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FCT FACULDADE DE CIÊNCIAS E TECNOLOGIA UNIVERSIDADE NOVA DE LISBOA

Department of Chemistry

Radiation damage and oxidative stress

REQUIMTE • Biochemistry and Biophysics

Biofísica Molecular
Molecular Biophysics

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PhD in Biochemistry (UNL, 2008)
10 papers in international peer reviewed journals
9 conference proceedings

ISI Web of Science index-13 (h-index=4)

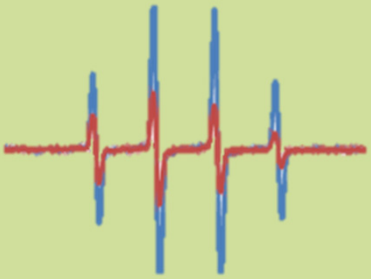
Objectives

One of our main objectives is to study radiation-induced damage to macromolecular systems such as DNA and DNA repair machinery. We aim to characterize the effect of ionizing radiation in metal ion cofactors, glycosylases and/or specific DNA sequences.

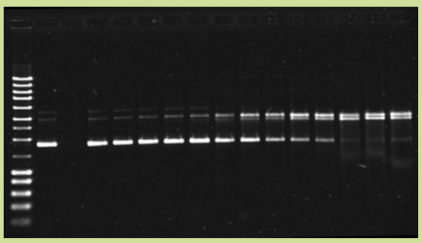
Also occupational exposure has been under study, namely on an Airline pilot population. In this case, we use specific metabolites to assess damage caused by radiation exposure in that population. Besides we aim the production of a "routine" test assay to monitor Airline Pilot's health based on aforementioned metabolites.

Methodology

We base our research in standard biochemical techniques such as, protein cloning and overexpression, protein purification, electrophoretic analysis (for protein or DNA) and metal content determination. Besides we also apply more complex techniques as stopped-flow or rapid freeze-quench coupled to UV-visible, EPR and Mössbauer spectroscopies to identify and characterize reactions and reaction intermediates.



When we are studying the effect of ionizing radiation in populations we also use radiation detection methodologies, EPR detection of radiacal species as well as standard blood sample analysis.



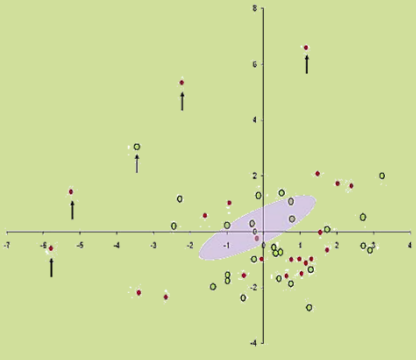
Expected Results

Regarding DNA repair enzymes we were able to:

- Verify the radiation effect in DNA repair protein clusters
- Verify the effects on the stability of the Protein-DNA complex
- Correlate the damage caused by ionizing radiation to DNA repair protein and its function **(Folgosa F, Eur Biophys J (2011) 40 (Suppl 1):S138)**

Regarding the effects of radiation on complex organisms we were able to:

- Distinguish exposed population from un-exposed population based on specific metabolites
- Use those specific metabolites to assess damage and build a "routine" based test assay to monitor Airline Pilot's health **(Silva R, et al., Radiat Environ Biophys, 2013 and Folgosa F, et al., FEBS J, 276, 308-309, 2009)**



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