

# Transformative Impacts on One Health Using Electron Beam as a Platform Technology

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In many parts of the world, society is confronted with urban sprawl, spread of infectious diseases, rampant foodborne disease outbreaks, sick livestock and companion animals, chronic water shortages, and often one disaster away from crippling food shortages. These global challenges require globally applicable solutions that are technologically feasible and economically sustainable. High energy electron beams (eBeam) generated using commercial electricity can dramatically improve the quality of life for Americans and the rest of the world. This is a platform technology that can significantly improve food safety, enhance the quality of therapeutics such as vaccines, ensure the phytosanitary quality of imported fruits and vegetables, eliminate environmental pollution by decontaminating municipal and industrial wastes, improve the durability and quality of medical implants, and improve biofuel and petroleum production efficiencies. The National Center for Electron Beam Research at Texas A&M University is the world leader in accelerating the commercial exploitation of this technology. Using the one-of-a-kind eBeam instrumentation and product processing capabilities at the National Center for Electron Beam Research as a core facility, this One Health project team (made up of 25 faculty members from 15 schools/colleges/centers/institutes) will synergize the University system's transdisciplinary research expertise to make transformative impacts on:

- Eradicating water borne, food borne, and feed borne infectious diseases in humans, livestock, and companion animals by developing novel vaccines and other therapeutics;
- Ensuring global food supplies by novel packaging and processing methods;
- Transforming food, feed, and water quality by novel processing, packaging, and treatment strategies; and
- Partnering creatively with entrepreneurs, technology providers, global regulatory bodies, and international financing institutions to sustain commercialized and profitable eBeam-based technologies.

The team assembled for this project will make a significant impact in the area of safe and available food and water, as well as human and animal consumer health through improved vaccines and immunological enhancement. Specifically, program impacts will manifest as substantial increases in the quantity and quality of available water and microbiologically safe foods. Moreover, those foods will be delivered conveniently packaged in biodegradable plastics, and possessed of extended shelf-life which ultimately will result in reduced food loss. The research impacts will also be felt in the increased availability of novel therapeutics targeting human, livestock, and companion animals. Given the track record of the participating team members, the team is confident that the endeavors will also result in the creation of commercial enterprises with new jobs for Texans and others. Underlying these impacts will be fundamental discovery of the previously uncharacterized relationships between food in-take, food associated microbes, and immune development that should promote a second wave of innovation to reduce the need for antibiotics and the incidence of food allergies and intolerances.

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