



RADIATION INDUCED OXIDATION OF METHIONINE-CONTAINING PEPTIDES

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DUBLIN, 27 FEBRUARY 2004

RESEARCH TOPICS

·OH-INDUCED RADICAL PROCESSES IN:

- *N-Acetylated oligopeptides containing internal methionine residues*
- *cyclic and open-chain dipeptides containing methionine residues in L and D configuration*
- *oligopeptides containing multiplied methionine residues*
- *oligopeptides containing N- methionine /glutamic acid and C-terminal methionine residues separated by oligoproline bridges*

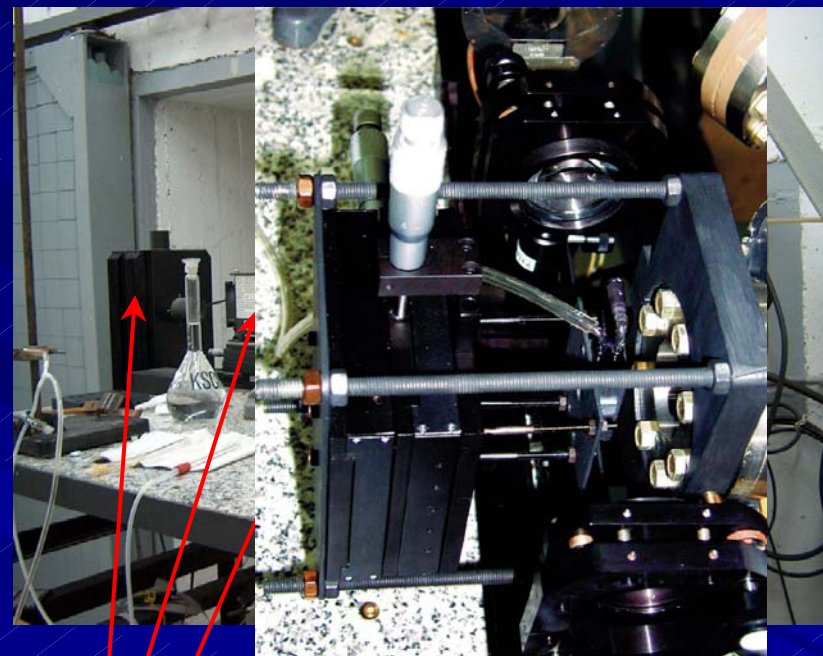
PULSE RADIOLYSIS SETUP

LINEAR ELECTRON ACCELERATOR



- Accelerating Section
- Electron Gun

MEASUREMENT ROOM



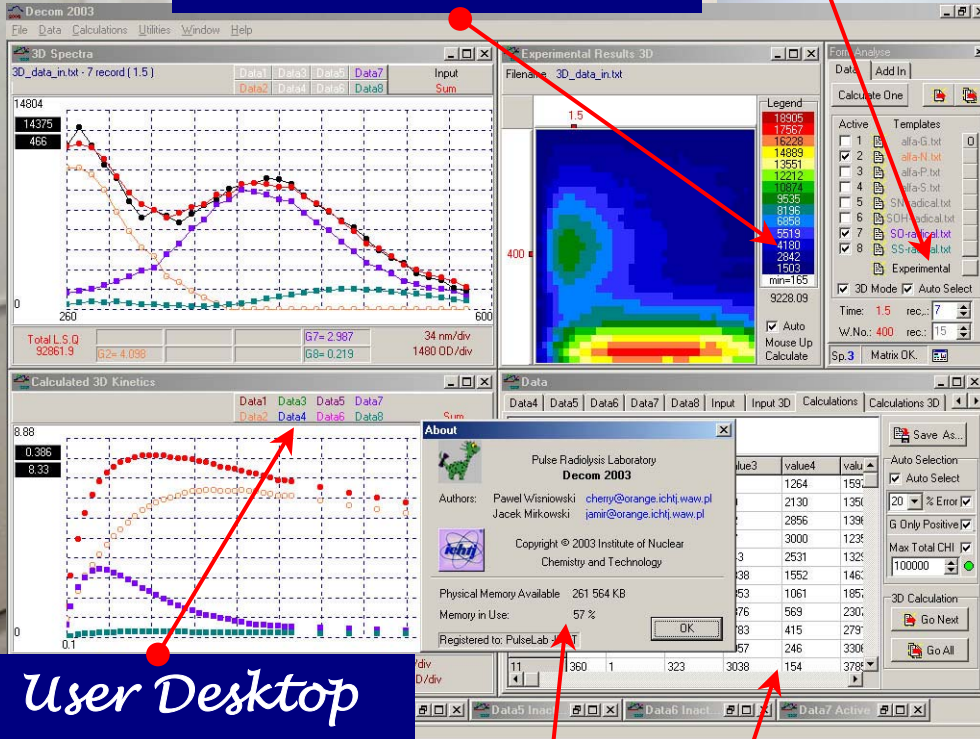
- Xenon Lamp
- Shutter
- Solution Container
- Cell

Pulse Radiolysis LeCroy Oscilloscope

Photomultiplier

Monochromator

Amplifier



User Desktop

Hardware Setup Window

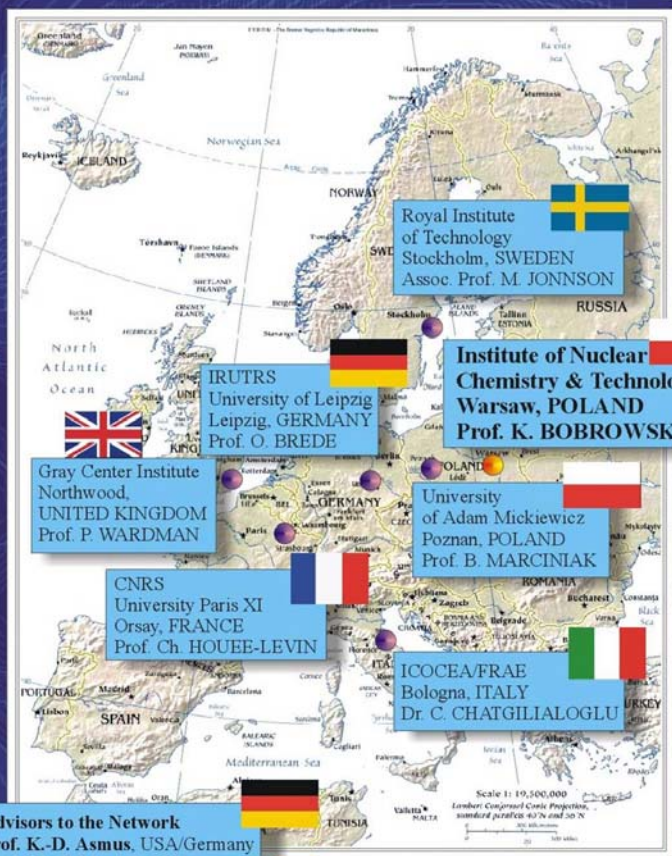
Deconvolution Software

Participation in 5-th Frame EC Programme

RESEARCH TRAINING NETWORK

SULFUR RADICAL CHEMISTRY OF BIOLOGICAL SIGNIFICANCE:
THE PROTECTIVE AND DAMAGING ROLES OF THIOL AND
THIOETHER RADICALS

within 5th Framework Programme (2002-2006)



Advisors to the Network
Prof. K.-D. Asmus, USA/Germany
Prof. Ch. Schöneich, USA

RESEARCH TRAINING NETWORK

SULFRAD

OBJECTIVES

characterize sulfur radical chemistry of biological significance in all three major cellular targets of oxidative stress: lipids, proteins and nucleic acids

identify the roles of thiols and thioethers in "repairing" free radical damage

settle the controversy whether sulfur radicals produced in radical "repair" are themselves damaging

Leu-Enkephalin

Met-Enkephalin

RESEARCH TRAINING NETWORK

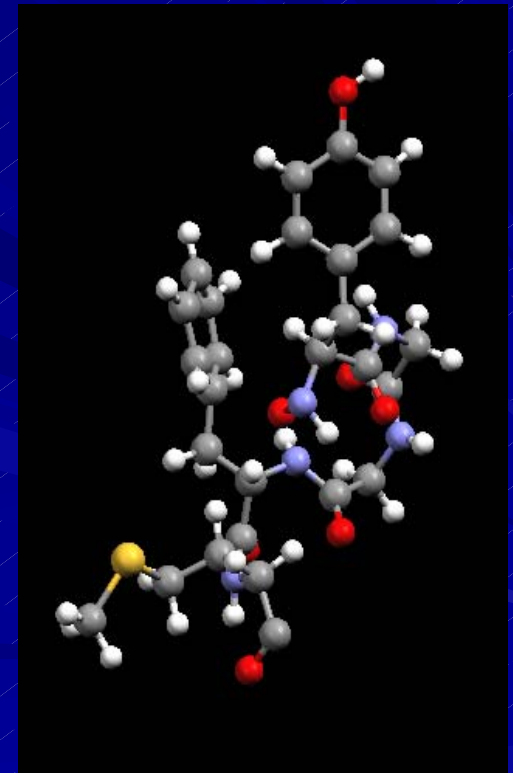
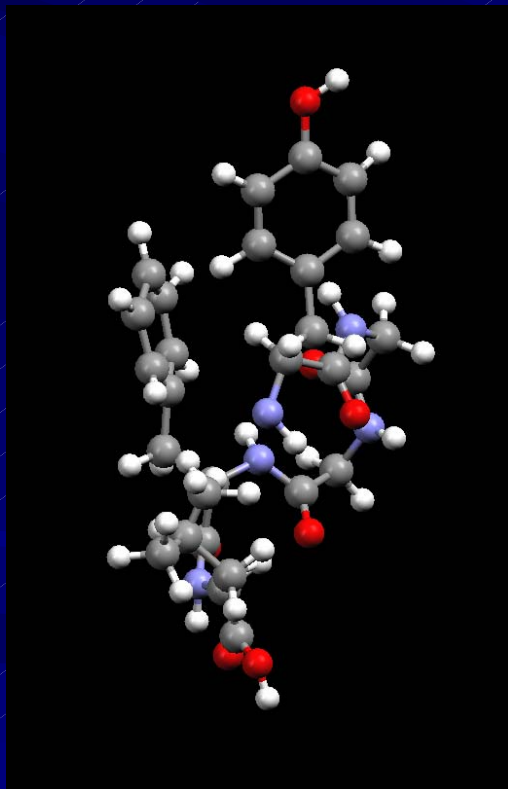
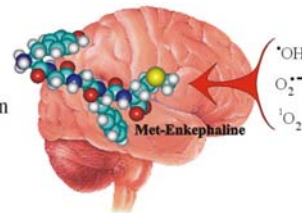
SULFRAD

OBJECTIVES IN PROJECT 3

To investigate the potential protective function of Met residues in enkephalins against oxidative attack, studying enkephalins with and without Met, Leu, modified enkephalin-derived peptides, and Met sulfoxide residues

Radiation-induced
Photo-sensitized
Fenton chemistry

oxidation



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RELEVANT PAPERS

- Ch. Schöneich, **D. Pogocki**, G. L. Hug, **K. Bobrowski** „Free radicals reactions of methionine in peptides: mechanisms relevant to b-amyloid oxidation and Alzheimer’s disease” J. Am. Chem. Soc. 2003, 125, 13700
- **D. Pogocki**, K. Serdiuk, Ch. Schöneich „Computational characterization of sulfur-oxygen three-electron bonded radicals in methionine and methionine-containing peptides; important intermediates in one-electron oxidation processes” J. Phys. Chem. A 2003, 107, 7032
- **D. Pogocki**, Ch. Schöneich “Computational characterization of sulfur-oxygen bonded sulfuranyl radicals derived from alkyl- and (carboxylalkyl)- thiopropionic acids: evidence for s*-type radicals” J. Org. Chem. 2002, 67, 1526
- **D. Pogocki**, Ch. Schöneich “Redox properties of Met35 in neurotoxic b-amyloid peptide. A molecular modeling study” Chem. Res. Toxicol. 2002, 15, 408
- **Paweł B. Wiśniowski**, I. Carmichael, R. W. Fessenden, G. L. Hug “ Evidence for b-scission in the oxidation of amino acids” J. Phys. Chem. A. 2002, 106, 4573
- **A. Korzeniowska-Sobczuk**, G. L. Hug, I. Carmichael, **K. Bobrowski** “Spectral, kinetics, and theoretical studies of radical cations derived from thioanisole and its carboxylic derivative” J. Phys. Chem. 2002, 106, 9251
- N. Varmenot, S. Remita, Z. Abedinzadeh, **P. Wisniowski**, G. Strzelczak, **K. Bobrowski** „Oxidation processes of N,S-diacetyl-L-cysteine ethylester: influence of S-acetylation” J. Phys. Chem. A. 2001, 105, 6867
- Ch. Schöneich, **D. Pogocki**, **P. Wisniowski**, G. L. Hug, **K. Bobrowski** „Intramolecular sulfur-oxygen bond formation in radical cations of N-acetylmethionine amide” J. Am. Chem. Soc. 2000, 122, 10224