12th Workshop on European Collaboration for Higher Education and Research in Nuclear Engineering & Radiological Protection

# FROM PARTICLE PHYSICS TO MEDICINE FOR A BETTER HEALTH

29 May – 1 June 2016 Cervia, Italy

# UBIMEDICAL

Is a space to promote the connection between the university and the business world. Created to streamline the transference of knowledge in the quest for new technologies, it allows companies to develop the research and the laboratorial tests needed for the effective selling of new products, adding value to the economy.

This structure came to enrich the Portuguese health cluster, acting as a spill-over in the connection between the university and the market and also promotes technology transfer between the scientific/academic world and the business community, applying the concept of translational research in response to the challenge that involves passing the basic knowledge to their clinical applications and to the general people.

# **LAB**oratório de **E**studos de **EXPO**sição ao **RAD**ão


The main objective of our laboratory is to study the different aspects of population exposure to radon and the arising health risks.

**We have several strands…**

# OUTREACH

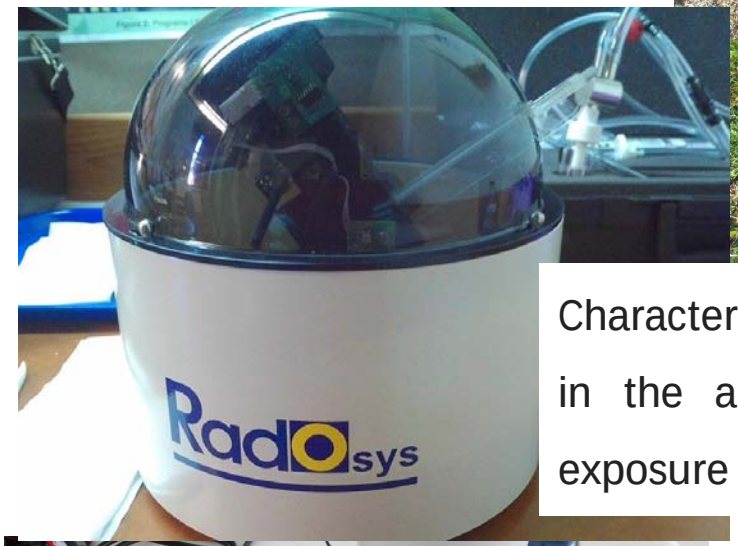
Radiation Environment Project

Scientific Occupation for high school students

Science at Primary Schools

Masterclasses in Particle Physics – Hands on Particle Physics

# SERVICES PROVIDER




Characterization parameters of public health, in the area of analysis of the effects of exposure to radon in public health.

Measurement and certification of radon effective dose and concentration in air, water and soil.

# RESEARCH

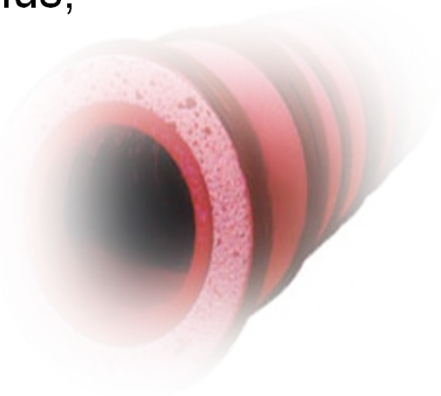
## 1. Microdosimetric study with Monte Carlo simulations

a) Build a microdosimetric model of the human lung tree;

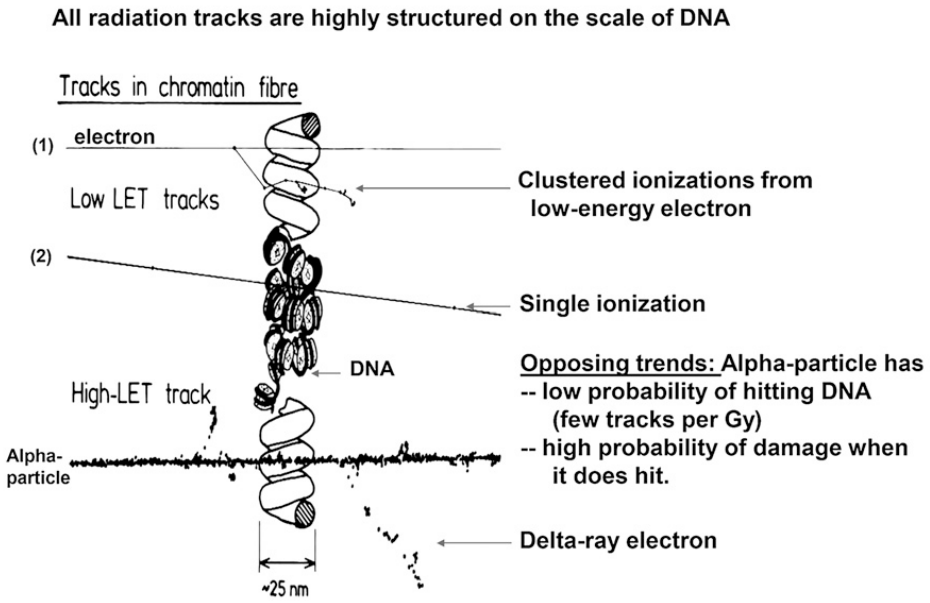
b) Develop a dedicate alpha particle transport MC code;

c) Study alpha particle interactions with human lung acinus;

d) Assess  radio-induced cancer risk on the site.



# Alpha particle radiobiology



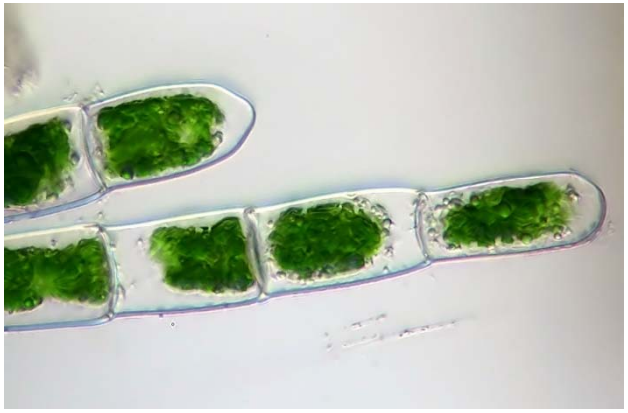

Goodhead DT. Talk 23, Alpha Emitters, from Session 6, Effects from Specific Sources of Internal Radiation. Presented at: CERRIE Workshop; July 21–23, 2003; Oxford, U.K.

In the studied regions, we paid special attention to the **nuclei of cells** where the DNA is located.

We only studied cells that are **radiosensitive** to alpha particles.

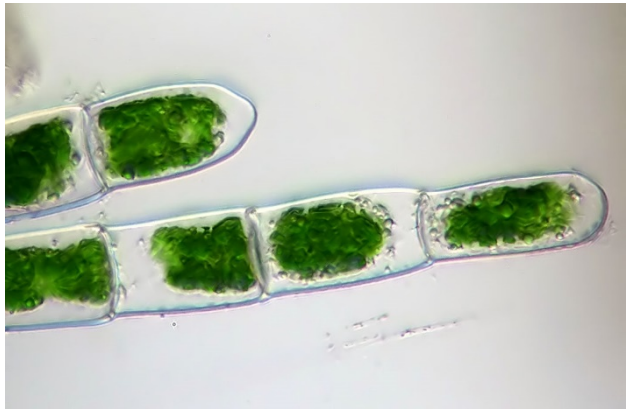
## 2. Radiobiology

Observe the **induced effects**, as a consequence of alpha particle deposition, on algae  and on nasturtium officinale cultures



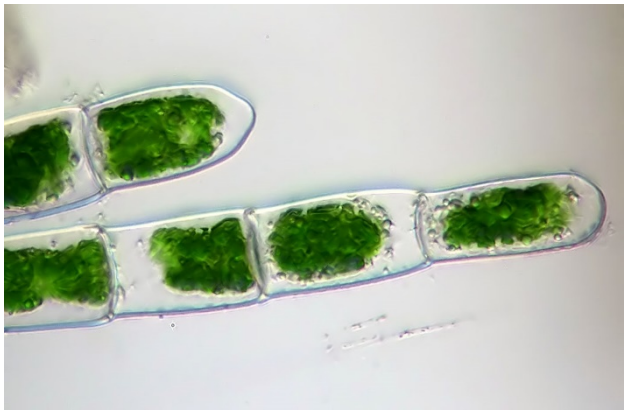
# Toxicological Response of the Green Alga *Chlorella vulgaris*

**Cellular viability** in green algae - The unicellular green alga *are* subjected to a variety of stress conditions and toxicological atmosphere



**Algal counting:**

Cell number was determined using a hematocytometer chamber (Neubauer) and a fluorescence microscope.



**We also analyse**

Chlorophyll (spectrophotometer)
Cell size (Zetasizer)
Cytotoxicity (MTT)

Examine:

- **antioxidative properties** of aqueous and ethanolic extracts of the leaf of Nasturtium Officinale;

- **bioaccumulation** of heavy metals in the watercress **leaves**.

Determination of **total phenols and flavonoids** contents were measured following a spectrophotometric method.

Extracts were evaluated for total **antioxidant activity** by DPPH.

LABORATÓRIO DE INSTRUMENTAÇÃO E FÍSICA EXPERIMENTAL DE PARTICULAS

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UNIVERSIDADE BEIRA INTERIOR



An open European academic network for cooperation in Higher Education on Radiological and Nuclear Engineering

**European Radon Association**

ERA
European Radon Association

Improving Awareness and Reducing Risk of Radon Exposure Across Europe

# Thank you for your attention