ANS Spotlight on Nuclear Careers: Life Sciences

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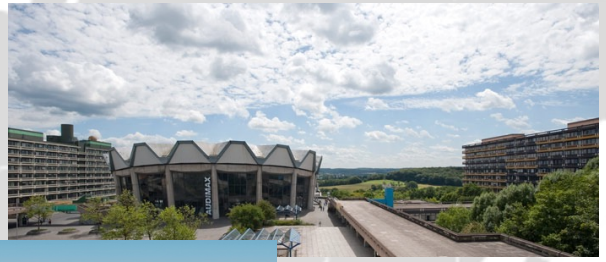
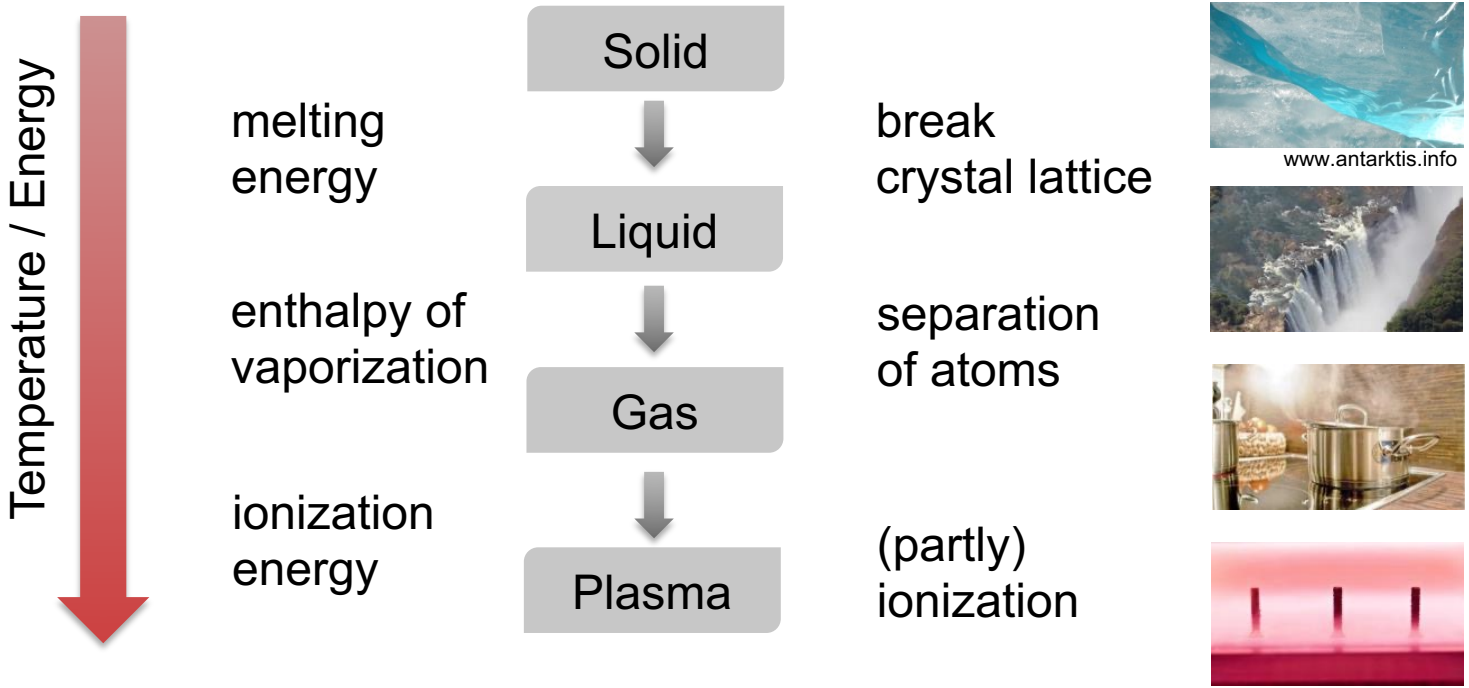
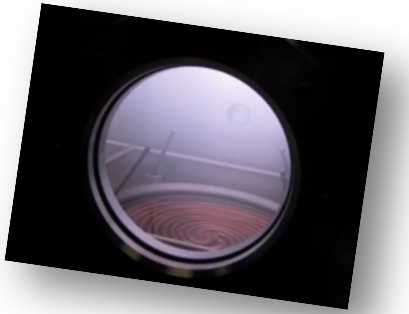


What is plasma?!?

- The 4th (or 1st) state of matter, a partly ionized gas



And what can we do with plasma in the life sciences?

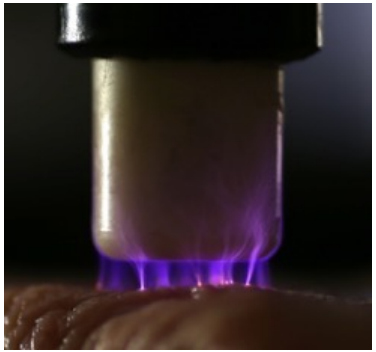


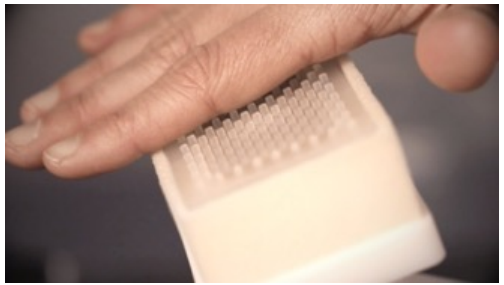
- Inactivation of bacteria, viruses, fungi, …
- Wound healing, various skin diseases
- Plasma Oncology
- Plasma Dentistry
- Air purification
- Wastewater treatment
- Plasma Agriculture

Plasma Medicine

DBD for wound healing / cancer treatment:

- How do the plasma-produced reactive species interact with human cells directly, how do they impact the immune response?
- What is the penetration depth of plasma?
- Effective dose?





PlasmaDerm®, Cinogy (www.cinogy.de)

Drexel UNIVERSITY RUTGERS

In collaboration with Drs. Vandana Miller, Fred Krebs, Francois Berthiaume

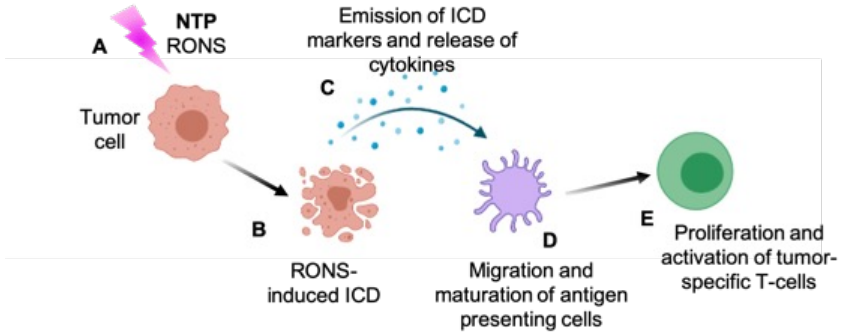
NIH National Institute of Biomedical Imaging and Bioengineering

R01EB029705

Plasma Medicine II

Non-thermal plasma induced Immunogenic Cell Death (ICD) in pancreatic cancer cells

- Which reactive species are responsible for ICD? Focus on NO, OH, and O
- Investigation of dose-dependent effects of plasma on pancreatic cancer cells
  - Translocation of CRT, HSP70, HSP90, secretion of ATP and HMBGB1, migration and phagocytosis

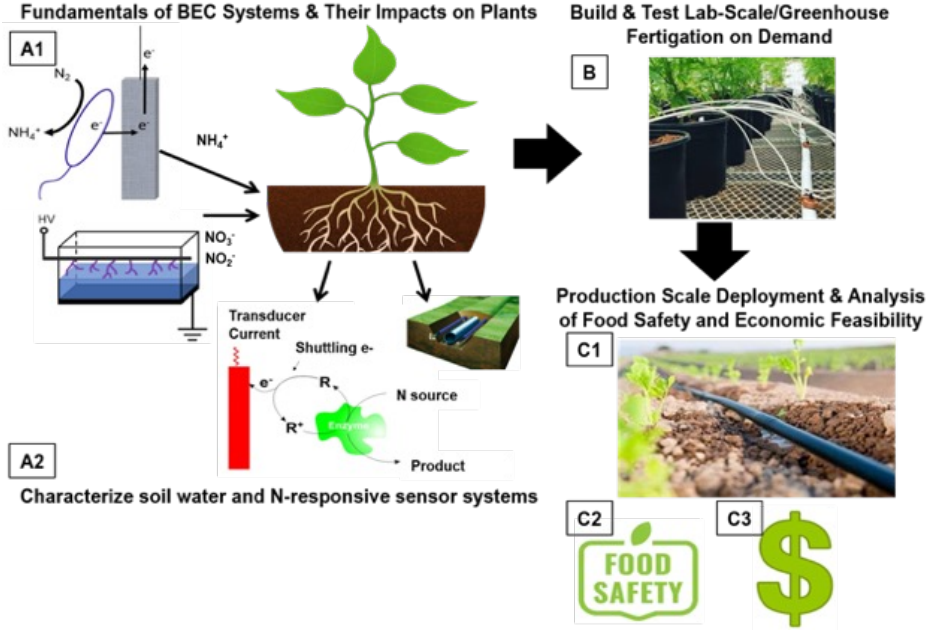


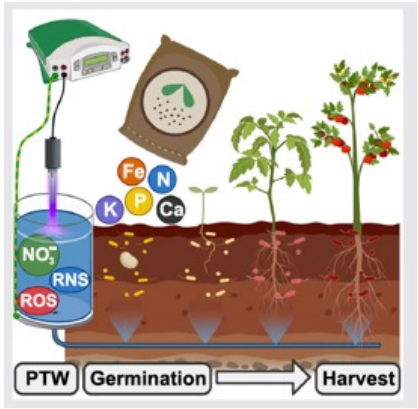
UNC LINEBERGER COMPREHENSIVE CANCER CENTER

In collaboration with Dr. Yevgeny Brudno, Biomedical Engineering

Plasma Agriculture

“Fertigation on Demand” - Plant Sciences Initiative @ NCSU





Received: 31 July 2020 | Revised: 15 September 2020 | Accepted: 16 September 2020
DOI: 10.1002/ppap.202000162

REVIEW

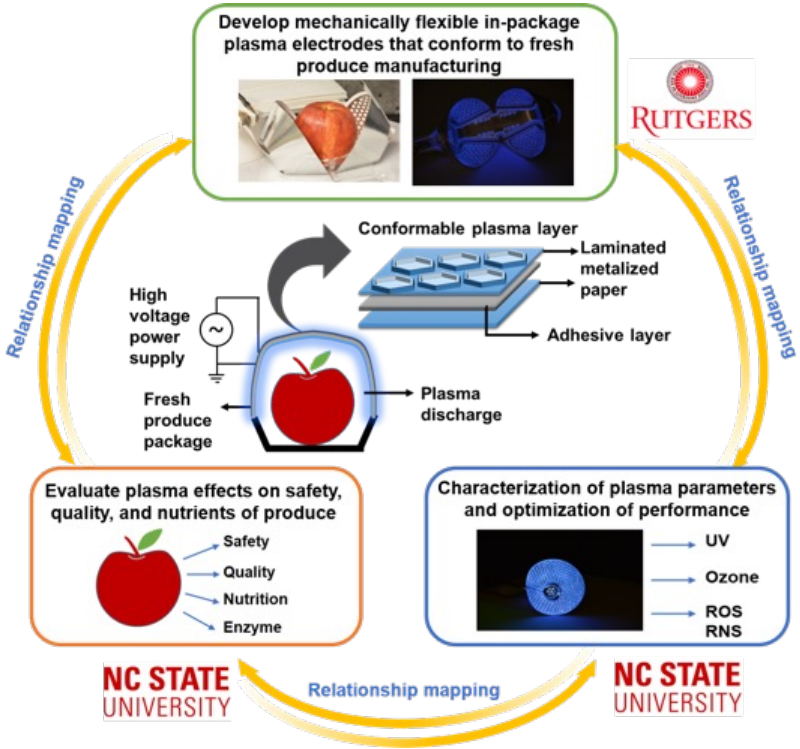
PLASMA PROCESSES AND POLYMERS

Plasma agriculture: Review from the perspective of the plant and its ecosystem

Pietro Ranieri[1] | Nicholas Sponsel[1] | Jon Kizer[2] | Marcela Rojas-Pierce[2] | Ricardo Hernández[3] | Luciano Gatiboni[4] | Amy Grunden[2] | Katharina Stapelmann[1]

Plasma Agriculture II

Flexible DBD for treatment of fresh produce:



USDA

High-quality manufacturing of packaged fresh produce with conformable in-package cold atmospheric plasma,

USDA 2020-67017-31260

In collaboration with
Dr. Deepti Salvi (NCSU) &
Dr. Aaron Mazzeo, Rutgers