TU LODZ, FACULTY OF CHEMISTRY
INSTITUTE OF APPLIED RADIATION CHEMISTRY

Wroblewskiego 15
93-590 Lodz, Poland

RESEARCH GROUP

- Dr Lidia Gebicka
- Dr Jerzy L. Gebicki
- Joanna Didik, PhD student
- Monika Jurgas, PhD student
- Magdalena Maciejewska, PhD student

INTRODUCTION

⇒ Identification of initial molecular targets of ionizing radiations in living cells provides a targeted approach to the inhibition or enhancement of radiation damage at an early stage

⇒ First molecular targets in cells are proteins rather than DNA or lipids

⇒ Proteins exposed to physiologically significant free radicals acquire semistable **peroxide groups** which can give rise to new radicals, **inactivate enzymes**, crosslink to DNA, and **oxidise intra- and extracellular antioxidants**

RESEARCH PLANS

based on our preliminary observations

(1) Reactions of radiolytically generated aminoacids and protein peroxides with various antioxidants in homogeneous and microheterogeneous systems

(2) Radiation-induced peroxidatic activity of catalase and cytochrome c

(3) Radiation-induced changes of heme enzymes entrapped in reverse micelles

WHAT WE HAVE

Pulse radiolysis (LINAC)

- dose per pulse: 5 Gy - 1 kGy
- fast spectrophotometry: time resolution ns – min (4 different timescales after single pulse); λ range 220 nm - > 2000 nm
- fast conductometry: time resolution microseconds

Steady-state radiolysis

- dose rate: 80 Gy/h - 4 kGy/h

Other

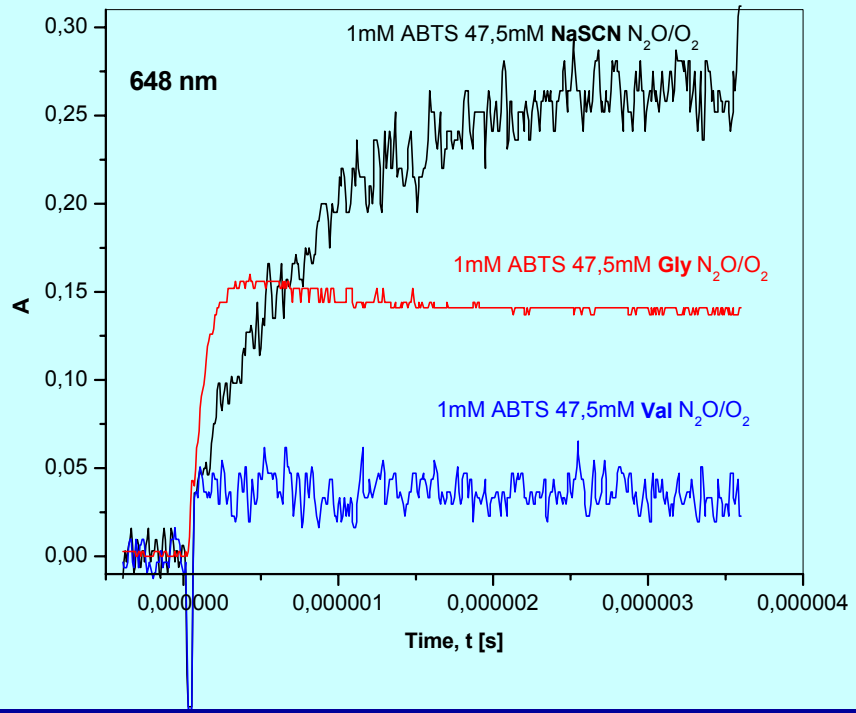
- stopped-flow spectrofluorimeter
- diode-array spectrophotometer
- oxygen meter

WHAT WE MIGHT NEED

- studies of enzyme/protein structures after irradiations in water and in micellar systems with e.g. CD (far-UV and Söret), NMR, scattering methods
- techniques of protein separations
- theoretical and experimental studies on radiation energy deposition in micellar systems without and with entrapped proteins


THANK YOU FOR
YOUR
ATTENTION

RECENT RESULTS



Aminoacids peroxides radicals