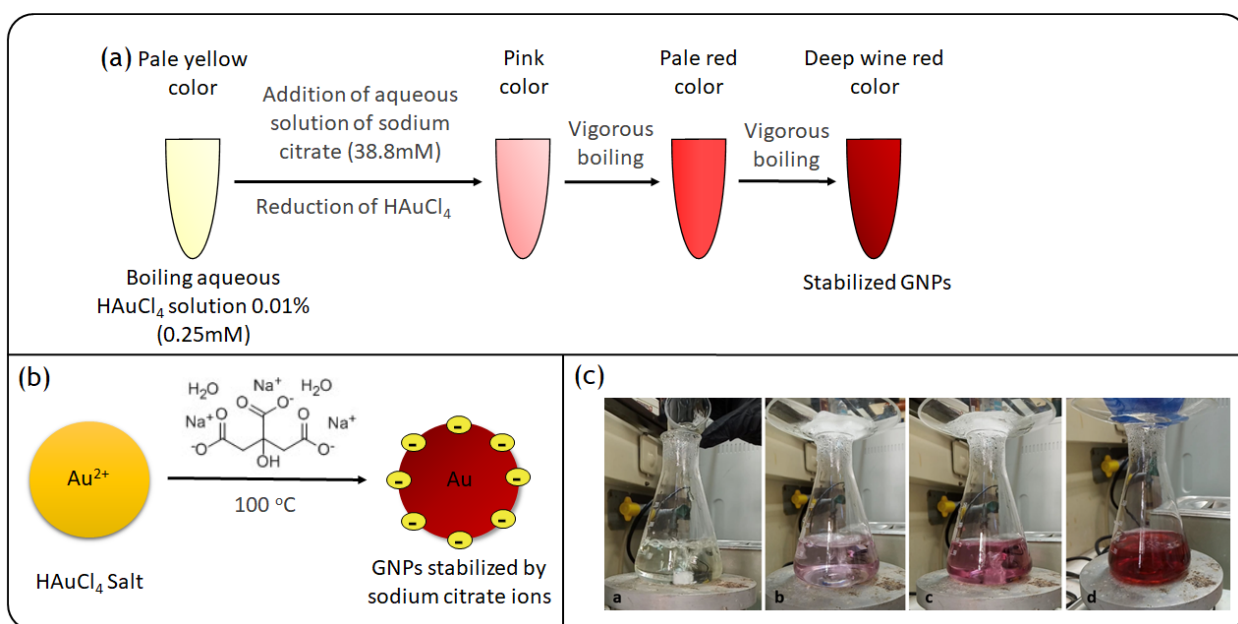


A simplified lateral flow immunosensor for the assay of carcinoembryonic antigen in low-resource settings

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Scheme S1. (a) Schematic of the Turkevich method for GNPs synthesis. (b) Reduction of chloroauric acid with sodium citrate. (c) Photos showing the solution's gradual color change.

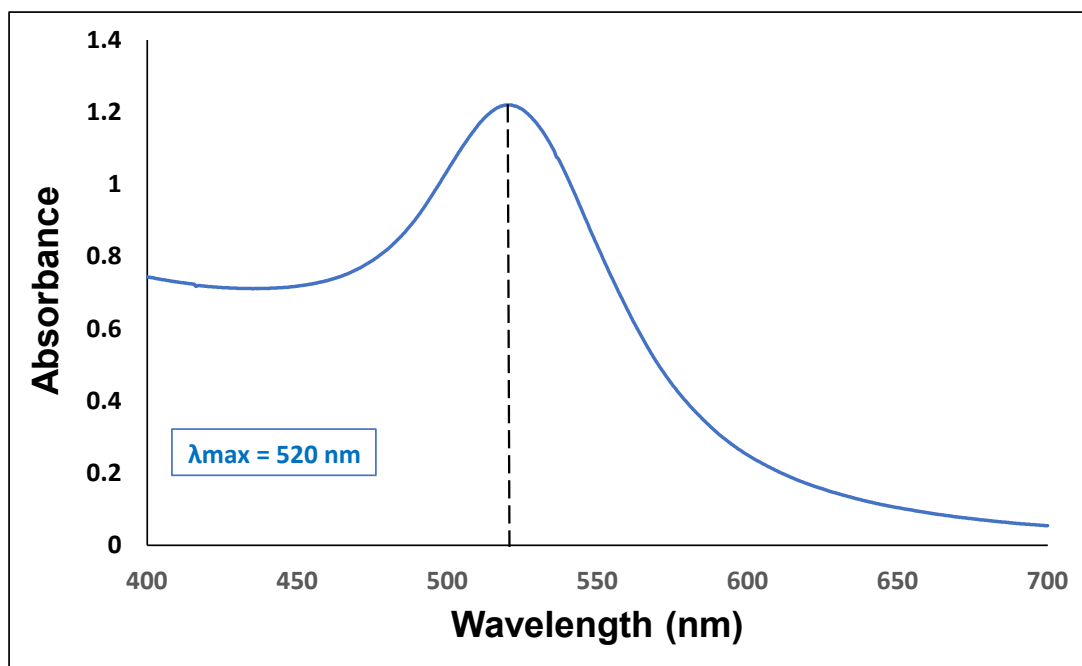
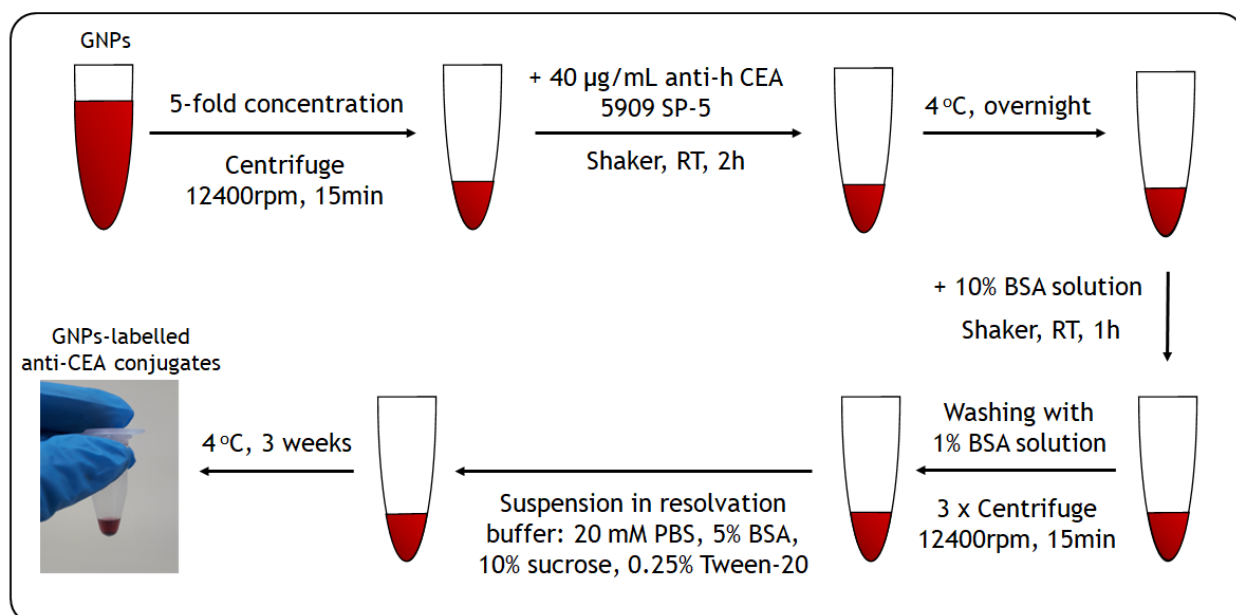


Figure S1. Absorption spectrum of GNPs using the modified Turkevich method.



Scheme S2. Schematic of the synthesis of GNPs- labelled anti-CEA conjugate probes.

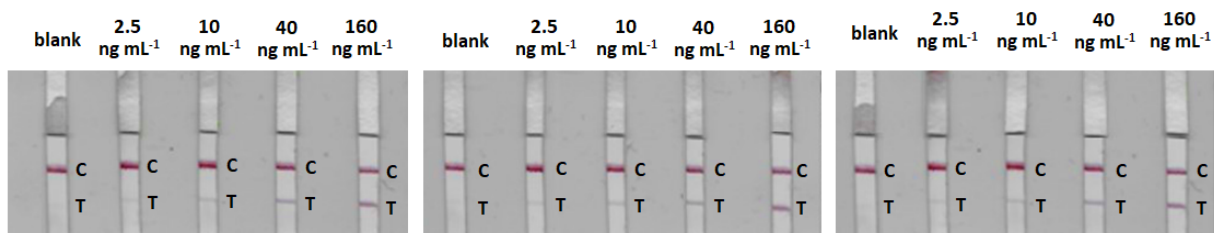


Figure S2. Images of strips for the triplicate assay of CEA in spiked serum diluted 1:1 with running buffer.

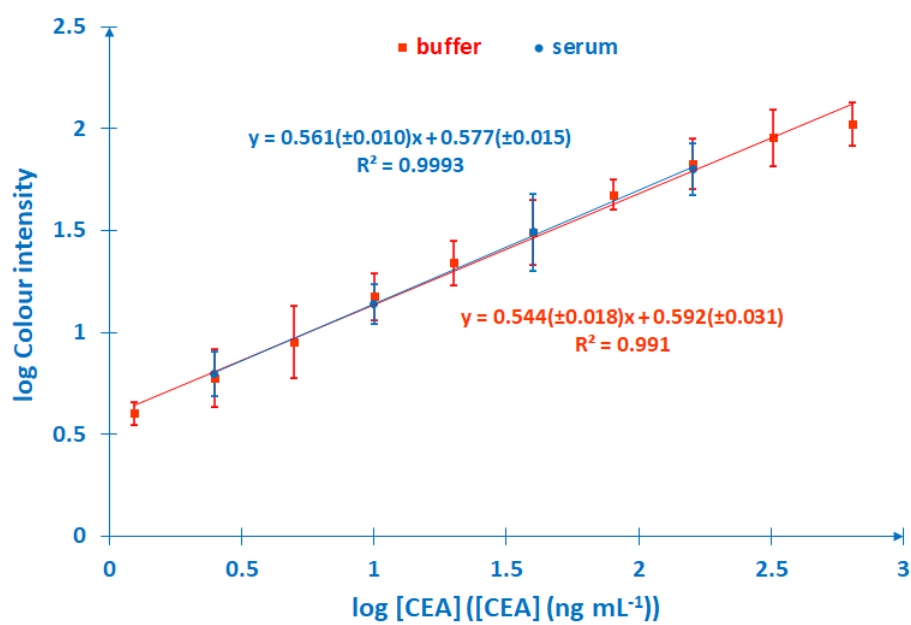


Figure S3. Comparison of calibration plots for CEA in running buffer and serum diluted 1:1 with running buffer.

Table S1. Comparison of the present lateral flow immunosensor with existing lateral flow immunosensors for CEA detection.

Detection method (reading device)	Probes	Ab at test line (μg)	Ab at control line (μg)	Linear range (ng mL^{-1})	Instrumental LOD (ng mL^{-1})	Visual LOD (ng mL^{-1})	Assay time (min)	Ref
Colorimetric (home-based reader)	polydopamine-modified GNPs	0.1	0 (PG used)	0.05-50	N.R.	0.05	15	37
Colorimetric (smartphone)	GNPs (enhanced by Au(III) hydroxylamine)	0.012	0 (PG used)	2-50	0.35	10	15	38
Colorimetric (commercial reader)	GNPs	0.24	N.R.	2-50	5	N.R.	10	39
Fluorescence (home-based reader)	QDs-QD nanobeads	0.6	0.3	1-50	0.0378	N.R.	15	40
Fluorescence (commercial reader)	QD-doped polystyrene particles	0.48	0.36	2.8-680	0.35	N.R.	15	41
Magnetic (commercial reader)	Magnetic nanobeads	0.6	0.3	1-100	0.045	0.5	30	42
Colorimetric (N.R.)	MNPs-ssDNA-MNPs	N.R.	N.R.	0.25-1000	0.25	0.25	15	43
Fluorescence (home-based reader)	QDs	N.R.	N.R.	1-100	0.049	N.R.	15	44
Fluorescence (home-based reader)	QDs	0.8	0.8	0.72-1000	0.72	N.R.	25	45
Fluorescence and colorimetric (commercial reader)	Fe_3O_4 nanospheres	N.R.	N.R.	0.28-10	0.01	N.R.	3	46
Colorimetric (commercial scanner)	GNPs	0.125	0.25	1.25-640	0.625		15	this study

GNPs, gold nanoparticles; N.R., not reported; QDs, quantum dots; MNPs, magnetic nanoparticles; ssDNA, single-stranded DNA

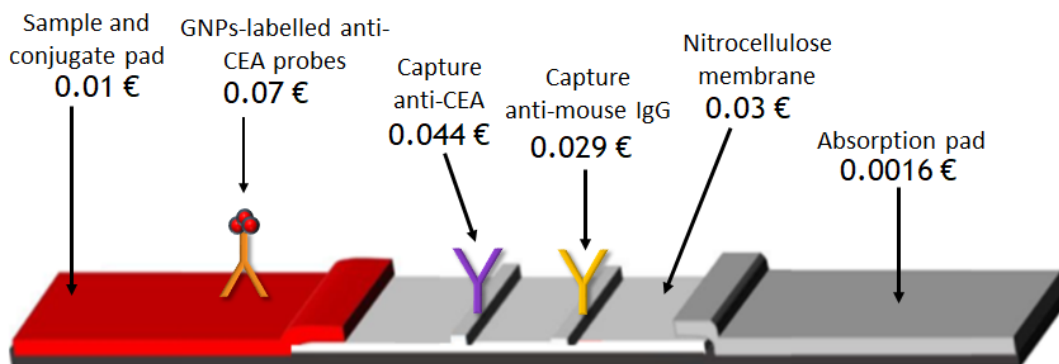


Figure S4. Cost analysis of the lateral flow strip in terms of materials.