Electronic Supplementary Material (ESI) for Analyst.

Upconverting nanoparticles clustering based rapid quantitative detection of tetrahydrocannabinol on lateral-flow immunoassay

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(Supporting information)

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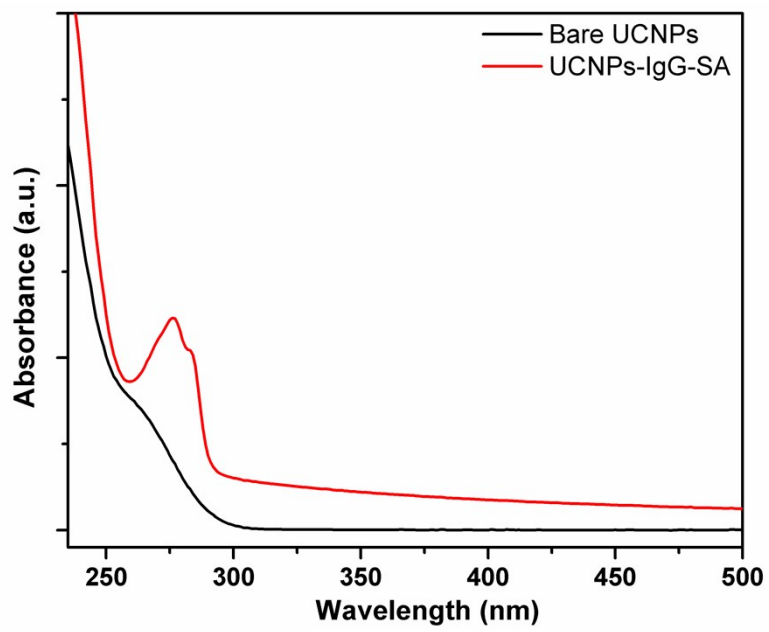

Figure S1: UV- Vis spectrogram of bare upconverting nanoparticles (UCNPs) and nano conjugates (UCNPs-IgG-SA).

Table S1: Comparison of nitrocellulose membrane for LFIA of THC.

NC membranes	Test zone intensity	Test zone
Millipore HF180	Weak signal	Incomplete circle
Whatman FF170HP	Normal signal	Complete circle
Whatman FF120HP Plus	Strong signal	Complete circle

Table S2: Optimization of UCNPs-IgG-SA dosage.

Volume (in μL)	Test zone intensity (THC 50 ng/mL)	Control zone intensity (THC 50 ng/mL)
4	No signal	Weak signal
6	No signal	Weak signal
8	Weak signal	Weak signal
10	Weak signal	Strong signal
15	Strong signal	Strong signal

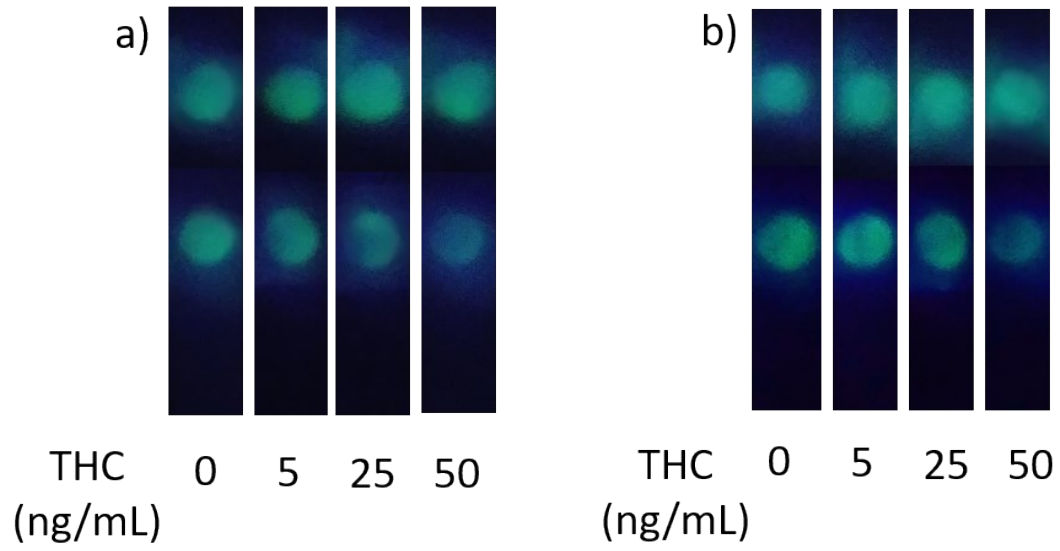

Figure S2: Corresponding optical images of THC assay with (a) standard LFIA and (b) secondary nano-conjugate (UCNPs-Biotin) mediated signal amplified LFIA of THC.

Table S3: Comparison of the developed THC LFA with previously reported works.

Sensor type	Platform	Technique	LOD	Linear range	Ref.
Quantitative	Multi Walled Carbon Nanotube modified electrode	Electrochemical	314.45 ng/mL	314.45 ng/mL – 1.884 μg/mL	1
Qualitative	Fluorescent tagged antibody	Lateral flow immunoassay	190 pg/fingerprint	N/A	2
Quantitative	THC–fluorescein conjugate	Fluorescent immunoassay	2 ng/mL (Diluted saliva)	2–50 ng/mL	3
Quantitative	Silver nanoparticle coated capillary	Surface enhanced Raman spectroscopy	314 pg/mL	78.5 pg/mL – 31.4 ng/mL	4
Quantitative	Upconverting nanoparticle – Ab conjugate	Lateral flow immunoassay	2 ng/mL	2 ng/mL – 15 ng/mL	This work

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