# GEORGIA TECH RESEARCH

**News Release**
Research Communications Office
Georgia Institute of Technology
Atlanta, Georgia 30332
(404) 894-3444

CONTACT: John Toon/Ginger Pinholster
(404) 894-3444

**SCIENTISTS UNVEIL LASER INSTRUMENT DESIGNED FOR EARLY DETECTION OF CATARACTS**

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B/W & Color Available

Scientists from Georgia Tech and the Joslin Diabetes Center have developed a laser eye-examination instrument that they believe can identify cataracts in the first stages of formation.

Once perfected, the device could alert ophthalmologists to the advance warning symptoms of cataracts, according to Georgia Tech Chemistry Professor Nai-Teng Yu, director of the team that developed the laser instrument.

Early detection of cataracts may help increase the rate of success for preventive measures, he said.

Yu has published his findings in scientific journals such as Investigative Ophthalmology & Visual Science and Proceedings of the National Academy of Sciences.

In collaboration with Biophysicist Sven Bursell of the Joslin Center, the clinical instrument was developed and based on a conventional slit lamp, which is used routinely for eye examinations in ophthalmologists' offices. While traditional slit lamps rely on filament light for illumination, the device developed at Tech will use a low-intensity laser beam to probe the lenses of human patients.

Bursell said the laser beam is no more powerful than the light used at supermarket checkout counters. The instrument's helium-cadmium laser generates a coherent signal that is two orders of magnitude less powerful than the maximum permissable exposure for the safe use of lasers, as required by the American National Standards Institute.

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Still, Yu said, the instrument is highly sensitive. According to Yu, the Georgia Tech device is the first diagnostic tool capable of detecting three important types of signals generated when laser light is focused on the lens of the eye: Raman scattering signals, fluorescent emissions and Rayleigh scattering signals. Bursell said the new device will complement instrumentation currently used to detect quasi-elastic light scattering signals at the Joslin Center.

With this pool of information, Yu said, the instrument can simultaneously measure the concentrations of cataract-susceptible proteins in the lens, as well as the chemical nature of some existing protein-forming bonds, the metabolic rates associated with protein growth, and the rates of change in protein particle sizes.

Yu and Bursell will continue working together when a two-year clinical trial begins this summer at the Joslin Center. By studying human subjects, the researchers will attempt to define the parameters in the instrumentation's data output that will give physicians early warning of possible cataracts. Establishing standards that are applicable to the general population will be difficult, since the incidence and manifestation of various cataracts, may vary according to an individual's age, culture and physical environment.

The Tech-Joslin Center research group will need experimental patients who are particularly likely to have early symptoms of cataracts. Patients at the Joslin Center will participate in the trials because diabetics exhibit an increased risk for cataract formation. Non-diabetic spouses of these patients will help form the control population, since they share the same general physical environment as those at greatest risk of developing cataracts.

Yu, who has studied cataract formation and diagnostic techniques for the last 10 years, believes parameters for early detection can be defined.

Established two years ago, the instrumentation development program is sponsored by the National Eye Institute, a division of the National Institutes of Health. The NIH Visual Science Study Section rated this program second among 49 projects approved in 1986.

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