
**Nanocrystal-based electrochemical biosensors of
glycan-lectin interactions suitable for
point-of-care use**

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Glycosylation is a prevalent post-translational modification on most cell-surface bound and soluble proteins and lipids. The alteration in glycosignatures associated with malignant transformation, tumor progression, and metastasis is very well documented. Existing methods for probing lectin-carbohydrate interactions are tedious, requiring extensive instrumental setup and technical expertise. Accordingly, there are critical needs for developing effective new glycotecnologies and biosensors that are sensitive, rapid, simple, reliable, and cost-effective. Here we present the first report on a novel nanoparticle-based bioassay based on glycan interaction with surface-immobilized lectins. The lectin acts as the glycans recognition element for the competition between a nanocrystal-labeled glycans and the target glycans for the carbohydrate binding sites on lectin. The extent of competition is monitored by highly sensitive electrochemical stripping voltammetry of the captured nanocrystals. Electrochemical readout offers attractive advantages of miniaturization and low-cost (for meeting the demands of point-of-care diagnostics) and elegant ways for interfacing biorecognition events and signal transduction.

doi:10.1016/j.nano.2006.10.140