

A Rapid Sensor Device for Toxic Agent Detection

Cellular Bioengineering, Inc.

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Problem

- Toxic agent detection
 - Military arena
 - Civilian arena
- Hardware and receptor based methods rely on specific characteristics of toxin and cannot detect unknown/modified toxins
- Excitable cell (muscle/nerve) based detectors use custom designed (expensive) hardware

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Solution

- The Cell Matrix Chip detects toxin-induced changes in beating pattern of a **network** of spontaneously active cardiac cells
 - CMC technology can detect both known and unknown/modified toxins with commercially available cameras
 - Toxins have been found to induce signature patterns
- Cameras and can be miniaturized (cell phone cameras)
- CMC cells can be modified to incorporate olfactory receptors, allowing the cells to smell specific substances (explosives, narcotics)

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Team

- Cell biologists to create device conditions to maximize cell health
- Engineers to design and create the CMC device
- Software designers who create the algorithm used to interpret cell activity from video data
- BAE who has the technology to generate toxic vapors and potential false positives at specific concentrations and measure this using hardware based technologies

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Status

ACHIEVEMENTS

- 10 toxic agents were proposed and all 7 cmpds tested (in solution at CBI) thus far affect cell activity at or below their lethal concentrations
- BAE construction of a toxic vapor generator has been completed and the cardiac cells are ready to be tested using toxic vapors
- Algorithm has been updated to improve speed from 5 mins to less than 1 min analysis time
- CBI will finish testing the CMC, which will be delivered to BAE for toxin/false positive testing
- BAE will test effects of toxic **vapors** on cardiac cells and determine effects of false positive vapors
- Algorithm will incorporate basic pattern detection mechanisms to provide a signal once toxin has been detected by the CMC

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Company Profile

- Company name: Cellular Bioengineering, Inc.
- Date Founded: 2003
- No of employees: 26
- Business areas:
 - Radiation decontamination/containment,
 - Artificial corneas
 - Microtags for authentication/identification
 - Biosensor for toxin detection
- Latest or most relevant Projects, Products, Services, Spin offs, etc: Decon Gel_{TM}, Artificial corneas, TruTag

Cellular **B**ioengineering, **I**nc.

Invent. Disrupt. Inspire.

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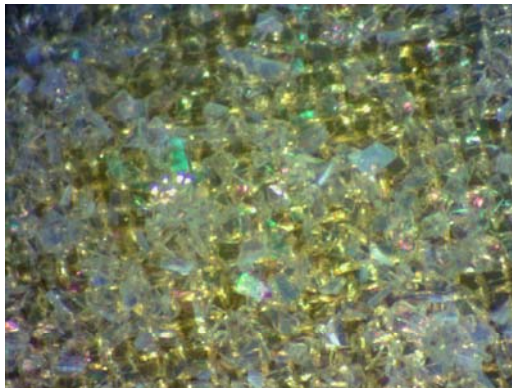
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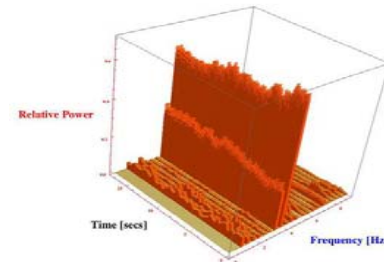
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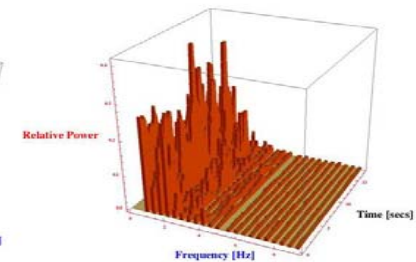


TruTags (above), each barely visible to the naked eye, appear iridescent when they catch the light. Pictured here are hundreds of TruTags in a space about the size of a pinhead. The tags provide a 'spectral barcodes'

Before Pentachlorophenate



After Pentachlorophenate



Cell Matrix Chip analysis of cardiac cell activity before and after 6 mg/L pentachlorophenate. Toxins induce signature changes in cell contraction pattern

DeconGel™ is the leading solution in the world for the remediation of radiological and nuclear contamination. It is able to effectively contain, trap, encapsulate and decontaminate a broad range of radioisotopes on different substrates in a simple, easy, no-preparation process.



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