Miniature synchrotron produces first light

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In 2004 Lyncean Technologies announced the construction of the Compact Light Source (CLS), a miniature synchrotron to produce high-intensity, tunable, near-monochromatic X-ray beams. The Compact Light Source was specifically designed to bring state-of-the-art protein structure determination to the university or industrial laboratory--but it has also promised a broad impact across the spectrum of x-ray science.

Today, Ronald Ruth, Ph.D., president of Lyncean Technologies, announced that the CLS prototype is up and running and has just produced its first X-ray beams.

It is, perhaps, old news that synchrotron light has revolutionized x-ray research across the physical and biological sciences. Perhaps the most striking examples of its impact come from the three-dimensional studies of protein structure. But synchrotron x-ray beams are now the mainstay of research extending from material science to structural biology to diagnostic imaging.

It is, definitely, new news that these high-quality, tunable x-ray beams are now available for the university, industrial or clinical laboratory. Unlike the stadium-sized synchrotron light sources, the Compact Light Source will fit into a typical university x-ray lab. The reduction in scale and cost is a factor of 200--made possible by using a laser beam instead of the "undulator" magnets of the large synchrotrons.

The Compact Light Source prototype effort was one of the advanced technology projects funded by the first phase of the NIGMS Protein

Structure Initiative (PSI). Its rapid development was enabled by a blend of commercial technology and the creative inventions of the world-class Lyncean team. "We have an outstanding staff with decades of experience; the CLS electron storage ring was turned on last June and has been operating since then." Ruth said. "Our laser system was tested in parallel and then installed in late January, 2006. We installed our x-ray window on February 21, tuned up the next day and saw our first x-ray beam on February 23, 2006."

"With the production of its first X-ray beam, the CLS has now demonstrated its feasibility," said Jeremy M. Berg, Ph.D., director of NIGMS. "The option for having such intense, tunable X-ray sources on site at many institutions has the potential to transform numerous fields of biomedical research."

This transformation is already beginning: the first Beta CLS is already under production and will be installed at The Scripps Research Institute as part of a new PSI-II center, the Accelerated Technology Center for Gene to 3D Structure (ATCG3D). ATCG3D scientists will not have to wait for their CLS; they will be able to collect data with the CLS prototype after Lyncean scientists finish their final tune up.

Describing the business prospects, Ruth commented, "Our biggest surprise at Lyncean has not been technical; it has been the international demand for the CLS. There has been a flood of interest, and several institutes world wide are already planning to purchase a Compact Light Source."

There has been an enormous gulf between the x-ray beams produced at the large synchrotrons and those in the typical home lab. Scientists have adapted their traditional experimental techniques, honed at their own laboratories, to fit into the internationally-shared synchrotrons to take advantage of their brightness and tunability. The Compact Light Source

now offers the opportunity for the techniques and technologies developed at the large light sources to migrate back to the researcher's home lab.

Prof. Ruth concluded, "We believe that the Compact Light Source will completely transform the practice of protein crystallography and significantly broaden the reach of state-of-the-art x-ray science across the board."

Source: Lyncean Technologies, Inc.