

**Technology Innovation of the Year
Pharmaceuticals & Biotechnology
North America, 2010**

Frost & Sullivan’s Global Research Platform

Frost & Sullivan is entering its 50th year in business with a global research organization of 1,800 analysts and consultants who monitor more than 300 industries and 250,000 companies. The Company’s research philosophy originates with the CEO’s 360 Degree Perspective,* which in turn serves as the foundation of its TEAM Research** methodology. This unique approach enables us to determine how best-in-class companies worldwide manage growth, innovation and leadership. Based on the findings of this Best Practices research, Frost & Sullivan is proud to present the 2010 North American Technology Innovation of the Year Award in Pharmaceuticals & Biotechnology to Cellular Bioengineering, Inc.



Significance of the Technology Innovation of the Year Award

Key Industry Challenges Addressed by Innovative Anti-Counterfeiting Products

Approximately 10 percent of the \$800 billion annual global pharmaceutical market is thought to be counterfeit. Each year, an avalanche of these potentially lethal drugs makes their way into pharmacies, hospitals, and medicine cabinets throughout the world. The ever-increasing demand for prescription medications coupled with the low costs of producing fakes has made counterfeiting a highly lucrative business, and a growing threat to public safety.

Defined as medicines which are deliberately and fraudulently mislabeled with respect to identity and/or source, counterfeit drugs are frequently produced in the absence of costly quality controls and safety standards. Some have been found to be composed of

everything from inert, ineffective materials without any therapeutic benefit, while others were discovered to contain toxic substances and contaminants like antifreeze and yellow highway paint. Though it's not uncommon for the active pharmaceutical ingredient to be completely missing altogether, it is usually present only in small quantities or substituted out for another less-effective compound. Alternatively, some bogus drugs have been found to contain as much as three times the prescribed active ingredient. Ingesting too much or too little of a pharmaceutical compound can, and has, resulted in deadly consequences.

As counterfeiters become increasingly sophisticated in their technologies and methods of introducing phony drugs into the system, the prevalence of these substandard, potentially lethal drugs continues to rise. Unfortunately, the highly complex pharmaceutical distribution chain presents many avenues of access to those with criminal intentions. From the moment that a drug leaves the manufacturing facility, it can be handed off to more than 20 stakeholders before reaching the patient. When corruption exists in any of the manufacturing, distributing, or dispensing links of the supply chain, standards for re-packaging, content, storage and, ultimately, safety, can no longer be guaranteed. Until comprehensive, cost-effective, and scalable technology solutions are in place for tracking drugs as they move through distribution channels, counterfeiters will continue to infiltrate the global drug supply.

Key Benchmarking Criteria for Technology Innovation of the Year Award

For the Technology Innovation of the Year Award, the following criteria were used to benchmark Cellular Bioengineering's performance against key competitors:

- Uniqueness of Technology
- Impact on New Products/Applications
- Impact on Functionality
- Impact on Customer Value
- Relevance of Innovation to Industry

Best Practice Award Analysis for Cellular Bioengineering, Inc.

The Decision Support Matrix, shown in Chart 1, illustrates the relative importance of each criterion for the Technology Innovation of the Year Award and the ratings for each company under evaluation. To remain unbiased while also protecting the interests of the other organizations reviewed, we have chosen to refer to the other key players as Competitor 1 and Competitor 2.

Chart 1: Decision Support Matrix for Technology Innovation Award

<i>Measurement of 1-10 (1 = lowest; 10 = highest)</i>	Award Criteria					
	Uniqueness of Technology	Impact on New Products/Applications	Impact on Functionality	Impact on Customer Value	Relevance of Innovation to Industry	Weighted Rating
Relative Weight (%)	20%	20%	20%	20%	20%	100%
Cellular Bioengineering	9	9	9	8	10	8.9
Competitor 1	7	7	8	7	9	7.6
Competitor 2	7	6	8	7	8	7.2

The Need for Fully Integrated Security

The serious public health threat posed by the massive proliferation of fake drugs prompted the World Health Organization (WHO) to create a global taskforce to combat counterfeit medicine. To accomplish its mandate, the taskforce, comprised of all 193 member states and numerous stakeholders, has focused on five key areas: legislative and regulatory infrastructure, regulatory implementation, enforcement, communication, and technology to prevent, deter, or detect counterfeit medicines.

Since counterfeits can be introduced at any point between manufacturing and the time a drug reaches pharmacy shelves, all parties in the chain have been urged to adopt detection technologies to stop the spread of phony drugs. At present, the primary means of tracking drugs and verifying authenticity is being done using packaging and labeling technologies like UPC codes and RFIDs (radio-frequency identifiers) to account for a drug’s full chain of custody. While such technologies undoubtedly help track packaged drugs as they move through the supply chain, they fall short of protecting the much sought-after contents within the packaging.

The practice of pharmaceutical repackaging is a key example of when neither UPC Codes nor RFIDs are able to prevent genuine product from ending up in counterfeit packaging, and vice versa. This common, legal practice is conducted by third-parties who repackage drugs and then source them from a low-cost country before re-importing them into one which commands higher prices. Once a drug has been removed from its original packaging, opportunities are created for counterfeiters to introduce phony drugs into legitimate supply channels.

TruTag™ Microtags

Cellular Bioengineering, Inc.'s. (CBI's) solution to this problem was to integrate security at the pill level. CBI's TruTags are optically encoded, micro-sized tags that can be incorporated into tablets or capsules, thereby making it possible to authenticate individual pills. Made of the highest purity silica, each safe, edible TruTag wafer is etched with a custom-manufactured spectral signature that has been chosen from over a trillion possibilities. Passive, requiring no energy input or output, each unique TruTag optical signature can be read by simply exposing the tags to a portable, easy-to-use, spectrometer-based reader.

What makes TruTags distinctive is that the optical signature is manufactured into the tags without the use of additional additives or markers. As such, the highly versatile tags can be added to coatings and applied to the exterior of edible goods, or added to ingredients such as powders. Furthermore, TruTags are encoded with information throughout their depth rather than merely along their surface. If any portion of a broken TruTag is recovered, the information it contains will not be lost. Unlike RFID which requires internal electrical connectivity or UPC codes whose surface must remain intact, TruTags have a melting point of 1600°C and are durable enough to endure all but the most extreme conditions.

A Comprehensive Solution

Adaptable to fit client's needs, TruTags can also be employed in a layered security scheme that involves coding both packaging and contents to create a unique spectral signature. The authenticity of contents within a pill bottle or blister pack can be quickly verified against cryptographic information printed on the package. If tampering has occurred with either a container or its contents, a security violation will be flagged. Equally important, the TruTag system can be designed for self-authentication or to reference further product information in a secure online database. For instance, a tag can reference a database label that can store detailed information such as links to a future pedigree track and trace system.

Counterfeit pharmaceuticals are one of the fastest growing categories of intellectual property crimes. Each time a phony drug enters the supply chain, dollars spent on R&D and marketing are lost for developer companies. Priced at what equates to a small fraction of a penny each, cost-effective TruTags can secure the chain from manufacturer to patient by making the widespread tracking of individual items feasible. CBI is able to fill an unmet need with TruTags, offering manufacturers an additional tool to add to their arsenal in the fight against drug counterfeiting. Therefore, due to the company's efforts in developing security solutions for maintaining the integrity of drug supplies, Frost & Sullivan is pleased to present Cellular Bioengineering, Inc. with the 2010 Technology Innovation of the Year Award in Pharmaceuticals & Biotechnology.

About Cellular Bioengineering, Inc.

Cellular Bioengineering Inc. (CBI) is a Hawaii based accelerator of disruptive technologies with biomedical and biodefense applications. CBI searches for innovative and ingenious ideas which it can nurture and grow into mature products that will change the way the world operates. It has brought forward suites of technology at varying stages of development which have favorably impacted health care and homeland security in our country.

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