

Significance: Clearly address how the proposed project, if successful, will have a major impact on the field of cancer research or on the care of patients with cancer. Summarize how the proposed research creates new paradigms or challenges existing ones.

This project challenges existing ones by creating a big impact in oncology with a significant reduction in premature cancer death estimated at 33% reduction achievable within 6 years from when funding is made available. Tests to measure results will be made on a sample of 10,000 people age 50-75 referring to a location with a constant history of 50 deaths/year in the past 20 years. The cost of this project is \$8 million and is estimated to reduce by 40 times the cost for each life saved from premature cancer death. The rationale supporting this claim is detailed in Section 5. This great cost reduction for health care for each life saved and the increased number of lives saved from premature cancer death will create new paradigms to focus more on early cancer detection as supported by experimental data showing that a tumor diagnosed at an early stage has 90% to 98% probability to save the life of the patient, rather than focusing almost exclusively as done in the past and now in the development of drugs and therapies attempting to cure cancer diagnosed at a late stage. The proposed 3D-CBS innovative technology is over 400 times more efficient than current 5,000 PET used in health care facilities. It can capture more accurately more signals from the tumor markers at a lower cost per signal captured, allowing to lower the radiation dose for a safe screening on asymptomatic patients and cancer survivors and enables early detection.