

Evaluating Multiple Biomarkers With Quantum Dots

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Quantum dots linked to biological molecules, such as antibodies, have shown promise as a new tool for detecting and quantifying a wide variety of cancer-associated molecules. Now, thanks to detailed studies of how to make these labeled quantum dots and use them to detect disease markers, so-called bioconjugated quantum dots may finally be ready for widespread use in the clinic.

Reporting its work in the journal *Nature Protocols*, a team of investigators at the Emory-Georgia Tech Nanotechnology Center for Personalized and Predictive Oncology provide detailed protocols for linking biomolecules to quantum dots and then using these constructs to detect multiple biomarkers simultaneously.

The team, led by Shuming Nie, Ph.D., co-principal investigator at the Emory-Georgia Tech Center, and May Wang, Ph.D., director of biocomputing and bioinformatics at this Center for Cancer Nanotechnology Excellence, also describes the exact methods used to prepare tissue samples to obtain optimal results using the bioconjugated quantum dots.

In general, note the researchers, quantum dot preparation takes approximately one day. Clinical assays take an addition one to three days, depending on the number of biomarkers being assessed simultaneously. Because quantum dots come in a variety of colors, it is possible to use a uniquely colored quantum dot for each biomarker being assayed. Multiplexed imaging and computer-aided analysis of the

resulting fluorescence emitted by the quantum dots then provides quantitative results for each biomarker.

This work, which was supported by the National Cancer Institute's Alliance for Nanotechnology in Cancer, is detailed in a paper titled, "Bioconjugated quantum dots for multiplex and quantitative immunohistochemistry." Investigators from the Veteran Affairs Medical Center in Atlanta also participated in this study. This paper was published online. An abstract of this paper is available at the online [journal's website](#).

Source: National Cancer Institute

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