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Selective glucose detection by various nanoparticle species NICHOLAS PARENTI, BRIAN YUST, Jefferson University, NANOPARTICLE SQUAD TEAM — With the rise of nanotechnology, applications of unique properties of nanoparticles (NPs) have been growing. These properties are a result of the size and shape of the NPs, where surface effects dominate bulk effects due to the high surface area to volume ratio. A NP-based sensing platform was designed for detecting glucose in the presence of sucralose. Current dyes used for the detection of glucose are not capable of differentiating the presence of glucose from that of the common sugar substitute sucralose, leading to false-positive results in metabolic studies. Gold, silver, and cerium NPs were synthesized to detect hydrogen peroxide concentrations in solution to indirectly detect glucose reacted with glucose oxidase. Absorbance spectroscopy was used to monitor the surface chemistry of the NPs with peaks at 260nm for Ag, 530nm for Au, and 310nm for Ce NPs. In Au and Ag NPs, the interaction etches the structure and changes their shape, resulting in a drop in the absorbance peak. In cerium NPs, oxygen vacancies on the surface of the NPs are filled and there is an associated charge shift from Ce+ 4 to Ce+ 3 with a drop in absorbance. Each of these NP species were investigated to detect peroxide byproducts at concentrations of 5μM-70μM.

Nicholas Parenti
Jefferson University

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