

Magdalena Niziolek-Kierecka
Jagiellonian University, Krakow, Poland
Faculty of Biochemistry, Biophysics and Biotechnology
Department of Biophysics

ESP "Short-Time Visits" Fellowship 2006 report

I spent 4 weeks in the laboratory of Prof. Barbara Krammer from Department of Molecular Biology, University of Salzburg in Austria. Work and studies of Prof. Krammer's research group are focused on the cellular mechanisms of photodynamic therapy (PDT).

PDT is a useful modality for some tumors treatment, which involves three components to induce cancer destruction: a photosensitizer, light and oxygen. Classical PDT involves administration of a tumor-localizing photosensitizing dye and its subsequent photoexcitation with light in the appropriate wavelength range. It produces photooxidative stress and starts cytotoxic photochemical reactions, leading to cell death.

A new approach to PDT is based on an endogenous production of photosensitizing agent after administration of its precursor (a pro-drug). The most promising example is 5-aminolevulinic acid (ALA), which is metabolized to protoporphyrin IX (PpIX), the active sensitizer and intermediate in the heme biosynthesis pathway.

ALA-induced PpIX was used as a photosensitizer in my experimental work performed in Salzburg. I worked with Dr Kristijan Plaetzer to establish protocols for inducing apoptotic death in A 431 (human epidermoid carcinoma) cells after ALA/light treatment.

My experimental work involved:

- maintaining A 431 cells in culture
- sensitization of cells with PpIX by incubation with ALA
- determination of PpIX level by fluorescence spectroscopy
- photodynamic treatment
- cell death assessment using MTT (thiazolyl blue) assay and flow cytometric analysis of nuclear fragmentation
- determination of intracellular ATP level by a luciferin-luciferase assay

Stay in Prof. Krammer's laboratory was very fruitful. I made a very good progress in the research project that I worked on, and I acquired new skills and techniques unique to Prof. Krammer's laboratory.

I thank the European Society for Photobiology for the Fellowship.