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INFN-DISCOVER22 at LNGS: gaining insight into the role of environmental radiation in modulating immune response in living organisms

Understanding whether the unavoidable exposure to environmental radiation is necessary for maintaining proper functioning and stress-response capability in living organisms is an intriguing open question.

The INFN-funded DISCOVER22 project investigated the immune response modulation in a below-background radiation environment exploiting the Laboratori Nazionali del Gran Sasso – LNGS facility.

Radiobiological experiments on cells cultured in low-radiation environment (LRE) compared to a reference-radiation environment (RRE) have shown a down-regulation of innate immunity in HaCaT cells (human keratinocytes), and have investigated the ability of immature immune cells (HL60) to differentiate into macrophages and neutrophils.

Biophysical modelling (cell-cycle perturbation, micronuclei induction in HaCaT) and dimensionality reduction data-analysis techniques (PCA, t-SNE) have been adopted to highlight fine effects associated with the radiation environment.

This project sets the basis for future investigations and fits in the research carried out in Deep Underground Laboratories worldwide, tackling this fundamental question in a variety of aspects and organisms.

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