

Publishable Summary, the KOALA staff exchange scheme

The KOALA staff exchange scheme (grant 295155) set out to improve the knowledge transfer between 5 European groups and the Australian group at the Mawson Institute at the University of South Australia in Adelaide, Australia who are collaborating in the frame of a European project under FP7 (grant 245500) in the areas of clinical wound management, surface modification and materials development. The intension was to enable knowledge transfer between the European and Australian partners by enabling face-to-face discussions and joint research work that would lead to joint publications and future collaborations. The program involved the training of staff at the partner sites for subsequent use of the learned know-how at the home institution. In addition the group aimed to go beyond the goals of presently running projects and to initiate new collaboration activities in other areas of research. The scientific work centered around the development of materials that respond to biological stimuli in a wound environment such as change of pH, bacterial toxins, enzymes and membrane proteins.

The international research staff exchange program KOALA enabled the partners to send staff members between the European groups and the Australian groups, to undertake training activities at the sites and to enable research activities which would otherwise not have been possible. The European partners have been able to send 4 experienced researchers (ER), 9 early stage researchers (ESR), 1 technical staff member and 1 management staff member (MGT) from Europe to Australia using the funding through KOALA. At least 4 other MGT staff trips took place from Europe to Australia, which were funded by other means. The Australian partner was able to send 5 early stage researchers (ESR) and 2 management staff members (MGT) from Australia to the European groups.

The transfer of knowledge and training of staff was an integral part of all secondments that took place in the course of the KOALA program. The training ranged from instructions to use analytical equipment all the way to training in the lab to enable chemical synthesis of responsive nanoparticles and capsules as well as responsive thin films on a variety of substrates suitable for sensing applications. Training in biological lab work was part of a few of the tasks carried out in the course of the project. During each of the secondments the staff members held at least one public lecture on the topic of their research within the seminar sessions of the hosting institutions. The seconded persons all participated in the seminar sessions or workshops held on a weekly basis and were, without exception, fully integrated into the daily working and training activities of the hosting institutions.

In January 2013 the KOALA consortium organised a Symposium which was held at the NanYang Technological University (NTU) in Singapore together with scientists from NTU and the National University of Singapore (NUS) (milestone 3). The symposium lasted 2.5 days and participants ranged from early stage researchers to research scientists and leading scientists of each institution. The activities of the KOALA group were disseminated in 5 talks and 9 posters. In April 2014 a second symposium was organised through the Australasian Society for biomaterials and tissue engineering (ASBTE) where 1 full session was dedicated to the KOALA program on antimicrobial strategies in wound healing (milestone 7). The KOALA principle investigators acted as plenary and invited speakers at the conference with the courtesy of the ASBTE. KOALA activities were disseminated in 5 talks and 4 different posters.

The objectives of the KOALA program were all met and the project achieved most of its technical goals with relatively minor deviations as a result of staff changes during the course of the project which required two adjustments of the GANTT chart. The individual topics for the exchange visits

were chosen to involve the training in methodologies and technical equipment (or both). The work so far has led to 7 peer reviewed publications and at least 5 more are anticipated.

The scientific highlights from the work are published on the following topics: (i) *Enzyme Responsive Hyaluronic Acid Nanocapsules Containing Polyhexanide and Their Exposure to Bacteria To Prevent Infection*, Biomacromolecules, 2013; (ii) *Studying the cytolytic activity of gas plasma with self-signalling phospholipid vesicles dispersed within a gelatin matrix*, J. Phys. D: Applied Physics, 2013; (iii) *Enzymatic degradation of poly(L-lactide) nanoparticles followed by the release of octenidine and their bactericidal effects*, Nanomedicine: Nanotechnology, Biology, and Medicine, 2014; (iv) *Ionized gas (plasma) delivery of reactive oxygen species (ROS) into artificial cells*, J. Phys. D: Appl. Phys. 2014; (v) *Approaches to Quantify Amine Groups in the Presence of Hydroxyl Functional Groups in Plasma Polymerized Thin Films*, Plasma Processes and Polymers, 2014; (vi) *Synthesis and surface immobilization of antibacterial hybrid silver-poly(L-lactide) nanoparticles*, Nanotechnology 2014, and (vii) *Synthesis and antibacterial properties of a hybrid of silver-potato starch nanocapsules by miniemulsion/polyaddition polymerization*, RSC, Journal of Materials Chemistry 2014.

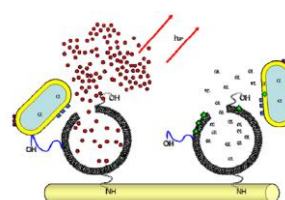
Other scientific highlights works not yet published include switchable nanoporous screening platform for in-line sensing approaches for pathogenic bacteria where we anticipate further publications in the next 12 months.



The project logo



Project dissemination (MDK forum 2012)



Schematic of the concept for a responsive wound dressing

The project is accessible on the www via the web link <http://www2.mpip-mainz.mpg.de/eu-projekte/koala/> which provides open information of the partnership, the objectives and goals of the project. It also provides an internal area for communication and dissemination between the partners. The results of the program have fed into numerous publications co-authored by the partners. The work from the KOALA program has also been included in dissemination activities to the general public in the form of University open days and has been a part of teaching and lecturing at University level. Since the main goal of the work in the KOALA program was the development of durable sensor platforms for sensing applications in wound healing, all secondments were of high academic interest but with a very strong focus on applied research and industrially relevant applications. During the course of the program we have been able to extend the application of enzyme responsive nanocapsules towards diagnostics in food storage, water monitoring and patient monitoring using a basic chemistry that is extendable from nanocapsules to thin films and to nanocapsules within thin films. Discussions are now underway to acquire funding for further applied research into these areas in partnerships with the private sector.