pathway. It is likely that deletion of *retS* results in decreased level of free RsmA, sequestering posttranscriptional regulatory protein, inducing the expression of TTSS and virulence factors, which are characterized in “acute infection”. In contrast, GacS is required for activation of genes involved in chronic persistence, including biofilm formation and production of the N-acylhomoserine lactone autoinducers regulating quorum-sensing.

Kuchama et al. (2) reported that a 3-component regulatory system regulates biofilm maturation and TTSS in *P. aeruginosa*. They isolated *P. aeruginosa* mutants that are defective for biofilm formation by transposon mutation assay. Sequence analysis indicated that the

transposon is located in a intergenic region between two divergently transcribed genes (*sadR*, PA3947 and *sadA*, PA3948). The *sadR* gene is adjacent to and transcribed in the same orientation as a downstream gene (*sadS*) encoding a polypeptide with high similarity to sensor histidine kinase (SHK). Mutation in the *sadARS* locus rendered cells defective for biofilm formation, and *sadARS* mutants exhibited defects in mature biofilm architecture. Identification of SadARS-regulated genes were carried out by using DNA microarrays. Among the genes regulated by the SadARS system are those required for TTSS. Expression of 35 TTSS genes was elevated in the *sadRS* mutant, and the genes *exoT* and *exoY* encoding two of the four known TTSS effector proteins also showed elevated expression in the analysis. Mutation in TTSS genes resulted in strains with enhanced biofilm formation. From these results, a possible mechanism for the role that the SadARS system plays in biofilm formation was proposed.

Ventre et al. (3) isolated 3 insertion mutants (PAIH21, PAIC41 and PAIJ68) unable to form a biofilm by Tn5 transposon mutant library assay. These mutants contained the transposon in the same gene (PA3947), and its ORF was predicted to encode a two-component sensor histidine kinase, which was designated as *ladS* for “lost of adherence sensor”. Overexpression of the *ladS* gene not only restored the ability of the bacteria to grow as a biofilm but also caused the formation of a thick bacterial aggregate at the air-media interface. It was shown that *ladS* regulates the *pel* exopolysaccharide operon. In contrast, *ladS* repressed TTSS gene expression and *ladS* mutant was hypercytotoxic as compared with infection with the wild strain. It was demonstrated that LadS and RetS exert opposite effects on the small regulatory RNA RsmZ. A model for the convergence of the signaling pathway during reciprocal regulation of virulence factors by LadS, RetS and GacS through transcription of the small regulatory RNA, RsmZ was suggested. It is possible that unknown signals received by the input domains of the sensor kinases (RetS and LadS) activate or repress

the expression of genes specifying factors necessary for acute or chronic infection. Other microorganisms employ this acute versus persistence strategy. Resch et al. (4) determined which genes are up-regulated in *Staphylococcus aureus* biofilm cells by a comparative transcriptome analysis. The gene expression patterns of several gene groups differed under the two growth conditions, biofilm formation and planktonic proliferation. In biofilm cells, the cell envelope appeared to be a very active compartment since genes encoding binding proteins, proteins involved in the synthesis of murein and glucosaminoglycan polysaccharide intercellular adhesin, and other enzymes involved in cell envelope synthesis. In contrast, toxins (leukotoxin, exotoxin, alpha-hemolysin precursor etc.) and proteases (ClpX, HtrA, Spl A-D etc.) were up-regulated under planktonic growth conditions.

Most known virulence factors in *Bordetella* are regulated by the BvgAS (*Bordetella* virulence gene) two-component signal transduction system. Expression of virulence genes differs based on 3 phases (Bvg⁺, Bvg⁻ and Bvgⁱ) induced by cultural conditions. Bvg⁺ phase is characterized by the expression of virulence factors, such as filamentous hemagglutinin (FHA), fimbriae and bifunctional adenylate cyclase/hemolysin (ACY). Bvgⁱ phase is characterized by expression of specific genes, e.g., *bipA* (Bvg intermediate phase protein). Irie et al. (5) reported that *Bordetella bronchiseptica* can form biofilm in vitro and that the generation of biofilm was maximal in the Bvgⁱ phase. It was also shown that FHA was required for maximal biofilm formation and that fimbriae may also contribute to this phenotype. ACY inhibited biofilm formation, most likely via interaction with FHA. Coordinated regulation of adhesins and ACY expression was suggested to lead to maximal biofilm formation in the Bvgⁱ phase in *B. bronchiseptica*.

Chronic infections more closely resemble a biofilm growth mode, while acute infections may more closely resemble planktonic growth (6). The studies published to date support the above hypothesis. The concept of distinct acute versus persistent infection pathways has obvious clinical implications, and different treatment strategies will be required for these two infections in the future.

References

1. Goodman AL, Kulasekara B, Rietsch A, Boyd D, Smith RS, Lory S: A signaling network reciprocally regulates genes associated with acute infection and chronic persistence in *Pseudomonas aeruginosa*. *Developmental Cell* 7:745-754, 2004.
2. Kuchama SL, Connolly JP, O'Toole GA: A three-component regulatory system regulates biofilm maturation and type III secretion in *Pseudomonas aeruginosa*. *J Bacteriol* 187:1441-1454, 2005.
3. Ventre I, Goodman AL, Vallet-Gely I, Vasseur P, Soscia C, Molin S, Bleves S, Lazdunski A, Lory S, Filloux A: Multiple sensors control reciprocal expression of *Pseudomonas aeruginosa* regulatory RNA and virulence genes. *Proc Natl Acad Sci USA* 103:171-176, 2006.
4. Resch A, Rosenstein R, Nerz C, Gotz F: Differential gene expression profiling of *Staphylococcus aureus* cultivated under biofilm and planktonic conditions. *Appl Environ Microbiol* 71:2663-2676, 2005.
5. Irie Y, Mattoo S, Yuk MH: The Bvg virulence control system regulates biofilm formation in *Bordetella bronchiseptica*. *J Bacteriol* 186:5692-5698, 2004.
6. Furukawa S, Kuchama SL, O'Toole GA: Keeping their options open: Acute versus persistent infections. *J Bacteriol* 188:1211-1217, 2006.

SOMED Newsletter is an electronic, periodic publication of the Society for Microbial Ecology and Disease, open to contributions from members and colleagues on the Society's related matters.

Contributions can be e-mailed to the SOMED President (gianfranco.donelli@iss.it) and/or to the SOMED Secretary (skamiya@kyorin-u.ac.jp).

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