Facile immunoassay for colorimetric detection of parathyroid hormone based on aggregation of gold nanoparticles

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Abstract: This work presents method development using gold nanoparticles for facile colorimetric detection of parathyroid hormone based on immunoassay. Gold nanoparticles were synthesized using Terkevich’s method by mixing of hot tetrachloroauric acid and trisodium citrate. The particles were conjugated with anti-parathyroid hormone antibody and incubated for 1 hour at 25 °C. Conjugated gold nanoparticles were applied to detection of parathyroid hormone by adding parathyroid hormone into the solution. Principle of detection is based on aggregation of gold nanoparticles by increasing of parathyroid hormone. Color of the solution was changed from red wine to purple and the surface plasmon peak characteristic was changed from 521 nm to 542 nm. Under optimized condition, the level of parathyroid hormone can be detected in the range of 10 – 1,000 pg mL\textsuperscript{-1} with good linearity ($r^2 = 0.9475$). This method was suitable and applicable for the parathyroid hormone determination. However, applications to blood samples are now under investigated.

Keywords: Parathyroid hormone, Gold nanoparticles, Immunoassay, Colorimetry