Warfighter Health and Performance

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Select Revolutions in Biotechnology

DNA read, writing, editing

Stem cell reprogramming

Organs-on-a-chip

Structural and functional measurements/models
Complex Biological System Interactions

- Understanding complex systems, like the microbiome and its affect in the gut, immune system, and brain
- Modulating the body through these routes to improve health and performance
Complex Biological System Interactions
Operational Threats to Our Warfighters

- Environmental extremes (heat, cold, altitude)
- Physical and cognitive load
- CBRN
- Ballistic/kinetic
- Directed energy
- Psychological trauma
- Trauma care in austere environments
Revolutions in Biotechnology – The Speaker Session

Keynote Speaker for Revolutions in Biotechnology

The Brain-Immune-Gut Super System and the Emergence of Human Chronic Disease

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The Vision

- Power/Comms Chip
- Sensor Chip
- Energy Harvester
- Interfaced with Comms
- Dangling Electrodes

NV Sensor Advantages over Conventional MEG

- Proximity to head
- Room temperature
- Full vector field
- Standoff detection
- Cryo sensors
- Detects only radial field

Diamond Sensors for Brain Imaging

Microelectronics Interfacing Neural Devices (MIND)

Microbiome

FY18 ArtGut Project

Meaningful collaborations shepherded by LL create an integrated strategy to study Parkinson's
Revolutions in Biotechnology – The Poster Session
Looking Towards the Future

• Biotechnologies are advancing at a rapid pace

• We will continue to develop and apply these biotechnologies to solve critical health and performance challenges

• This will lead to healthier and more effective servicemembers
  – Active duty and reintegrating into civilian life

• ... and healthier and happier civilians as military medical technologies transition to the commercial sector