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Press Release

NANODIARA – THIRD SCIENTIFIC MEETING IN FRIBOURG, SWITZERLAND, MARCH 1 TO 3, 2011

The third scientific Meeting of NanoDiaRA took place in Fribourg in Switzerland, a historic University city at which one of the research groups of NanoDiaRA is located. Around 40 principal investigators, trainees and collaborators from the 15 partner institutions attended this very successful meeting. They came together to network, share and discuss their progress in research during the first year of operation. The first day was dedicated to a discussion of the management of the network, ethical issues and strategic aspects of the ongoing research. A workshop was held later in the day to plan co-ordination of future research, establish research priorities and set a timetable for the months prior to the next meeting in October, 2011. During the afternoon the General assembly was held at which the draft first year report was accepted.

The aim of this European funded Project called NanoDiaRA is to develop new nanotechnology to address major unmet clinical needs relating to the early detection and treatment of arthritic diseases like rheumatoid arthritis (RA) and osteoarthritis (OA). We want to see if these treatments for joint damage are working early on rather than waiting many months to a year for RA or 1–2 years for OA. This aim is made possible by the combination of very new and powerful technologies from a multitude of different very specialized disciplines used by the different partners involved in the project. The combination of this expertise means that we can work on major health problems that none of us can solve on our own.

The project is driven by the excellence of the Principal Investigators and the curiosity, enthusiasm, knowledge and ability of the Young Investigators/trainees. One of the aims of the Network is to promote interactions and exchanges between these young investigators and to have them present their research to the project team and all the other attending scientists. The Young Investigators Day, which takes place once a year in NanoDiaRA, gives them the opportunity to present their recent research, to get to know each other better, to engage in discussions of each other's research, and to be involved in planning future research. 15 oral presentations and five posters provided a detailed overview of their research in the first year. Starting with the preparation of the specially prepared nanoparticles to be used for imaging and immunoassays and the study of their interactions with proteins, Usawadee Sakulkhu, a materials scientist at the Ecole polytechnique fédérale de Lausanne (EPFL) in Lausanne, Switzerland, showed the great importance of standardized technology and a well-defined particle characterization when preparing these highly specialized nanoparticles for use in our projects. Further requirements to be fulfilled from the engineering side were presented by Anthony Redjem from the University of Fribourg, Switzerland, who is

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developing special microreactors for this project. Julian Kaufmann, Centre Suisse d'Électronique et de Microtechnique, CSEM at Alpnach, Switzerland, spoke about special microdevices by which the magnetic particles can be separated and concentrated. Our European project, like others, is dedicated to creating new knowledge through research, which is then developed into new products that can be used to help patients. Merck Chemie Estapor at Pithivier, close to Paris, France, is the company involved in the project to realize this goal of particle preparation, and Damien Jegourel and Richard Vidal discussed this in their presentation.

Early diagnosis of RA and OA needs different tools for characterisation, either by magnetic resonance imaging or by using bioassays. In our case, we are developing new modifications of these existing technologies to achieve much higher sensitivity and specificity. This involves the discovery of new well-defined biomarkers. Patrik Önnarfjord from University of Lund, Sweden, presented novel results from work on human cartilages identifying new biomarkers using a technique called quantitative proteomics. This was followed by a presentation of how biomarker assays are developed by Anna Pramhed, from AnaMar, Lund, Sweden. Hui Gao, Arrayon Biotechnology Neuchatel, Switzerland, presented details on how combinations of biomarkers can be analyzed using multiplex assays optionally in combination with iron oxide particles.

The development of these laboratory analyses of blood and urine and imaging technologies involves techniques for the detection of inflammation and other disease-related changes in the affected joints. New ways of imaging using magnetic resonance (MRI) are designed to detect disease activity much earlier than current approaches focussing on the damage caused by the disease. In the first year, imaging techniques were validated for longitudinal assessment of experimental RA as described by Azza Gramoun from University of Geneva, Switzerland, and Eline Vermeij, Radboud University, Nijmegen, Netherlands. They discussed how nanoparticles could be used with new MRI protocols that have been developed to make it possible to detect these nanoparticles in joints and thereby joint inflammation. At the Paracelsus Private Medical University in Salzburg, Austria, structural disease progression of knee OA using new ways to analyse MRI images have been developed and were presented by Wolfgang Wirth. All these studies are interrelated and integrated so that different parts of the research program work together to progressively create these new technologies.

The NanoDiaRA Consortium involves research from bench to bedside, from fundamental studies in chemistry, biology, pathology and materials science to clinical studies. Therefore, a session was dedicated to clinical investigations. Markus Wagegg from the Charité, Berlin, Germany, talked about the influence of nanoparticles on immune cells, while Heide Boeth and William Taylor from the same institution discussed their work on the functional assessment of RA in finger joints and early OA in the knee joint. Agu Tamm from University of Tartu, Estonia, described their studies of the development of early knee OA in the Võru cohort that will be used together with RA patients from Charité to assess the new disease detection technologies that are being developed.



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Beside research, it is necessary to consider the ethical, social and legal issues related to the disease and to novel technologies and materials like nanoparticles, the uses of which are still under discussion. The representatives of the Europäische Akademie in Bad Neuenahr-Ahrweiler, Germany, are leaders of this ELSI workpackage; Dorothee Dörr and Felix Thiele spoke about these activities. Alessandra Hool from MatSearch Consulting Hofmann, Pully, Switzerland, and Margarethe Hofmann, the latter responsible for the scientific coordination of the project, outlined the management system, established to co-ordinate all these activities with the aid of an intranet that is used to communicate existing and new research information, to track samples, documents and record all scientific studies and outcomes.

On the third day of this important meeting, all workpackage leaders presented their work to the Project Technical Advisor Dr. Carlos von Bonhorst and Heico Frima from the Research Directorate-General of the European Commission, together being responsible for critiquing and advising on such projects from the Commission's perspective.

Very complex and challenging projects as this would not be possible without the involvement and collaboration of outstanding researchers in many different disciplines and countries, both in academia and industry. Without industry involvement from project inception, we would face even greater challenges to turn this new knowledge into technologies to improve the care of patients with arthritis. Without the funding and guidance of the European Commission, none of this would be possible.

For more information about our research group, go to www.nanodiara.eu.

The project "Development of novel nanotechnology based diagnostic systems for rheumatoid arthritis and osteoarthritis (NanoDiaRA)" is funded by the 7th Framework Programme of the European Union. Its consortium consists of 15 European partners from both university and non-university institutions. The coordinator of the NanoDiaRA project is the Europäische Akademie zur Erforschung von Folgen wissenschaftlich-technischer Entwicklungen Bad Neuenahr-Ahrweiler gGmbH, Germany (www.ea-aw.eu) dealing with the scientific study of the consequences of scientific and technological advances for individuals, society and the natural environment. MatSearch Consulting Hofmann, Switzerland (www.matsearch.ch), an independent consulting organization specialized in the field of materials science and technology, is responsible for the scientific coordination.

Further information: www.nanodiara.eu