

The Army's University Affiliated Research Center

The UTEXAS UARC

Chem-Bio Program Objectives

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Biological and Chemical Countermeasures

UARC Chem-Bio Program

UARC Chem-Bio Program

Objectives

To minimize by 2015 the operational and combat capability constraints posed by Chem-Bio threat.

Components of Consortium

- The University of Texas System
 - Austin, Dallas, Galveston, San Antonio
 - Texas Department of Health, First Responders
 - Texas National Guard, 6th Civil Support Team
 - Institute for Defense Analyses
 - Central Texas FBI

Research to Operations

- Sensors and Situation Awareness
- Medical Countermeasures
- Communication
- Transition through OEM, 6th CST, NG
- Archival Data Set and Disease Surveillance
- Interface with INTEL- FBI

Research Areas

- Scientific validation of B/C incident
 - situation awareness systems-sensors, signatures
- Medical countermeasures
 - Biosurveillance-archival data, HAN
 - Vaccine, pharmaceuticals, transport
- Communications
 - Security, medical, public; mobilize resources
 - Intelligent software agents

Sensor Element-Binders

- High affinity antibodies- K_d less than 10^{-12}
- Aptamers
- cDNA probes

Sensor Platforms

- Multi-array system – Stephen Johnston
- Chip detection- James Chambers
- Redox Detector- Adam Heller and Gal
- “Electronic Tongue”- Anslyn and Neikirk

Virulence Factors

- Gene encoding binding to target cells
 - LEE is an attachment gene
- Heme transport gene
 - Aerobactin is iron transport gene
 - pColV is plasmid with Aerobactin gene

Information Processing

- Software agent for belief maintenance
- Software agent for resource allocation

Field Work

- TDH Archival data and HAN
- 6th CST integration with OEM through IAT
- Integrate with Texas National Guard through General Daniel James III
- Integrate with Metropolitan Medical Response System (HHS)
- University linkage through IAT

Persons Funded

- Sensors- G. Georgiou, B. Iverson, E. Anslyn, A. Ellington, S. Payne, J. Chambers, A. Heller
- Antivirals- R. Shope, D. Gorenstein, S. Johnston
- Public Health, Training and 1st Responders- S. Barber, S. Collier, D. Perotta, D. Eaton, J. Davis
- DoD Transition- G. Boezer, J. Grote

Technology Demonstration

Identified Underground Facility at Ft. Hood,
3rd Corps- 72,000 sq ft footprint.

Scenario should utilize sensor,
communications, medical response
elements-demonstrate teaming

Vulnerabilities

- Focus on early alert as well as consequence management
 - Intel
 - Biosurveillance: Archival and Emergent
- Resource Allocation- locally, regionally
 - Succession Issues
 - Limits on antibiotic for families
 - Doctrine

Vulnerabilities

- Different needs in different states: urban, livestock, plant
- Overarching Integrated Strategy: e.g Medical, Security, Evidence Retention Agencies

SUCSESSES in FY 2000 I

- Generated high affinity Ab's-anthraxis toxin
- Designed aptamer based MEMS chip
- Developed anti-ricin aptamers for detector elements
- Detect 10^8 copies/microliter of 70 base DNA in 20 min; S/N ratio 7
- Characterize heme transport gene in pathogenicity island

Successes in FY 2000 II

- Demonstrated new vaccine against multiple pathogens
- Identified potential signatures for early alert disease outbreak
- Developed compounds with potential protective properties against Pichinde virus

Successes in FY 2000 III

- Defined B/C Incident constituencies and their unique communications requirements
- Identified “signature” flags in health system for early warning of B/C event
- Identified ER facility and faculty at Hermann Hospital, Houston, with leading edge electronic data entry for surveillance