

Industry/University Center for Biosurfaces (IUCB)

SUNY Buffalo, Robert Baier, Director, 716.829.3560, baier@buffalo.edu

SUNY Buffalo, Anne Meyer, 716.829.3560, aemeyer@buffalo.edu

University of Memphis, M. Shah Jahan, 901.678.2620, mjahan@memphis.edu

Center website: <http://wings.buffalo.edu/iucb/>

Superior Relief From Dry Eye Problems

Many people suffer from “dry eye” problems, or a “gritty” sensation when blinking in a dusty environment. A significant improvement in the lubricity of in-the-eye comfort formulations has been achieved with the introduction of a borate-buffered solution of HP Guar containing active demulcents polyethylene glycol and propylene glycol. Researchers at the Industry/University Center for Biosurfaces (IUCB) developed a new tissue-on-tissue testing protocol that demonstrated the superior reduction of “blinking” friction associated with addition of this novel solution compared to the normal saline-



wetted tissue surfaces. Previously available test methods did not reveal the clinically relevant superior lubricity for the borate-buffered HP Guar formulation. Synthetic materials articulated with preserved tissue surfaces did not exhibit the very low coefficients of friction actually obtainable in the tissue-on-tissue test system. The scientific lesson is that laboratory simulations of biological joints and of other situations where bioadhesion is important must adequately replicate the complex natural tissue surfaces involved. The new measurement technology provides information that correlates better with what really goes on in the eye, and fosters the development of products that reach to the public's benefit more quickly than possible with earlier techniques.

Economic Impact: Alcon Laboratories of Fort Worth, Texas has brought this and a new formulation to market, under the trade names SYSTANE and SYSTANE ULTRA. Annual commercial sales of the SYSTANE “artificial tears” solutions now exceed \$100,000,000. As a result of this and other prominent successes of Fort Worth, TX-based Alcon Laboratories' new product introductions, Novartis Corporation has acquired Alcon and merged it with their CIBA Vision Division, Duluth,

Industry/University Center for Biosurfaces (IUCB)

GA, continuing now in a joint partnership to develop superior contact lens lubricating solutions employing IUCB test methods.

For more information, contact Robert Baier, 716.829.3560, baier@buffalo.edu.

Allergy Friendly Room Program

Until recently, there have been only specific individual products available to improve air quality in indoor environments. Pure Solutions LLC has developed a patented process that has been tested at the University at Buffalo's Industry/University Center for Biosurfaces (IUCB). It received the 2008 Innovator Award for the best innovation in the hospitality industry by Cornell University's Institute for Hospitality Entrepreneurship. The process provides pre-packaged allergy friendly rooms to the hospitality market, as well as commercial and resi-



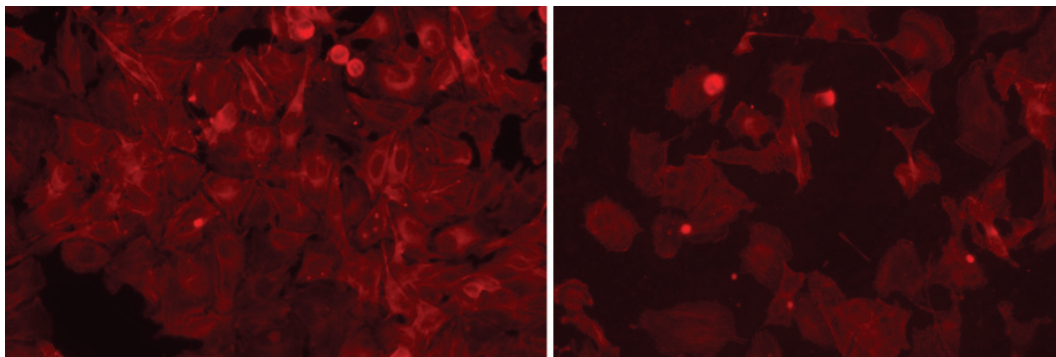
dential markets. Pure Solution's allergy friendly rooms process offers multiple interventions to substantially improve an indoor environment and has added a quarterly maintenance program that will continue the hygienic conditions over a 24-month period. The process substantially reduces particles, bacteria, mold spores and fungi in indoor environments. An added benefit is energy savings of 25% or more through the cleaning and sanitization of heating and cooling coils in an air-handling unit. The company has developed a worldwide licensing program and has partnered with companies in the U.S., Canada, Dutch Caribbean, Barbados, United Arab Emirates, Singapore, Scandinavia, Malaysia and China to provide its allergy friendly room technology to markets around the world. The Hyatt national hotel chain agreed to convert 2,800 rooms over the next year. The contract, valued at over \$10.0 million, had initial work started in July 2010, and will generate substantial royalty fees for the Company. Extensions of the process are in development for the environmental control of large conference rooms where participant comfort and attention can be maximized.

Economic Impact: This work is resulting in substantial new business opportunities. A sampling includes: PURE is in final negotiations with the owner of 153 Five Star hotels in India, for an initial trial conversion of 76 rooms at a price of \$240K and a net profit of \$150K; its licensee in Taiwan has been successful in having "PURE Allergy Friendly Rooms" become a brand standard for the Starwood Luxury Hotels. The Grand Hyatt San Francisco has successfully tested a smoking room conversion program on a 40/60 revenue share program with a US Master Licensee.

For more information, contact Robert Baier, 716.829.3560, baier@buffalo.edu.

Inadvertent Implants? Visualizing Lung Cell pH

Inhaled particles and pollution can stress lungs, causing asthma and other diseases. Indigestible fibers, too long to be engulfed, cause lung disease. Most difficult to remove are long, thin asbestos-like fibers. Researchers at the Industry/University Center for Biosurfaces (IUCB) have shown how the body protects itself against safe insulation glass fibers, and how to select formulations for new, safe building materials. A surprise has been the discovery of a new use for the insulation fibers, as scaffolds for regenerating body tissues. "Chemistry in action" is recorded and displayed using laser photonics combined with confocal microscopy to take "visual slices" through living cells. Living cells take in a dye that gives off fluorescent rays of two different colors, red for acid production and blue for alkalinity. Lung cells digest away respirable fiberglass by an acid attack that shortens them, and an engulfment into the cells that allows them to be digested and carried away before disease processes can be triggered.



These microscope views show that how one treats the surface of glass can control the degree of spreading and adhesion of living cells. The cells shown here are expected to make saliva to give comfort to "dry mouth" sufferers, from dissolving-glass implants replacing failed natural glands.

In addition to discovering how the lung safely handles certain new forms of industrial fiberglass particles, this research demonstrated that some inhaled nanoparticles become agglomerated and then processed by the lung tissue in the same way as larger pollutant particles. The result? A recent National Technology Program decision that certain inhalable glass wool fibers are reasonably anticipated to be a human carcinogen replaced the earlier decision (7th Annual report in 1994) that all respirable glass wool is reasonably anticipated to be a human carcinogen. This change was made because not all glass wool or man-made fibers were found to be carcinogenic. This breakthrough allows some fiber compositions to be removed from the list; the distinction between those left on and those removed is based on their biopersistence.

Economic Impact: This advance is a scientific triumph of collaboration by those who have worked in industry, academe and government. Removing some fibers from the list of carcinogens has resulted in substantial economic benefit to industry and consumers. IUCB is now exploring the use some of the newly produced rock wool glass products as scaffolds for "tissue engineering" (see photo).

For more information, contact Robert Baier, 716.829.3560, baier@buffalo.edu.

