Scanning electrochemical microscopy for detection of biosensor and biochip surfaces with immobilized pyrroloquinoline quinone (PQQ)-dependent glucose dehydrogenase as enzyme label

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Abstract: Scanning electrochemical microscopy (SECM) was applied to study quinoprotein-based biosensor or biochip. A typical quinoprotein, pyrroloquinoline quinone (PQQ)-dependent glucose dehydrogenase (GDH), was taken as example. Feedback mode and generation collection (GC) mode in SECM have been explored in imaging the catalytic activity of GDH on microscopic magnetic bead domains. Biotinylated GDH was immobilized by using streptavidin-coated paramagnetic microbeads, which were deposited as microspot on a hydrophobic surface. Ferrocenemethanol and ferricyanide were used as electron mediators for feedback and GC detection, respectively. Enzymatic catalysis was further studied quantitatively using the theory developed for SECM.

Author Keywords: Biosensor; PQQ-dependent glucose dehydrogenase; Pyrroloquinoline quinone (PQQ); Quinoprotein; Scanning electrochemical microscopy

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