Belgian Society for Microbiology

Quarterly Newsletter of the Belgian Society for Microbiology
Issue no. 3, January 2012

Contents

Welcome

The 3rd issue of the BSM Newsletter coincides with the start of 2012. It gives me the opportunity to wish you a successful and inspiring New Year, and to promise BSM members another interesting BSM activity year.

On the start of a new year, it is always nice to look back to what was realized in the past year. I think we may be really proud that we could bring BSM members value for money. The BSM board took several initiatives such as a new outlook of the website, on-line registration for activities and the start of an E-Newsletter in which interesting information and background information was given, and above all the annual symposium "Life, death and survival of Microorganisms" held on November 16, 2011, for which 175 microbiologists registered and at which 69 posters were presented.

Thanks to the generosity of the sponsors, for which I am very grateful, BSM was also able to award the best posters with an award. The list of the poster awards can be found further in this issue.

As BSM is member of FEMS, 2 BSM members could profit from FEMS support to visit and work in a lab abroad. A report of such stay can be found further in this issue. Guidelines to apply for this type of grants, as well as for other grants, can be found at the FEMS website.

I hope we can make 2012 at least as attractive as the previous year, with the annual symposium to be held on November 30th, and possibly other new initiatives, of which BSM members will be informed in due time. As you will see further in this issue, the BSM Board is extended with 3 new members, Prof. A. Allaoui (ULB), Prof. P. Cos (UA) and dr. L. Gillet (ULg), as such strengthening the representation of different institutions and disciplines, and they will serve as local contact points for BSM.

Finally, as a society cannot survive without financial support, you will soon receive an invitation to pay your membership fee for 2012 (€ 25). I hope that you will renew your membership or, if not a member yet, that you will join BSM as such supporting also the discipline of Microbiology.

Jozef Anné, President BSM

NEXT BSM SYMPOSIUM : Friday 30 November 2012 ; Academy Palace, Brussels.
Topic : "Posttranscriptional regulation and epigenetics in microorganisms"

Membership

Historically membership of BSM has been linked to the attendance of the yearly BSM symposium : the registration fee for the symposium was at the same time the membership or vice versa. While this has been a convenient system it poses several problems, the most important one that membership fees are only collected at the time of the symposium, which is typically in November or December. In addition, microbiologists who for one reason or another do not attend the yearly symposium are no longer a member of the BSM. For these reasons, the BSM board decided to uncouple both and to collect membership fees before 1 July 2012.

Members who pay their fee before 01/07/2012 pay €25 and will get free access to the annual symposium. Later payments for symposium pre-registration or for membership will cost €30. On-site registration fee will be €35.

To renew your membership please visit the BSM website (**www.belsocmicrobio.be).**

News from FEMS

FEMS is the Federation of European Microbiological Societies, and its main mission is to advance and unify microbiology knowledge. FEMS brings together 46 member societies from 36 European countries, covering over 30000 microbiologists. Belgium is represented in FEMS by BSM, and our FEMS delegate is Jozef Anné.

Members of FEMS Member Societies can apply for research fellowships, an advanced fellowship (new as of 2006) and/or support when organizing a meeting. These benefits are restricted to members of FEMS societies only. For more information, go to the FEMS website (**http://www.fems-microbiology.org**).

Every other year FEMS organises the Congress of European Microbiologists – the 5th edition will be in Leipzig in July 2013.

Future Microbiology Meetings

The KNVM-NVMM congress 2012 (Papendal, Arnhem, The Netherlands)

The spring meeting of the two Dutch Microbiological Societies (KNVM & NVMM) will be held on 2012 April 17 & 18 in Papendal, Arnhem. Last year, when the 100th anniversary of the -now Royal- Dutch Society for Microbiology was celebrated, over a thousand visitors attended. This year there is again a two-day programme with on day one a plenary session with renowned national and international speakers. Throughout the programme there will be seminars and symposia addressing all areas of microbiology, from basic research to clinical applications.

The general theme of this year is sustainability. Microbes make up most of the biodiversity on Earth, and microorganisms are of critical importance for the cycling of nutrients, the degradation of various compounds, and the global climate. Knowledge of this helps us to develop strategies to utilise our natural resources in a long term sustainable manner. Also within, patient care and treatment options sustainability is a theme that we encounter more and more.

The Stichting Antonie van Leeuwenhoek will again sponsor all presenting PhD students with grants.

For more information and registration please visit: www.nvvm-online.nl/modules/2012.

Viruses of Microbes (Brussels)

This EMBO conference in Brussels (16-20 July) will address the diversity, evolution, ecology and environmental impact of microbial viruses, the most abundant biological entities on Earth. New developments in fundamental, (bio)technological, industrial and medical aspects of virus research will be discussed. More information can be found at http://events.embo.org/12-virus-microbe/index.html.

Biometals 2012 (Brussels)

The Biometals 2012 meeting will be held in Brussels in July 2012. More information can be obtained from www.biometals2012.be (still under construction).

Gut Day Symposium (Leuven)

The 14th Gut Day Symposium, an initiatve of the Gut Flora Foundation (www.gutflora.org), will take place November 9th, 2012, in Leuven (University Hall). Organising committee: Kristin Verbeke (Chairperson), Sarah Lebeer, Christophe Courtin, Tom van de Wiele, Jeroen Raes, Jos Vanderleyden

Prof. Emile Van Ermengem, *Clostridium botulinum*, botulin and ...botox !

Introduction

Even to many Belgian microbiologists, the name of Prof. Emile Van Ermengem (1851-1932) does not immediately ring a bell, despite the fact that his name and fame is mentioned in practically all international textbooks in the field of general and food microbiology! Emile Pierre-Marie Van Ermengem, born in Leuven, Belgium on 15 August 1851, obtained his degree of Doctor in Medicine at the Catholic University of Leuven on 20 September 1875.

Subsequently he spent several research periods over 1876 to 1878 in different renowned microbiology-laboratories and clinics in Paris, London, Edinburgh and Vienna; in 1883 he worked at the famous laboratory of Robert Koch in Berlin and in 1885 he studied the vaccination potential against cholera in Spain. Based on this international basic and applied experience, he qualified for a professorship in Hygiene and Bacteriology at the medical faculty of the State University of Ghent in 1888. He had his laboratories at the Bijloke-site where nowadays the Rommelaere Institute (build in 1899) is located ; in these labs he made in 1895 and 1896 his seminal studies on the isolation from contaminated ham and further characterization of "his" *Bacillus botulinus,* now named *Clostridium botulinum.* He published in 1896 his first findings on this serious case of food poisoning, that occurred in Ellezelles (Elzele), Belgium, and on the new anaerobic bacterium involved.

After this famous case, he was called in frequently for advise by local and foreign authorities and received several distinctions and awards in Belgium and abroad. He died in 1932, aged 81 years.

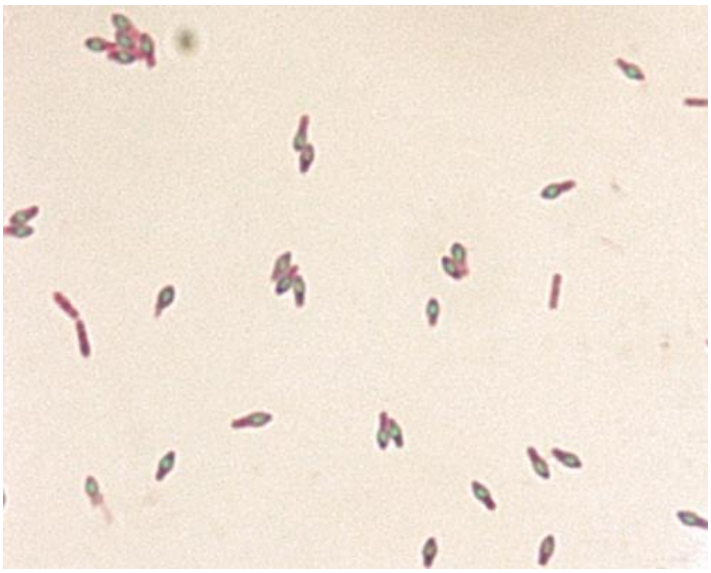
The Ellezelles food poisoning in 1895

On 14 December 1895, the musicians of the brass band of Ellezelles, a farming community near Ronse (Renaix), Belgium, played - as was the custom- at the funeral of Antoine Creteur, and afterwards they had a meal with raw ham in the nearby pub "Le Rustic". The next day most of the 34 musicians fell ill and 3 young members (aged between 15 and 21 years) died within 5 to 7 days. The victims –all that had eaten raw ham - were troubled by visual disturbances, weakness of the muscles, inflammation of the mucous membranes of the upper respiratory tract, speech disorder ,… and more than 10 musicians were in a dangerous condition for some time. Brass members who had not eaten the raw ham did not became ill. This led the local medical doctors to believe that the symptoms were due to eating spoiled raw ham meat.

This serious case of food poisoning led to a legal investigation to trace the origin of the ham and to chemical analysis and autopsy of two of the victims ; part of the suspected cured (salted and smoked) ham and organs of the dead victims were sent for further investigations to Prof. E. Van Ermengem at Ghent University. Clinical, toxicological and bacteriological tests were performed; small fragments of the ham were injected subcutaneously and/or fed to a range of animals (monkeys, guinea pigs, rabbits, mice,..) and caused similar symptoms as in the human victims ; even a very small dose was lethal. A endospore-forming bacterium could be isolated from the ham and from the organs of the victims, only when cultured under strictly anaerobic conditions, with characteristics and toxic properties different from the then well-known pathogenic anaerobic bacteria.

Prof. Emile Van Ermengem, *Clostridium botulinum*, botulin and …botox ! - continued

In 1896 Prof. E. Van Ermengem named the isolate "*Bacillus botulinus*" (from Latin : botulus = sausage), since the symptoms were similar to those of a long known syndrome in the south of Germany, occurring after eating certain sausage types. He was also the first to investigate the effect of the toxin that was produced by the bacterium, now known as botulin toxin. Only in 1923 the currently used name *Clostridium botulinum* was introduced, after "*Ermengemillus botulinus*" and "*Botulobacillus botulinus*" had been around for several years. It stirred the interest of laboratories active in the field of food control and safety and of military labs in view of its use as a biological weapon. Over the years, *C. botulinum* has been found in soil, marine sediments, feces, fish, birds, mammals,… and food.



Clostridium botulinum stained with malachite green to visdualise the spores. Obtained from the ASM Microlibrary (http://www.microbelibrary.org/images/uploads/0/jpg/1221_cbotulinummalachite-hires.jpg)

<u>*Clostridium botulinum* toxin as a poison</u>

The toxin produced and excreted by the anaerobic endospore-forming soil dwelling bacteria *Clostridium botulinum* is now named botulin ; it is one of the most poisonous molecule known on earth, the lethal dose (LD_{50}) being 1 nanogram per Kg body weight. The *C. botulinum* toxin-complex consists of a neurotoxin and a stabilizing auxiliary protein. The heat-labile neurotoxin is itself a protein that contains about 1300 amino acids and consists of two protein chains linked through a cysteine bridge. The genes that code for the toxin are situated on a prophage. Seven antigenic serotypes are known, named type A, B, C, D, E, F and G. Types A and B are found in humans, C and D in cattle.

The toxin can cause food poisoning, named botulism, through the consumption of food that is contaminated with the bacteria or the toxin. The toxin migrates to the muscles and nerves where it irreversibly blocks the release of the neurotransmitter acetylcholine, resulting in the weakening of the muscles, dizziness, difficulty in breathing, paralysis and ultimately death. In the 1930's, botulism was a much feared phenomenon, for example in the production and introduction of canned food, that was not always prepared and sterilized optimally at that time. The toxin is indeed heat labile (inactivation at 85 °C after 15 min), but the *Clostridium* endospores can survive heat treatment and subsequently turn quickly - in anaerobic conditions - into actively growing cells, that excrete the toxin. Humans can also be infected through wounds or via intestinal growth of the toxin producing bacilli.

Prof. Emile Van Ermengem, *Clostridium botulinum*, botulin and ...botox ! - continued

Animals as well die of botulism, especially water fowl in the warm season, when the water in ponds, pools, ... becomes quickly oxygen-deprived because of abundant growth of other aerobic (oxygen consuming) microorganisms (bacteria, algae, ..). In 2002, on a dairy farm in England, 164 dairy cows became infected of which 141 died within 2 weeks ; all symptoms pointed towards botulism but the source of contamination (drinking water, silage, ..) nor the *Clostridium* neurotoxin could be confirmed unequivocally. This case has led to increased caution as to our ”great knowledge” about botulism even today!

Clostridium botulinum toxin as a medicine

The botulin toxin -“botox”- can also be turned into a medicine, especially neurotoxin A, when applied in very low doses, for example in the treatment of dystonia, involuntary and (socially) undesirable muscle contractions in humans and animals. This idea arose, when it was also realized that the inhibitory effect of the toxin on acetylcholine release was temporarily and lasted only for about 3 months.

This botox-principle was already tested in 1973 by Dr. E. J. Schantz of the University of Wisconsin, Madison, USA, in collaboration with Dr. A. B. Scott, an ophthalmologist from San Francisco, CA, USA, in order to treat strabismus (squint eye, lazy eye, …), blepharoplasm (closed eyelid), and other hemifacial spasms. In the early 1980’s, the use of the toxin was introduced by Dr. P. de Jong (who had visited Dr. Scott in San Francisco) in the Wilhelmina Gasthuis hospital in Amsterdam, The Netherlands, and by Dr. P. Devriese at Ghent University. In 1989-1990 the US-FDA (Food and Drug Administration) and NIH experts gave permission and guidelines to the therapeutic use of botulin, in nanogram dosis.

Nowadays it is used medically to cure focal dystonia around the neck, jawbone, vocal cords, (tennis)elbow, etc. or to stop stuttering and alleviate migraine. It has made many operations and other medication redundant; however, repeated topical injections of the toxin remain necessary. Unfortunately, some patients develop antibodies to the toxin which make the desired effects disappear.

Other (potential) medical applications are the weakening of the muscles that control the movements of the stomach and the intestines or that cause clubfoot, or to remedy the paralysis following a stroke.

Botox - neurotoxin A - is now also increasingly used in the cosmetic sector as a “cosmeceutical “ to make disappear wrinkles (crow’s feet) in the skin (by relaxing skin muscles), or to counter excessive sweating and hyperhydrosis. This non-medical use was approved by the FDA in 1992 and these applications received wide publicity : even the International Herald Tribune of 3 March 2003 published an article about botox with the provocative title : “New uses for a poison turned wrinkle warrier“!

Prof. Emile Van Ermengem, *Clostridium botulinum*, botulin and ...botox ! - continued

Production of the "botox "-toxin and its vaccine

The botulin toxin is produced via a fermentation process with the appropriate *Clostridium botulinum* strains. Especially serotype A toxin, produced by the "Hall" strain is clinically used. One either aims at the production of the toxin itself or this toxin is further transformed into a vaccine. As *Clostridium botulinum* is strictly anaerobic, produces endospores and a dangerous toxin, special culture conditions need to be observed.
Best growth is observed at 35 °C on glucose, protein hydrolysates and yeast extract under nitrogen atmosphere. Contained batch fermentors with incinerators for exhaust gas and with control of pH, stirring speed, temperature, gas flow and foam are necessary to obtain high exotoxin-titres.

The toxin is excreted by the cells in the culture broth. After separation of the cells, the protein-toxin is purified in several steps and eventually crystallized. This preparation is then formulated to be used in medicine and in the cosmetic sector. Already 60 years ago the principle of production and purification of botulin was resolved in the microbiological labs of the American Army in Fort Detrick, MD, USA. At the moment several firms produced the toxin, but also its weakened toxoid derivative, by chemical or physical treatment of the toxin; this is no longer toxic, but still able to induce the production of antibodies (in this case named antitoxins), once brought into the bloodstream. The toxoid-vaccine is then used to preventively vaccinate/immunize humans and animals. Also laboratory animals (rabbits, horses,…) are immunized deliberately with toxoid ; they then build up a supply of antitoxins in their blood; when their blood is tapped, these antitoxins can be separated in order to apply them curatively to individuals that have been intoxicated.

Epilogue

Prof.E. Van Ermengem received over 100 years ago international recognition for his discoveries, but he could not foresee the beneficial impacts of his scientific contributions to microbiology, medicine, and food safety and to society in general worldwide. Microbial toxins are indeed real poisons, but - ever since the work of Louis Pasteur - they already are at the root of many universally applied vaccines. Whether other toxins will also be broadly applied as "trained" medicines (just like botox) remains to be seen and will demand further research.

Em. Prof. dr. ir. Erick J. Vandamme, Dept. Biochemical & Microbial Technology, Fac. Bioscience Engineering , Ghent University

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PhD Corner – Aurélie Crabbé

In this section of the newsletter we will highlight the work of a recently graduated PhD student who obtained his or her degree at a Belgian university. In this edition we will focus on the work of Aurélie Crabbé who obtained her degree at the VUB.

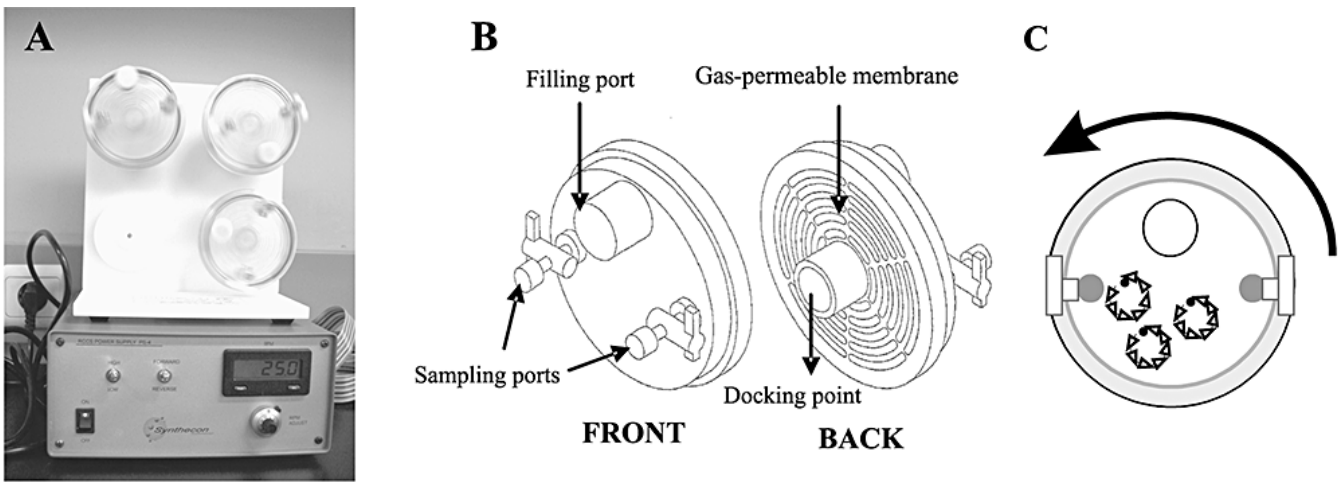
If you are interested to have your work highlighted in the next issue of this newsletter, send a one-page summary of your work to BSM.newsletter@gmail.com

Mimicking the three-dimensional (3-D) architecture, multicellular complexity and function of tissues in our body is of key importance when studying the infectious disease process *in vitro* (Barrila *et al.*, 2010). Specifically, since the mucosal surface is the most common location for bacterial encounter and initiation of infection, tissue culture models that take into account the interactions between the different cell types of the mucosal immune system (i.e., macrophages, dendritic cells, B-cells and T-cells) are of increasing interest. Indeed, the attuned responses of mucosal cells determine processes such as host defense, immunity, inflammation, and tissue repair, and will thus tip the balance to either health or disease.

Aiming at advancing our understanding of respiratory infections by opportunistic pathogens, Dr. Aurélie Crabbé focuses on engineering immunocompetent three-dimensional (3-D) tissue models of the lung. During her doctoral and postdoctoral studies, Dr. Crabbé utilized a low fluid-shear suspension culture system, called the rotating wall vessel (RWV) bioreactor, to generate an immunocompetent tissue model of the lung, comprised of alveolar epithelial cells and functional macrophages (Crabbé *et al.*, 2011a).

The developed alveolar lung model expressed important architectural and phenotypic hallmarks of the parental tissue, as evidenced by highly differentiated epithelium (expressing tight junctions, mucus and polarity markers), spontaneous differentiation of monocytes to functional (i.e., phagocytic) macrophages that were located on the alveolar surface, and a macrophage-to-epithelial cell ratio relevant to the *in vivo* situation. This immunocompetent model was applied to study the cytotoxic effects of the quorum sensing (QS) molecule *N*-(3-oxododecanoyl)-L-homoserine lactone (3-oxo-C_{12} HSL), produced by *Pseudomonas aeruginosa*, on both epithelium and macrophages (Crabbé *et al.*, 2011a).

This QS molecule was found previously to exert cytotoxic effects in macrophages *in vitro*, which was believed to affect host innate immunity *in vivo*. However, the multicellular complexity of the lung had not been considered when assessing macrophage responses to the QS molecule. Hence, this study demonstrated, for the first time, that alveolar epithelium could protect macrophages from QS-induced cytotoxicity, via removal of QS molecules by alveolar epithelial cells.



The RWV technology (A) with RWV bioreactors, (B) in which bacterial cells are grown in a low-shear environment. The back of the RWV bioreactors is covered with a gas-permeable membrane. As the RWV is rotated, cells are maintained in suspension in a restricted fluid orbit (C). Taken from Crabbé et al. (2008).

Furthermore, the QS molecules induced expression of the intercellular adhesion molecule, ICAM-1, in both alveolar epithelium and macrophages, which is a key player in mediation of the innate immune response. Thus, in contrast to what was previously believed, these results suggest that the QS molecules presumably do not impede the host immune system through cytotoxic effects on alveolar macrophages, but are able to induce key features of innate immunity.

The 3-D tissue models are currently being applied towards studying other aspects of the *P. aeruginosa* infection process. Ongoing research building upon this work also includes increasing the cellular complexity of the immunocompetent models of the lung, and exploring their application for studying bacterial infections, and the impact of environmental pollutants. Overall, this body of work emphasizes the importance of using multicellular 3-D organotypic models to integrate the role of each cell type in the overall organ homeostasis and disease development in response to external factors.

In addition to using the RWV technology for tissue engineering and studying host-pathogen interactions, it also has important applications for investigating the role of fluid-shear on bacterial behavior as such.

During her doctoral studies, Dr. Crabbé utilized the RWV bioreactor technology to study the influence of physiologically relevant low fluid-shear conditions on the virulence of *P. aeruginosa*. Her research demonstrated that low fluid-shear drastically impacts the biofilm phenotype, production of quorum sensing molecules, and other virulence factors of *P. aeruginosa*; which are important for its infection process in the cystic fibrosis lung environment (Crabbé *et al.*, 2008, Crabbé *et al.*, 2010, Crabbé *et al.*, 2011b). Hence, her findings suggested that the low fluid-shear environment in the thick, viscous mucus layer in the lungs of cystic fibrosis patients could aid the infection process of *P. aeruginosa*. In collaboration with the Cystic Fibrosis Center at the University Hospital Brussels and the VUB, she is currently exploring the potential of translating these research findings for treatment of CF lung infections, during an ongoing clinical trial.

For any questions or more details regarding the above-mentioned studies, please contact Dr. Aurélie Crabbé (acrabbe@asu.edu).

Aurélie Crabbé obtained her Bachelor and Master degrees in Biomedical Sciences at the Vrije Universiteit Brussel (VUB). She graduated with a Ph.D. in Bioscience Engineering at the VUB (Promotor: Prof. Pierre Cornelis) in December 2009. During her Ph.D. studies, Aurélie collaborated with the Belgian Nuclear Research Center (Prof. em. Max Mergeay, Drs. Natalie Leys and Rob Van Houdt) and Arizona State University (ASU) (Prof. Cheryl Nickerson). Her research was funded by a grant from the European Space Agency; and she was awarded with a Henri Benedictus Fellowship from the Belgian American Educational Foundation (BAEF) and the King Baudouin Foundation to perform one year of her Ph.D at ASU. In 2010, Aurélie initiated her postdoctoral studies in the laboratory of Prof. Nickerson in the Center for Infectious Diseases and Vaccinology at ASU and is currently an Assistant Research Scientist.

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Lise Vanderkelen (LMM-KULeuven)

FEMS Research Fellowship at VU, Amsterdam, The Netherlands

Amsterdam, the city of Anne Frank, the Van Gogh museum, Heineken beer, the many canals, the brown cafes,… is a popular destination for many tourists. In September 2011 I had the opportunity to visit this large city for my research on lysozyme inhibitors with the support of a FEMS research Fellowship. I managed to rent a nice studio outside the city center but with my folding bike I got around perfectly.

In the framework of my PhD-research at the laboratory of food microbiology of Prof. Chris Michiels, I am investigating the role of bacterial lysozyme inhibitors in bacteria-host interactions. It is wel known that lysozymes are key effectors of the animal innate immunity system that protect the host against invading bacteria. Recently, three lysozyme inhibitors, two against chicken (c-)-type lysozyme and one against goose (g-)-type lysozyme, were discovered in *Escherichia coli* and shown to enhance its survival in lysozyme-rich environments such as egg white (2, 4, 6). These *in vitro* results indicated that lysozyme inhibitors could contribute to bacterial virulence however real *in vivo* experiments were still lacking.

A review by Dr. Astrid van der Sar on the use of zebrafish as a model to study infectious diseases including human infections (5), sparked the idea to investigate the role of the lysozyme inhibitors in virulence of Avian Pathogenic *Escherichia coli* (APEC) using this model system. Since both a c- and a g-type lysozyme are known to be expressed in zebrafish, we considered this organism as an ideal host to study the role of the c- and g-type lysozyme inhibitors in APEC. Although the research group of Dr. Astrid van der Sar mainly focusses on the interaction of *Mycobacterium marinum* with zebrafish, she was very enthousiastic and found willing to share the expertise and facilities of her research group in the departement of Medical Microbiology and infection control of VU medical centre, and to host me to conduct these experiments.

Using the zebrafish embryos as an infection model we have found convincing indications for a role of the g-type lysozyme inhibitor in the virulence of APEC towards the embryos. The observation that only this inhibitor plays a significant role may reflect the fact that g-type lysozyme is relatively more important than c-type lysozyme in fish, whereas the opposite is true in mammals and birds (1, 3).

Still some additional experiments need to be conducted at the VU to further confirm the previous results and to conduct a rigourous statistical analysis.

This fellowship was not only fruitful for my own research but it also led to a new collaboration. During and after work I also had the pleasure to make new friends and I really enjoyed the team building day in Haarlem, the afterwork diners, the reception or 'borrel' on every last Thursday of the month, … From a scientific as well as a personal point of view I look back with great pleasure at my time in Amsterdam.

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List of Poster Awards given during the 2011 Annual BSM Symposium (Brussels, 16/11/2011)

Virology

1. Maria Pontes (UGent). Pseudorabies virus glycoprotein E induces Erk 1/2 activation in T lymphocytes. *(MSD award).*

2. Bénédicte Machiels (ULg). Antibody evasion by a gammaherpesvirus O-glycan shield.

3. Anne Giraut (KULeuven). Mutagenic analysis of the preprotein signal sequence of the cellular HIV-1 receptor CD4, a unique target for CD4 down-modulating agents

4. Benjamin Dewals (ULg). Deletion of ORF73 renders *Alcelaphine herpesvirus 1* unable to induce malignant catarrhal fever

Bacteriology

1. Nathalie Goeders (ULB). Characterization of homologous RelE toxins *(MSD award)*

2. Benoît Desguin (UCL). Biochemical characterization of the lactate racemase of *Lactobacillus plantarum*: a new member of the nickel-enzyme family. *(ASM award)*

3. Nurlinawati (KULeuven). Genetic analysis of psychotrophy in *Serratia plymuthica* RVH1

4. Ann Jans (KULeuven). Unraveling the general stress response in *Rhizobium etli*.

5. Michaël Deghelt (FUNDP). Localization of proteins involve in cell wall elongation and chromosomes duplication of *Brucella abortus* during *in vitro* and infection conditions.

Composition of the BSM Board

President & FEMS delegate : Jozef Anné (KULeuven)
Secretary & representative in the IUMS : Paul De Vos (UGent)
Treasurer & liaison with NVVM : Tom Coenye (UGent)
Members : Abdelmounaaim Allaoui (ULB), Spiros Agathos (UCL), Alfons Billiau (KULeuven), Pierre Cornelis (VUB, liaison with ASM), Paul Cos (UA), Herman Favoreel (UGent), Isabelle George (ULB), David Gillan (UMons), Natalie Leys (SCK-CEN), Laurent Gillet (ULg), Max Mergeay (SCK-CEN), Jozef Vanderleyden (KULeuven)

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Call for contributions

With this quarterly newsletter the BSM board wants to improve its communication with BSM members and we hope to bring you useful microbiology-related information on a regular basis.

Of course this is only possible with your contributions and we would like to invite you to submit these contributions to BSM.newsletter@gmail.com (preferably as a Word document).

What can you submit ? Basically anything that is microbiology-related : vacancies in your lab, announcements of seminars, a summary of important/interesting research findings etc. If you want to discuss whether something would be suitable for inclusion in the newsletter prior to preparing the text, feel free to contact us as well.

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