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## Non-stop chemiluminescent biosensor for early diagnosis of cancer

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Using guanine (G)-rich DNA aptamer-conjugated 6-FAM capable of rapidly capturing prostate specific antigen (PSA) in human serum, rapid and simple biosensor with guanine chemiluminescence detection was developed for early diagnosis of prostate cancer. Free G-rich DNA aptamer-conjugated 6-FAM emit bright light in guanine chemiluminescence reaction. However, G-rich DNA aptamer-conjugated 6-FAM bound with PSA cannot emit light because 6-FAM excited by guanine chemiluminescence reaction transfer energy to PSA based on the principle of chemiluminescent resonance energy transfer. Chemiluminescent biosensor using the different properties of G-rich DNA aptamer-conjugated 6-FAM in the absence and presence of PSA was able to quantify trace levels of PSA in human serum within 30 minutes without time-consuming and complicated procedures (e.g., multiple incubation and washing) required for conventional immunoassays operated with expensive and intractable antibodies. The limit of detection of chemiluminescent biosensor having a wide linear dynamic range (1.9-125 ng/ml) was 1.0 ng/ml. The excellent correlation ( $R=0.985$ ) between chemiluminescent biosensor and conventional enzyme immunoassay indicates that the accurate, precise, and rapid chemiluminescent biosensor can be applied as a new method for early diagnosis of cancer.

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