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# Fabrication of Novel Nanostructured $Pd^{2+}$ Doped $Tio_2$ Platform for Detection of Cholesterol

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With recent advances in nanotechnology, rapid progress has been made in biosensors based on nanomaterials, however there are still challenges to overcome with practical applicability of such systems. We describe nanomaterial-based biosensors with unique properties, provides a promising platform, which is simple, cost-effective, and requires no external modification to biomolecules. The unique catalytic, amperometric cholesterol biosensors have been developed based on the immobilization of cholesterol oxidase (ChOx) in the nonostructured films of sol–gel-derived Pd doped $TiO_2$. The presence of Pd in the sol–gel-derived $TiO_2$ onto ITO providing more surface energy as well more surface area which improves the sensitivity and long-term stability of the biosensor. Analytical performance of the cholesterol biosensor based on the Pd doped $TiO_2$ films is superior to that of the biosensor based on undoped $TiO_2$ films in terms of response time, sensitivity, and long-term stability. The Pd doped $TiO_2$ nanostructured platform offer the pathway for direct electron transfer between the electrode surface and the active redox centers of Cholesterol oxidase (ChOx) which enables the biosensor to operate at a low working potential and to avoid the influence of the $O_2$ presence on the amperometric current response. This work offers a unique platform for development of enzymatic electrochemical biosensors.