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# An electrochemiluminescence biosensor for detection of CdkN2A/p16 anti-oncogene based on functional electrospun nanofibers and core-shell luminescent composite nanoparticles

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**Abstract** An electrochemiluminescence (ECL) biosensor based on functional electrospun nanofibers for hybridization detection of specific CdkN2A/p16 anti-oncogene at trace level *via* binding luminescent composite nanoparticles for signal amplification has been developed. The carboxylated multiwalled carbon nanotubes (MWCNTs) doped polycaprolactam 6 (PA6) electrospun nanofibers (PA6-MWCNTs) was prepared *via* electrospinning, which served as the nanosized backbones for silica nanoparticles (SiO<sub>2</sub>) electrodeposition. The functional electrospun nanofibers (PA6-MWCNTs-SiO<sub>2</sub>) used as supporting scaffolds for single-stranded DNA1 (ssDNA1) immobilization can dramatically increase the amount of DNA attachment and the sensitivity of hybridization. The sandwich construction of ssDNA1-CdkN2A/p16 anti-oncogene-tri(2,2'-bipyridyl)ruthenium(II) (Ru(bpy)<sub>3</sub><sup>2+</sup>)/silver nanoparticles (AgNPs) doped gold (Au) core-shell luminescent composite nanoparticles (RuAg@AuNPs)-labeled ssDNA2 (RuAg@Au-ssDNA2) was fabricated through a hybridization reaction. It was observed that high amount of doped Ru(bpy)<sub>3</sub><sup>2+</sup> in RuAg@AuNPs successfully amplify the recognition signal by adding tripropylamine (TPrA). The change of ECL intensity was found to have a linear relationship in respect to the logarithm of the CdkN2A/p16 anti-oncogene concentrations in the wide range of 1.0×10<sup>-15</sup>~1.0×10<sup>-12</sup> M, with a detection limit of 0.5 fM (S/N=3) which is

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