





# 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)

- Red Blood Cell Research (Plasma Membrane, Hemoglobin, Mechanics)
- Structural Chemistry of Proteins, Temperature Transitions, Denaturation
- Microcirculation: Endothelial Cell Layer Permeability, Adhesion, Migration, Angiogenesis
- Drug Research and Clinical Studies
- Technology meets Biology (Bacterial Killing through Ions, Biological effects of Magnetic fields, etc)
- Tissue Engineering: Artificial Blood, 2D/3D Tissue Culture
- Cell Activation, Cellular Interaction and Cell Surface Adhesion
- Cell Bioassays for Drug Studies
- Cell Biological Measurement Technology
- Biocompatibility and Biomaterials

## **Software and hardware development**

Recent technological developments:

- Endothelial Cell Permeability Analyser\*
- Cell Drum Technology\* (Mechanical Cell & Tissue Tension, Mechanics of Biological Natural Membranes (Amniotic Sac, 3 D Tissue cultures)
- Flow Chamber Technology\*
- Automated Cell Shape Analysis\*
- High Throughput System for the Morphological Analysis of Genetically Modified Plants\*
- Artificial Blood (Bioreactor\*)
- Temperature controlled microscope cell chamber\*
- Erythrocyte deformability analyser (ELIAS)\*

## **Methods**

**Full Scale Cell Culturing:** Cell Culture Facilities, Freezer, Cell Handling etc.

**Full Scale Cell Biology:** Cell lines, Primary Cell Cultures, self exciting cells

**Full Scale Microscopy:** Confocal, Fluorescence, Computer and Video Imaging

**Full Scale Molecular Biology:** Electrophoresis (2D, SDS-PAGE, Agarose Gel), Western Blotting, ELISA, Protein Expression

**Genetics:** Real-Time PCR, computed Gel Analysis, Micro array Technology  
Gene Expression

**Protein Structural Analysis:** (in cooperation with Research Center Juelich and UCSD, San Diego, USA), Light Scattering, Circular Dichroism, Proton Scattering, Spectroscopy

**Red Blood Cell Research:** ELIAS (\*), LORCA-Laser Optical Rotational Cell Analyser, CTA -Cell Transit Analyser), Single Cell Technique (Micropipette Aspiration Technique),

**Others:** Due to the combined expertise in Technology and Cell Research we have access to Technology solely available to us (all methods above marked with a star sign )

**Engineering:** Design, Manufacturing, Electronic Device Development, Software Development, Integral System Solutions, Lab automation

## **Key technologies:**

See above

## Infrastructures:



- Biochemistry Lab (100m<sup>2</sup>)
- Cell Culture Facilities (25m<sup>2</sup>)
- Microscope Lab (20m<sup>2</sup>)
- Assistants and Students Computer Rooms (70m<sup>2</sup>)
- Electronics- und Mechanics Development (20m<sup>2</sup>)
- Due to Close Cooperation to the Research Centre Juelich many more Facilities are Accessible.

## Key publications

### A. Temiz-Artmann

1. Digel I, Maggakis-Kelemen C, Zerlin KF, Linder, P., Kasischke, N., Kayser, P., Porst, D., **Temiz Artmann A.**, Artmann G.M. Body temperature-related structural transitions of monotremal and human hemoglobin. *Biophys J.* 2006;91:3014-3021.
2. Ilya E. Digel, **Temiz Artmann, A.**, Hideo Nojima and GM. Artmann: Bactericidal Effects of Plasma Generated Cluster Ions., *Med Biol Eng Comput.* 2005;43:800-807.
3. **Temiz Artmann, A.**, Akhisaroglu, M., Sercan, Z., Kayatekin, BM., Yorukoglu, K., Kirkali, G.: Erythrocyte endothelium adhesion after acute exhaustive exercise in juvenile and adult rats, *Physiol Res.* Oct, 2005, 17.
4. **Temiz Artmann, A.**; Linder, P.; Kayser, P.; Digel, I.; Artmann, GM.; Lücker, P.: NMR in vitro Effects on Proliferation, Apoptosis, and Viability of Human Chondrocytes and Osteoblasts, *Methods Find Exp Clin Pharmacol.* Jul-Aug;27(6), 2005, 391-4.
5. Demirci, T., Trzewik, J., Linder, P., Digel, I., Artmann, G.M., **Temiz Artmann, A.**: Mechanical Stimulation of 3T3 Fibroblasts Activates Genes: ITGB5 and p53 Responses as Quantified on the mRNA Level, *Biomedizinische Technik* 2004; Band 49: 1030-1031.
6. Digel, I., Trzewik, J., Demirci, T., **Temiz Artmann, A.**, Artmann, G.M.: Response of Fibroblasts to Cyclic Mechanical Stress: A Proteome Approach, *Biomedizinische Technik* 2004; Band 49: 1042-1043.
7. J. Trzewik, **A. Artmann-Temiz**, P. Linder, T. Demirci, I. Digel, and G.M. Artmann: Evaluation of Lateral Mechanical Tension in Thin-Film Tissue Constructs. *Ann. Biomed. Eng.*, Vol. 32, No. 9, Sept. 2004, pp. 1245–1253.
8. Artmann GM, Burns L, Canaves JM, **Temiz Artmann A.**, Schmid-Schonbein GW, Chien S, Maggakis-Kelemen C.: Circular dichroism spectra of human hemoglobin reveal a reversible structural transition at body temperature. *Eur Biophys J.* 2004 Vol. 33, p. 490-96.
9. **Temiz A.**, Yalcin O., Resmi H., Baskurt O.K.: Can white cell activation be one of the major factors that affect hemorheological parameters during and after exercise? *Clinical Hemorheology and Microcirculation* **2002**; 26 (3): 189-93.
10. **Temiz A.**, Baskurt O.K., Pekcetin C., Kandemir F., Güre A.: Leukocyte activation, oxidant stress and red blood cell properties after acute, exhausting exercise in rats. *Clinical Hemorheology and Microcirculation* **2000**; 22 (4): 253-259.
11. Baskurt O.K., **Temiz A.**, and Meiselman H.J.: Effect of super oxide anions on red blood cell rheologic properties. *Free Radical Biology and Medicine* **1998**; 24 (1): 102
12. Baskurt O.K., **Temiz A.**, and Meiselman H.J.: Red blood cell aggregation in experimental sepsis. **1997**; *J. Lab. Clin. Med.* 130 (2): 183-190.
13. Baskurt O.K., Edremitlioglu M., **Temiz A.**: Effect of erythrocyte deformability on myocardial hematocrit gradient. *The American Physiological Society (Heart Circ. Physiol* 37) **1995**; 268 H260-H264.
14. Baskurt O.K., Edremitlioglu M., **Temiz A.**: In vitro effects of in vivo activated leukocytes on red blood cell filterability and lipid peroxidation. *Clinical Hemorheology* **1994**; 14 (4): 591-596.



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## 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)

Present projects

Other international  
collaborations:

- Drexel Univ. Philadelphia, USA (Prof. Dr. Peter Lelkes)
- Dokuz Eylül Univ. Medical School Depts, Biochemistry, Medical Biology and Genetics, Pharmacology, Physiology, Microbiology, Radiology Izmir, Turkey
- Univ. AMC-Amsterdam, Netherlands (Max Hardeman)

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. Gülgün Oktay PhD  
Dokuz Eylül Univ. Medical School, Dept. of Biochemistry  
Balcova-İZMİR 35340 Turkey [gulgun.oktay@deu.edu.tr](mailto:gulgun.oktay@deu.edu.tr)

## 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).

### **As Medical Doctor working with Bioengineers – Fun, Solutions and Challenge** **(Aysegül Temiz Artmann, MD., PhD)**

An increasing number of young, intellectual and talented students devote years of their lives to study and to conduct high-end research in Bioengineering for solving medical and biological problems at the University of Applied Sciences Aachen, Germany. They derive from many countries of the world; do their Master studies given in English language and study bioengineering with us. Bioengineering integrates physical, chemical, mathematical, and computational sciences and engineering principles to study biology, medicine, behaviour, health and disease. It advances fundamental concepts; creates knowledge from the molecular to the organ systems levels; and develops innovative biological materials, processes, implants, devices, and informatics, approaches for the prevention, diagnosis, and treatment of disease, for patient rehabilitation, and for improving health. As member of a strong and internationally active research group, as medical doctor and scientist coming from Physiology and Biochemistry, I would like to present new frontiers in bioengineering to this audience. The lecture comprises an introduction to selected contemporary scientific bioengineering, cell biology and medical topics currently studied in our lab.

A recent survey conducted by the publicly funded Competence Network Sepsis reveals that severe sepsis and/or septic shock occurs 110 out of 100,000 only in Germany annually. This illness is responsible for approximately 60,000 deaths and ranges as the third most frequent cause of death after acute myocardial infarction. Our previous studies showed an



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immediate anti-aggregant effect of Lipopolysaccharide (LPS) on Red Blood Cells (RBC). The erythrocyte diameter was increased after LPS application, which was visualized in microscopic images. Precise cell volume studies were done using micropipette aspiration. The results shed more light on pathophysiology on sepsis for the new therapeutic approaches.

Quantifying cellular forces still is a hot issue and widely unsolved and very important from tissue engineering to tumour growth. We will introduce a new principle for the evaluation of mechanical forces developing inside ultra thin cell and 3D tissue layers. This universal system is also applicable to mechanical studies with tissue engineered 3D-myocardial bioartificial tissues. A planned upgrade will allow high throughput tests with as many as 96 autonomously and simultaneously beating bioartificial heart walls. In another attempt of using the CellDrum principle was to determine the mechanical properties of the amniotic sac especially to estimate premature births. The impact of the amniotic sac mechanics might give more explanations on the origins of premature births as around 85% of the cases cannot be explained. It shows like many others the impact of a fruitful cooperation between biologists and doctors with engineers.

The questions asked by scientists coming from medicine and/or engineering are solved in a better way resulting new diagnostic, prognostic tools and the treatments by applied high technology.

**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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