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CMU SMARTZONE COMPANY'S BREAKTHROUGH PROCESS MAKES PRECISE DENDRIMERS AVAILABLE AT LOW COST

MOUNT PLEASANT – Precise dendrimer nanostructures are available at low cost for commercial applications because of a breakthrough by a company at Central Michigan University.

Priostar™ dendrimers, created by Dendritic NanoTechnologies Inc. at CMU's Center for Applied Research and Technology, may be used as nanoscale building blocks in the medical, food and agriculture, energy, electronics, environmental and industrial safety, personal, household, chemical, and manufacturing markets.

Dendrimers are sphere-shaped nanostructures that can be precisely engineered to carry molecules — either encapsulated in the interior or attached to the surface. The size and shape of a dendrimer is determined by shells, called generations, which are grown around the core structure. The reactivity of the dendrimer is determined by its surface chemical functionality together with size and shape. Until dendrimers reach a certain generation, other functions cannot be added to them.

Priostar™ dendrimers radically change the economics of nanotechnology and have broad commercial applications. They share and improve the physical properties of the original PAMAM dendrimers that were invented about 25 years ago by DNT president and chief technology officer Donald Tomalia while he was at The Dow Chemical Co.

To create a PAMAM Generation 3 dendrimer, it took eight steps and one month of processing time. Priostar™ Generation 3 dendrimers can be created in three steps and a few days.

"Our new dendrimer process vastly reduces the amount of labor and reagents normally required by our PAMAM process," said Tomalia. "An exciting new feature of the Priostar™ family of dendrimers is the ability to add extenders or functionality to the interior of the dendrimer to customize interior spaces and reactivity."

The Priostar™ dendrimers may be engineered in more than 50,000 variations of size, composition, surface function and interior nanocontainer space, said DNT CEO Robert Berry.

"Our new Priostar™ dendrimers place DNT in the enviable position of controlling a dominant nanoscale platform with many applications in multiple billion-dollar markets," said Berry. "This new technology will establish a price point for an essential technology."

DNT is located in one of Michigan's premier SmartZones for technology development at CMU.

On May 17, CMU broke ground for a new wet lab facility to house the research activities of companies such as DNT, with laboratory facilities currently in CMU's Dow Science Complex, and MultiGEN Diagnostic Inc., which specializes in developing new DNA-based technologies used for detection and diagnosis of microbes and biological threats. MultiGEN is currently housed in CMU's Health Professions Building.

Research that can change the world is just what a university needs, said CMU President Michael Rao.

"We're all amazed at the great opportunities to advance life through dendrimers," said Rao. "The laboratory that will be built on this site has the power to change CMU, Mount Pleasant, mid-Michigan and even the state. It will provide research opportunities for faculty and students, be a critical faculty recruitment tool, and make a significant impact on economic development."

Nanotechnology growth is expected to increase exponentially across manufactured goods in the next 10 years. In 2005 $13 billion worth of products will incorporate emerging nanotechnology, less than 1 percent of the global manufacturing output. That figure is expected to reach $2.6 trillion and 15 percent of manufacturing output in 2014.

Nature magazine recently named Mount Pleasant one of the country's major "biotech hotspots."

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