Antonia Lanni is Full Professor of Physiology at Department of Environmental Biological and Pharmaceutical Sciences and Technologies, Università degli Studi della Campania "Luigi Vanvitelli". She teaches General Physiology and Physiology of Nutrition for the Master degrees in Biology and, Food and Nutrition Sciences, respectively. From November 2005 to October 2009 she has been Chairman of Council of Courses of Study in Biology. She has been working for many years on cellular mechanisms involved in energy expenditure and specifically on the effects of thyroid hormones at the cellular level and their mechanism of action. In the last years her attention has been focused on the study of biological activity of both triiodothyronine (T3) and 3,5-diiodothyronine (T2), a derivative of the peripheral metabolism of T3. She demonstrated that T2 is able, similar to T3, to stimulate the resting metabolism but the mechanism of action of T2 is different from that of T3 since T2 acts directly on mitochondria (its cellular target) in a protein synthesis-independent pathway in contrast to T3 that acts through the well known nuclear way. By using a particular approach, “the top-down elasticity analysis” she evidentiated the sites of action of T2 that, at mitochondrial level, are responsible of the increased respiratory rate. From the above analysis it has been shown that 3,5-T2 stimulates the producers of the mitochondrial proton-motive force which allow the substrate oxidation. At the level of the respiratory chain, the complex IV and the block of reactions involved in the reduction of cytochrome c have been evidenced as target. In addition, further results demonstrated that T2, produced in vivo by the peripheral deiodination of T3, acts in combination with T3 as the “short term” effect of thyroid calorigenesis is due to 3,5-T2 while the “long term” effect is due to T3. Subsequent studies evidenced the presence of liver cytosolic proteins able to bind 3,5-T2 independently of the presence of NADPH. These proteins, in the presence of NADPH also bind T3, thus suggesting that the redox state of the cell could determine the binding of T3 or 3,5-T2 and regulate T3 translocation to the nucleus and/or mitochondria and 3,5-T2 to the mitochondria. During the last years she has demonstrated that the administration of T2 to rats receiving a hyperlipidic diet prevents adiposity and body weight gain without inducing thyreotoxicosis. T2 strongly increases hepatic fat oxidation leading to an improvement of lipid serum profile and of diet-induced insulin resistance. These results are of potential clinical importance because recently he showed that the administration of T2 increase resting metabolic rate and reduces body weight in human, without undesirable side effects at cardiac level. These studies have given rise to the application for a national patent (Lanni Antonia, Moreno Maria, Lombardi Assunta, Goglia F. -2007- Composition including 3,5-diiodothyronine and pharmacological use of them. N. 0001343549).

She also investigated on the mechanisms through which thyroid hormones are able to induce, at mitochondrial level, an uncoupling between the electron transport and ATP synthesis and, thus, regulate heat production at cell level. Her studies contributed to the demonstration that Uncoupling Protein 3 (UCP3) is a molecular determinant of the calorigenic effect of T3. Indeed, when acutely injected into hypothyroid rats, T3 induces: the expression of UCP3 in muscle, a decrease in energy efficiency, on one hand, and an increase in resting metabolic rate (RMR), on the other. Furtherly, starting from previous results indicating that UCP3-mediated uncoupling in skeletal muscle mitochondria from hyperthyroid rats is associated to a higher fatty acid content and ROS production in comparison with the euthyroid, she showed that UCP3 translocates lipid hydroperoxide and mediates lipid hydroperoxide-dependent mitochondrial uncoupling. These results have contribute to clarify the physiological function of this protein. His scientific activity has produced more than 100 full length papers (citations: 3046, H index: 34))in peer-reviewed journals and several book chapters. She is associated editor of “Thyroid Research” , referee of international Journals and member of national and international scientific associations.

She has been, local coordinator of five projects of Relevant National Interest (PRIN 2000,PRIN 2002,PRIN 2004, PRIN 2006 and PRIN 2008) and partecipant of an european project (Metabolic Integration and Energy Control-MIEC)and coordinator of 2 Regional projects. She is referee of scientific projects from foreign countries. She is a member of the PhD College "Biomolecular Sciences" She was a member of the National Scientific Commission for suitability to Professor of Physiology (2012-2013).