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Oxidative stress and immunosenescence

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Immunosenescence is characterized by a decreased ability of the immune system to respond to foreign antigens, as well as a decreased ability to maintain tolerance to self-antigens. This results in an increase susceptibility to infection and cancer, and reduced responses to vaccination. During senescence an imbalance between production and clearance of reactive oxygen species and increased levels of oxidatively damaged biomolecules is also observed.

We present evidence that splenic and lymph nodal antigen presenting cells purified from old mice present an oxidatively damaged proteome modified by carbonylation, advance glycation end products and lipid peroxidation. Using qualitative and quantitative mass spectrometry we demonstrate that oxidative stress and endosomal accumulation of oxidatively modified proteins interferes with the efficient processing of exogenous antigens. In support of a causative role for oxidized products in the inefficient immune response, a decrease in oxidative stress improved the adaptive immune response to immunizing antigens. These findings underscore a previously unrecognized effect of the age-dependent oxidatively damaged proteome on the induction and regulation of the immune response.

Biography

Laura Santambrogio has completed his Ph.D from Padua University in Italy and postdoctoral studies from NYU and Harvard University. She is an Associate Professor of Pathology, Immunology & Microbiology at Albert Einstein College of Medicine. She has published more than 80 papers in reputed journals, serves as reviewer on several internationally recognized journals as well as on different NIH study sections.

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