



Participant Profile

for the
Turkish-German Strategy Workshop 2006
TÜBİTAK Marmara Research Center,
Istanbul- Gebze Turkey
13 – 15 December 2006



International Bureau (IB)
of the Federal Ministry of
Education and Research
(BMBF)

1. Contact details and personal information

| | | | |
|-----------------------------------|---|---------------------------------------|--|
| Name: | Dr. Frank Witte | Phone: | +49-511-5354-546 |
| Role/function¹: | Director of Biomaterial Research | Fax: | +49-511-5354-875 |
| Institution: | Laboratory for Biomechanics and Biomaterials | E-Mail: | f.witte@web.de |
| Department: | Dpt. of Orthopedic Surgery, Hannover Medical School | Website: | www.lbb-mhh.de.vu |
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| Postcode and City: | 30625 Hannover | | |

¹ **Role/function** e.g. working group leader, managing director, postdoc, PhD etc.

² **Organisation type** e.g. university, research institution, small and medium enterprise (SME), industry etc.

| | |
|---|--|
| Working Group: | <input checked="" type="checkbox"/> 1 Material Technologies <input checked="" type="checkbox"/> 2 Biotechnology, Genomics and Food <input type="checkbox"/> 3 Energy <input type="checkbox"/> 4 Information and Communication Technologies <input type="checkbox"/> 5 Environmental Protection, Climate Change and Sustainable Development |
| Areas of activity: | <input checked="" type="checkbox"/> research <input checked="" type="checkbox"/> technology development <input type="checkbox"/> demonstration <input checked="" type="checkbox"/> training <input type="checkbox"/> dissemination <input type="checkbox"/> other: |
| Keywords characterising your area of research: | <p>Please choose the appropriate key words (max. 5) from the following list: http://www.cordis.lu/fp6/keywords</p> <p>Medical sciences, Animal surgery, Traumatology, Locomotion system, Orthopaedics, Cell biology, Histology, Medical physics, Biomechanics, Biomedical materials, Materials technology</p> |
| Expertise, technologies and infrastructures available in your institution: | <p>Research activities / expertise: The participant is the Director of Biomaterial Research of the Laboratory for Biomechanics and Biomaterials at the Hannover Medical School. He is working on magnesium alloys as biodegradable implant materials for musculoskeletal applications for more than 5 years. His main interest is the process of in-vivo corrosion of magnesium alloys and their interaction with bone and cartilage tissues.</p> <p>Expertise:</p> <ul style="list-style-type: none"> • Bone biology • Animal studies in Orthopaedic Research • Biomaterials for bone surgery • Biomechanical testing of Bone and Biomaterials • Microtomography of Bone and Biomaterials • Histology and Pathology <p>Methods: Animal Models in Orthopaedic Research, Bone histology, paraffin sections, undecalcified thin-sections (microtome sections, cutting-grinding technique), immunohistology, in-situ hybridization on plastic embedded thin-sections, microtomography of bone-implant interface, cell culture (different cell lineages), electrochemical corrosion testing, mechanical testing of biomaterials or cell-material constructs</p> <p>Key technologies: bone-implant histology (immunohistology) on plastic embedded sections, microtomography, animal studies for musculoskeletal research, cell culture, electrochemical testing, mechanical testing</p> <p>Infrastructures: Animal Laboratory, Histological Laboratory, Cell Laboratory, Biomechanical Laboratory</p> |



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Key publications:

Witte F., Ulrich H, Rudert M, Willbold E

Appropriate inflammatory response to biodegradable magnesium scaffolds
J Biomed Mater Res Part A, 2006, accepted

Feyerabend F, **Witte F.**, Kammal M, Willumeit R

Unphysiological high magnesium concentrations support chondrocyte proliferation and redifferentiation.
Tissue Eng 2006, accepted

Witte F., Fischer J, Nellesen J, Crostack HA, Kaese V, Pisch A, Beckmann F, Windhagen H

In vitro and in vivo corrosion measurements of magnesium alloys.
Biomaterials 2006; 27(7):1013-1018.

Witte F., Kaese V, Haferkamp H, Switzer E, Meyer-Lindenberg A, Wirth CJ, Windhagen H.

In vivo corrosion of four magnesium alloys and the associated bone response.
Biomaterials 2005; 26(17):3557-3563.

2. Past and present research collaborations

Are you familiar
with the European
Framework
Programme?

Yes

No

- with Framework Programme 5
- with Framework Programme 6
- with Framework Programme 7

EU-projects you are
involved in:
Past projects

Programme title / contract number / title / acronym / your function (coordinator / partner / contractor)

Applied for Eu projects in Framework 6

Present projects

No Eu – Projects running at present; national projects: BMBF, DFG

Other international
collaborations:

Sweden, Israel, France

Name(s) and
contact details of
potential partners:

If you would like to suggest the participation of particular partners from the partner country based on existing contacts or collaboration experience, you are welcome to indicate their names and contact details below:

Prof.Dr. Ali Arslan Kaya

Manager of Metal Tech.Project Group and Electron Microscopy Lab.

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3. Presentation at the Workshop

I will give a presentation at the workshop (approx. 10 min.) to present my institution, my expertise, and my collaboration interests. The contents of my presentations is summarised below (max. 1 page).



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Titel: In-vivo corrosion of magnesium implants and their interaction with surrounding tissues.

Biodegradable metal implants for musculoskeletal and intravascular applications made of magnesium alloys have been shown to degrade in-vivo by corrosion. The in-vivo corrosion of magnesium alloys has the potential to provide a new mechanism which will allow metal implants to be applied in musculoskeletal surgery as biodegradable implants. This would particularly be true if magnesium alloys with predictable in-vivo corrosion rates could be developed. Since the magnesium corrosion process depends on the corrosive environment, the corrosion rates of magnesium alloys under standard in-vitro environmental conditions are not directly comparable to results obtained from an animal model. Synchrotron-radiation based microtomography (SR μ CT) enabled us to investigate non-destructively the in-vivo corrosion as well as the osteointegration at the implant-bone interphase at a high spatial resolution. Corrosion morphology and its metallurgical quantification of pit formation could be obtained. Since the alloying elements of magnesium alloys have significant importance for the degradation process in biological environments, the biocompatibility depending on their local concentration and distribution has to be investigated. An overview on the current status of magnesium research in the biomedical field will be given and possible points of cooperation will be outlined.

I agree with the publication of my data on the Workshop website!

PLEASE FILL IN THIS FORM UNTIL 22 SEPT. 2006 AND RETURN IT TO:

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