Screening and Analysis of Thyroid-Disrupting Chemicals Based on Selective Recognition for a Thyroxine-Binding Peptide

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Received: 1 June 2021 / Accepted: 27 July 2021 / Published: 10 September 2021

Thyroxine (TH) is an essential hormone for animal growth and development. Environmental exposure to thyroid-disrupting chemicals (TDCs) can alter the synthesis, secretion and transport of TH. In this study, a peptide with strong affinity for L-thyroxine (T4) was screened and synthesized, followed by attached to a gold electrode surface and then evaluated for its selective recognition ability for 36 chemicals with known activities towards TTR. The peptide-Au electrode could distinguish TCDs and thyroid-nondisrupting chemicals (non-TCDs) by impedance. The sensitivity, specificity and correct assignment of TDC action for these test compounds were 61.5, 73.9 and 69.4%, respectively. This method can therefore be used as a rapid, specific and cost effective way to identify TCDs.

Keywords: Thyroxine (TH); Thyroid-Disrupting Chemicals(TDCs); Peptide; Gold electrode; Impedance

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