Professor Vincenzo Nicola TALESA
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University of Perugia, Perugia, Italy

Biography: Vincenzo Nicola Talesa was born in Vibo Valentia (VV), Italy, on 8 December 1959. He is internationally recognized in the area of toxicology, cancer and neurodegenerative research fields in which his major interest is on the comprehension of the mechanisms that lead to the genesis and progression of the related diseases in the bio-medical area. Vincenzo Talesa has published more than 100 publications in high-ranked scientific journals. He has been involved in the EU projects "Multidisciplinary approach to structure and functions of Cholinesterases", "New Biosensors for improved detection of environmental contamination by anticholinesterase pesticides" and "Development of targeted nutrition for prevention of undernutrition for older adults". Reviewer of international journals with impact factor. Scientific leader of the research group "Glyoxalases inhibition and expression *in vivo* and *in vitro* in the control of tumor growth". Organizer of the International Meetings "New Biosensors for improved detection of environmental contamination by anticholinesterase pesticides", Perugia, Italy, and VIIIth International Meeting on Cholinesterases, Perugia, Italy.

Curriculum Vitae:

-1982: Graduated with honors in Biological Sciences from the University of Perugia (Perugia, Italy)
-1985-1986: Visiting Scientist at the Department of Medical Chemistry, University of Helsinki (Finland);
-1989: Visiting Research at North Texas State University, Denton, Texas (USA);
-1993-1994: Research Assistant at the Laboratoire de Differenciation cellulaire et Croissance, INRA, Montpellier (France) under the project "Multidisciplinary approach to structure and functions of cholinesterases" funded by the European Economic Community (Human Capital and Mobility);
-1998: Research Assistant at the Laboratoire de Differenciation cellulaire et Croissance INRA, Montpellier (France) under the project "Galileo."
-1999–2004 Associate Professor of Applied Biology, University of Perugia Medical School (Perugia, Italy)
-2004-2020 Full Professor of Applied Biology, University of Perugia Medical School (Perugia, Italy)

COORDINATION OF RESEARCH ACTIVITY

- Biological, biochemical and molecular characterization of Acetylcholinesterases (AChEs) in a) human diseases and b) mechanisms involved in insecticide resistance.

a) Since the discovery of the cholinergic deficit in Alzheimer disease (AD), acetylcholinesterase (AChE) has been widely investigated in tissues involved in the disease. These studies showed modifications in AChE activity and changes in its polymorphism in brain as well as in cerebro-spinal fluid (CSF) and blood. The co-localization of the enzyme in the senile plaque provided evidence of its anomalous features. It has been also shown that AChE forms a stable complex with senile plaque components through its peripheral anionic site. Moreover, the neurotoxicity of amyloid components is increased by the presence of AChE. The occurrence of an altered glycosylation of some AChE forms in AD is closely related to the presence of amyloid formations. In this ambit, Vincenzo Talesa studied the effect of different AChE inhibitors as potential agents in the treatment of AD.

b) Cholinesterase (ChE) is one of the most employed biomarkers in environmental analysis. Among ChEs, potentially the most significant in environmental terms is AChE, the enzyme that terminates the nerve impulse. Because of its physiological role, AChE has long been considered a highly specific biomarker for organisms exposed to anticholinesterases agents, primarily agro-chemicals (organophosphate and carbamate pesticides). The effects of these pesticides depends upon their selective inhibition of AChE. In this ambit, Vincenzo Talesa performed the kinetic and molecular characterization, particularly focusing on the

kinetic and inhibition of this enzyme in different phyla of Vertebrates and Invertebrates. Of particular relevance is the identification (molecular cloning and expression) of a full-length cDNA encoding a new AChE resistant to organophosphate.

- Glyoxalases inhibition and expression, *in vivo* and *in vitro*, in the control of tumor growth.

Glyoxalase 1 (Glo1), together with glyoxalase 2 (Glo2), forms the main scavenging system of methylglyoxal, a potent pro-apoptotic agent mainly generated by glycolysis. An increased rate of glycolysis is a well-known signature of cancer cells. As a survival strategy, Glyoxalases are overexpressed in many human malignant cells. Hence, targeting these enzymes represents a strategy to selectively inhibit cancer. In this ambit, the research group directed by Vincenzo Talesa identified some major molecular mechanisms based on glyoxalase system and the related glycative and oxidative stress in the genesis, progression and response to therapy in prostate and breast cancers . In the same malignancies, studies have been performed in order to evaluate the association of a specific Glo1 SNP (loss-of-function mutation) with the risk of genesis, progression and survival of tumor-bearing patients. A similar study was performed in the autoimmune disease, multiple sclerosis, and in cerebral cavernous malformations (CCM), a major cerebrovascular disease of proven genetic origin.

- *In Vitro* study of the role of Natriuretic peptides (NPs) in inflammation and immunity

NPs (ANP and BNP) are hormone/paracrine/autocrine factors released by the heart in response to myocardial stretch and overload, modulating body fluid homeostasis. However, a role of NPs in inflammation and immunity is emerging. Interleukin-1β (IL-1β) is a potent pro-inflammatory cytokine involved in a wide range of biological responses, including the immunological one. Unlike other cytokines, IL-1β production is rigorously controlled. Primarily, NF-kB activation is required to produce pro-IL-1β; subsequently, NALP3 inflammasome/caspase-1 activation is required to cleave pro-IL-1β into the active secreted protein. NALP3 is a molecular platform capable of sensing a large variety of signals and a major player in innate immune defense. Due to their pleiotropism, IL-1β and NALP3 dysregulation is a common feature of a wide range of diseases. Identifying molecules regulating IL-1β/NALP3/caspase-1 expression is an important step in the development of new potential therapeutic agents. In this ambit, the research group directed by Vincenzo Talesa provided new evidence of the direct involvement of NPs on NF-kB/NALP3/caspase-1-mediated IL-1β release and NF-kB-mediated pro-IL-1β production. We suggest a possible employment of NPs for the treatment of inflammatory/immune-related diseases and IL-1β/NALP3-associated disorders, affecting millions of people worldwide.

TEACHING ACTIVITY

-Professor of Cell Biology and Genetics in the the MD Program at Perugia University Medical School
-Professor of Cell Biology and Genetics in the Biotechnology Degree Program
-Professor of Cell Biology and Genetics in the Nursing Degree at Perugia University Medical School
-Professor of Cell Biology and Genetics in Postgraduate Specializations of Medical School

COORDINATION OF TEACHING ACTIVITY

-2002-2010 Director of the nursing Degree Program at the University of Perugia
-Director of the University Master in Planning, management and evaluation of integrated health promotion actions for the community

MANAGEMENT AND ADMINISTRATION

-Vice Dean of Faculty of Medicine
-Deputy Rector for Teaching Division, University of Perugia
-2011-2013 Member of the Board of Governors, University of Perugia
-Board member and Vice-coordinator of the “Evaluation team” of the University of Perugia;

-Member of the Academic Board of the PhD in Systems Biology in Immune and Infectious Pathologies;
-Board member of the Genomic Center
- Director and Vice- Director of the Center for Advanced Medical Simulation
-2014-2019 Director of the Department of Experimental Medicine, University of Perugia (Perugia, Italy)
-Chief of the Library of the Faculty of Medicine
-Member of the University Senate, University of Perugia (20014-2019);
--2020 Member of the Board of Governors, University of Perugia-2020 Director of the Department of Medicine and Surgery, University of Perugia (Perugia, Italy)

List of of publications in recent years

Exploring the radiosensitizing potential of AZD8931: a pilot study on the human LoVo colorectal cancer cell line.
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Glyoxalase I drives epithelial-to-mesenchymal transition via argpyrimidine-modified Hsp70, miR-21 and SMAD signalling in human bronchial cells BEAS-2B chronically exposed to crystalline silica Min-U-Sil 5: Transformation into a neoplastic-like phenotype.
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