Short Review

Probing of Protein Kinase Activity by Electrochemistry

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Protein kinase can catalyze the transfer of a phosphoryl group from adenosine triphosphate (ATP) to protein/peptide substrate at the serine, tyrosine or threonine residues. The phosphorylation can induce the surface charge change of substrate peptides-modified electrode; the reaction could be measured by the change of the electrochemical impedance or the tyrosine oxidation current. The phosphate groups can be selectively recognized by anti-phosphorylated peptide antibody and metal ions, metal complexes as well as metal nanoparticles through the coordination or electrostatic interaction, which facilitated the design of various electrochemical kinase biosensors. Furthermore, the γ -phosphate-modified ATP analogues (e.g. biotinylated, sulfated and ferrocene-labeled ATP) have been used as the co-substrates of phosphorylation to monitor protein kinase activity. All of these electrochemical strategies for kinase assays were summarized in the present work.

Keywords: kinase; phosphorylation; electrochemistry; adenosine triphosphate; self-assembled monolayers

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