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Leveraging principles of aging to enhance cancer therapy

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The aging population in the United States will double from 2020 to 2060. Diseases of aging such as heart disease and cancer will therefore increase and the healthcare infrastructure must respond with therapies that are less toxic and tolerable for this population. Caloric restriction (CR) as an intervention has consistently been shown to extend life and reduce age-related chronic diseases, such as cardiovascular disease and cancer, in animal models. CR does this by reducing oxidative stress and improving insulin sensitivity. Furthermore, breast cancer incidence in humans has been shown to be strongly correlated to dietary intake in retrospective studies. These observations have led the Simone laboratory to harness the principles of CR to use in combination with standard cancer treatment. In multiple preclinical models, we have shown that CR enhances the efficacy of radiation and chemotherapy. At the molecular level, it does so by decreasing oxidative stress and improving insulin sensitivity. We have now translated these findings into multiple clinical trials. Our pre-clinical and clinical findings, demonstrate the utility of harnessing the anti-aging properties of caloric restriction to enhance cytotoxic therapy for cancer.

Biography

Nicole Simone is the Margaret Q. Landenberger Associate Professor of Radiation Oncology, Co-Leader of the Breast Cancer Research Program at the Sidney Kimmel Cancer Center at Thomas Jefferson University. She received her MD from Rutgers – New Jersey Medical School and did her Radiation Oncology training at the National Cancer Institute. As a Physician-Scientist, she studies how caloric restriction augments chemotherapy and radiation. She translates laboratory findings to patients with 3 open clinical trials using diet for breast, prostate and endometrial cancer. She has authored over 40 research publications, sits on national grant review committees and breast cancer clinical trial committees.

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