Optimization of gold nanoparticle-based real-time colorimetric assay of dipeptidyl peptidase IV activity

ALDEWACHI, Hasan <http://orcid.org/0000-0003-2126-4366>, WOODROOFE, Nicola <http://orcid.org/0000-0002-8818-331X>, TUREGA, Simon <http://orcid.org/0000-0003-1044-5882> and GARDINER, Philip <http://orcid.org/0000-0002-2687-0106>

Published version

ALDEWACHI, Hasan, WOODROOFE, Nicola, TUREGA, Simon and GARDINER, Philip (2017). Optimization of gold nanoparticle-based real-time colorimetric assay of dipeptidyl peptidase IV activity. Talanta, 169, 13-19.

Copyright and re-use policy

Supporting Information

Gold nanoparticle-based real-time colorimetric assay of dipeptidyl peptidase IV activity

Hasan Saad Aldewachi[1,2] , NicolaWoodroofe[1] and Philip H E Gardiner[1]

1 Biomedical Research Centre, Sheffield Hallam University, City Campus, Sheffield, S1 1WB, UK.

2 Pharmacy College, Mosul University, Mosul, Iraq.

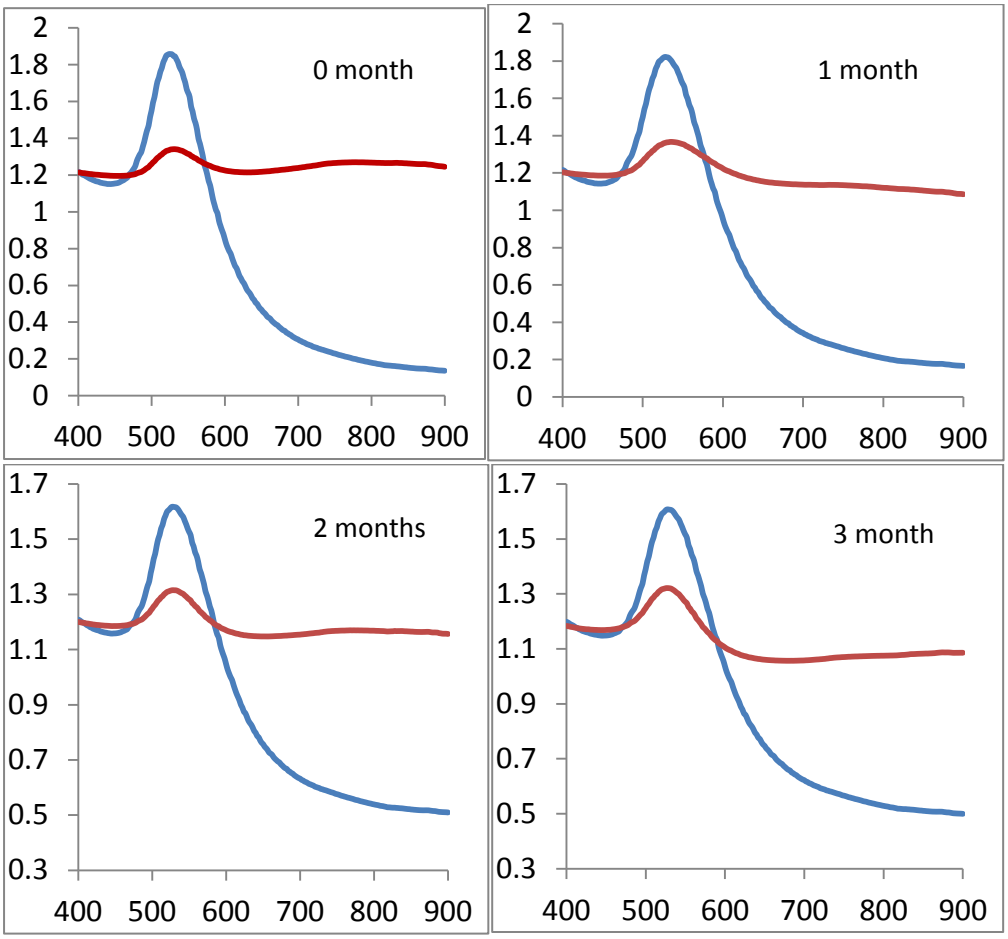
Fig. S1. The stability of the as-synthesized AuNP (UV-vis absorption spectra of the colorimetric assay toward 0 U/L DPP IV/CD 26 (blue curve) and 20 U/L DPP IV/CD 26 (red curve) after the Au NP was stored for 0 month,1 month, 2 months, 3 months, respectively). Error bar represents the standard deviation (n = 3).

Fig. S2 a) Plot of absorbance of GPDC-AuNPs at 642/522 nm versus reaction time at various enzymatic activities of DPP-IV/CD-26 (0, 2.5, 5, 7.5, 10, 12.5, 15, 20 and 25 U/L) for 60 minutes, Inset: Plot of absorbance of GPDC-AuNPs at 642/522 nm versus reaction time for the firsts 10 minutes. b) Hydrodynamic size of GPDC-AuNPs measured by DLS at different incubation time (measured at 1 minute intervals) with 20 U /L of DPP-IV enzyme.

Fig. S3 various enzymatic activities of DPP-IV/CD-26 (0, 2.5, 5, 7.5, 10, 12.5, 15, 20 and 25 U/L) with unmodified citrate capped gold nanoparticles.

Fig.S4 UV-vis absorption spectra of the colorimetric assay toward spiked DPP IV standards (5, 10, 15, 20 and 25 U/L DPP IV /CD26) using human serum samples, (b) calibration plots (between the red shift of the LSPR peak and DPP IV activity/CD26). Error bar represents the standard deviation (n = 3).

Fig. S1


0 month
1 month
2 months
3 month
400 500 600 700 800 900

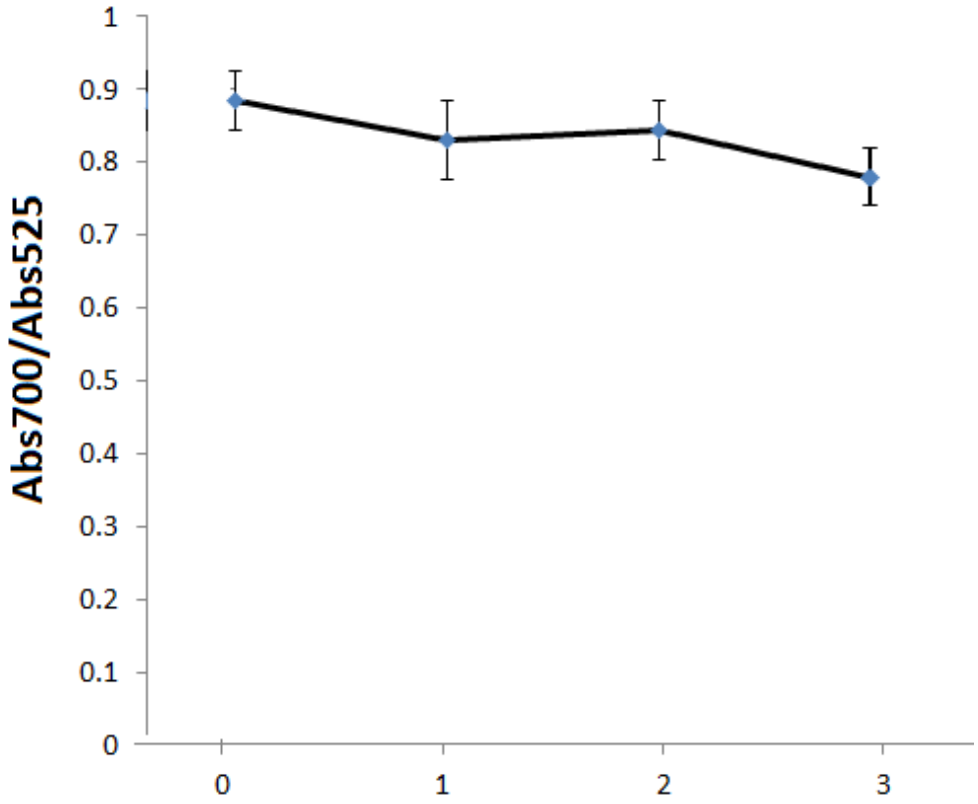
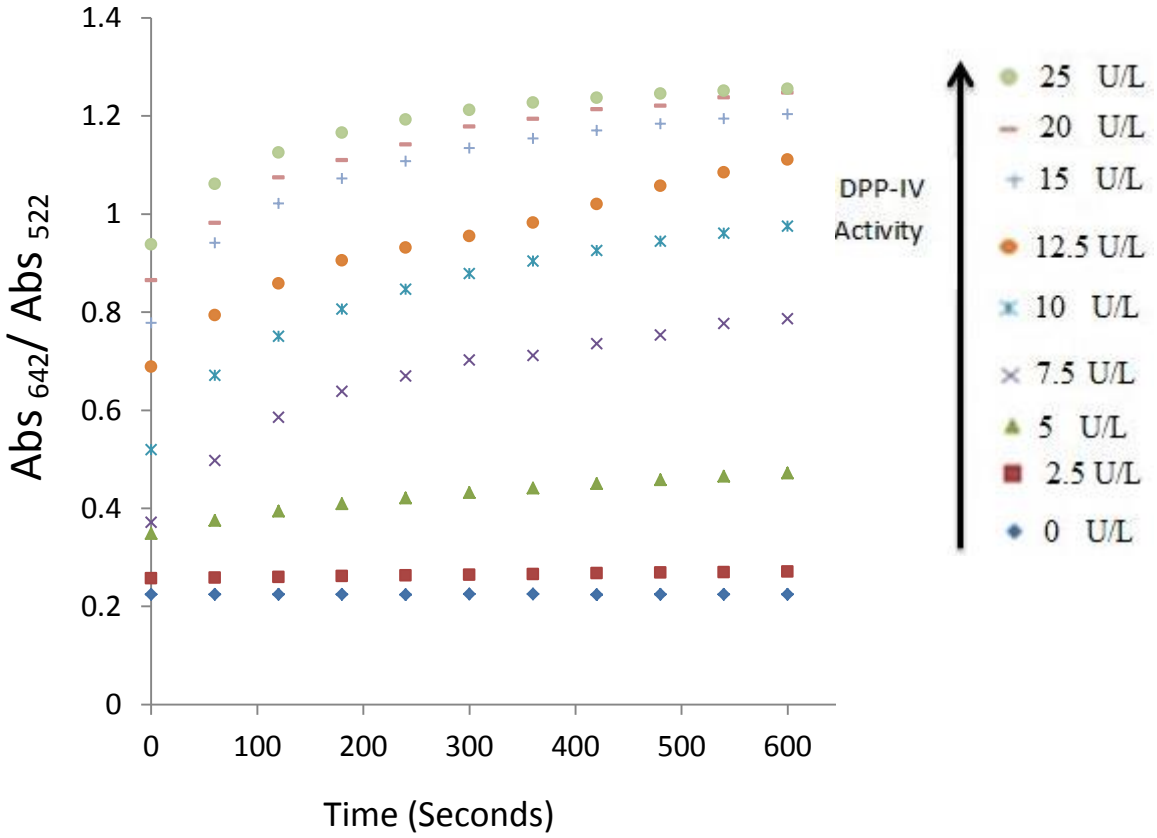
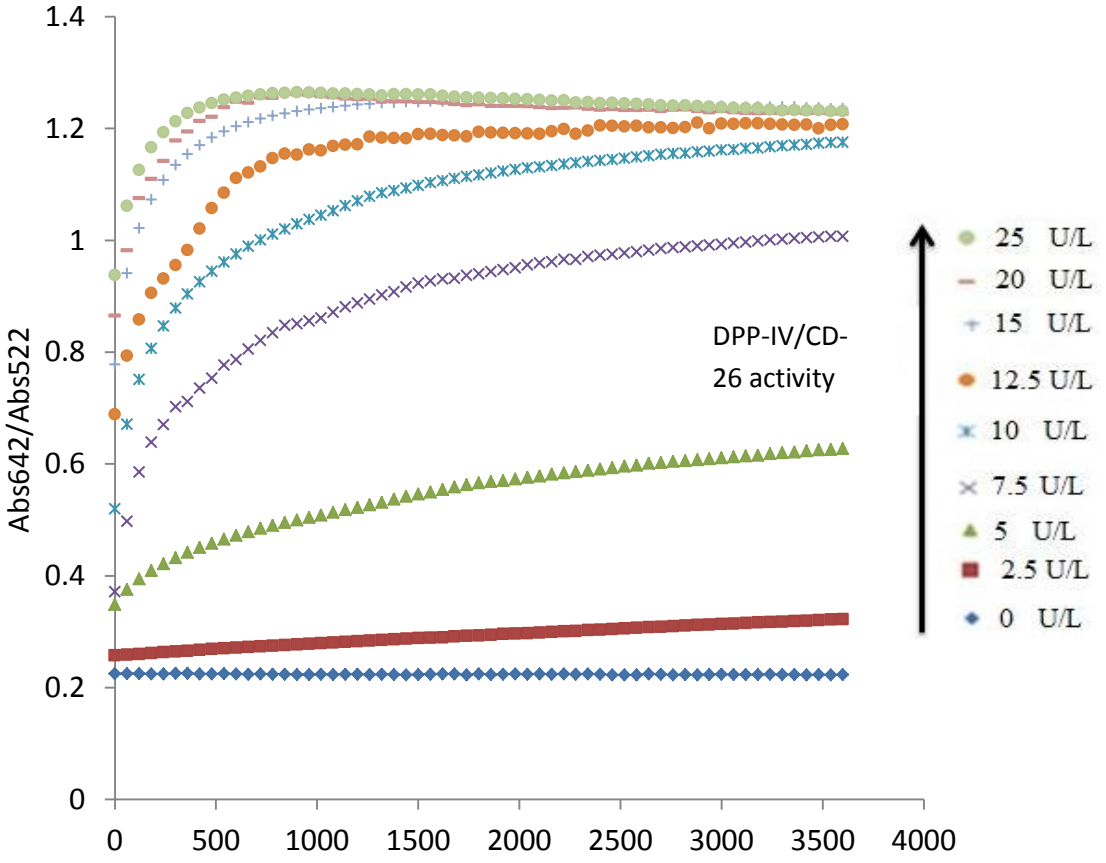

Abs700/Abs525
0 1 2 3

Fig.S2

a)


1.4
1.2
1
0.8
0.6
0.4
0.2
0
Abs 642/ Abs 522
0
100
200
300
400
500
600
Time (Seconds)
DPP-IV Activity
25 U/L
20 U/L
15 U/L
12.5 U/L
10 U/L
7.5 U/L
5 U/L
2.5 U/L
0 U/L


1.4
1.2
1
0.8
0.6
0.4
0.2
0
Abs642/Abs522
0
500
1000
1500
2000
2500
3000
3500
4000
Time (Seconds)
DPP-IV/CD-26 activity
25 U/L
20 U/L
15 U/L
12.5 U/L
10 U/L
7.5 U/L
5 U/L
2.5 U/L
0 U/L

b)

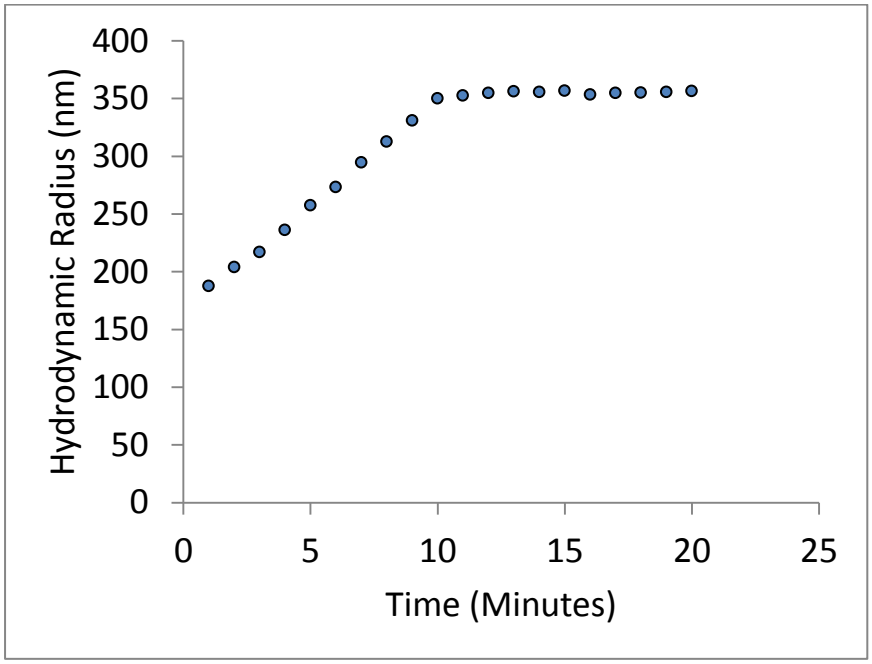

400
350
300
250
200
150
100
50
0
Hydrodynamic Radius (nm)
0
5
10
15
20
25
Time (Minutes)

Fig.S3

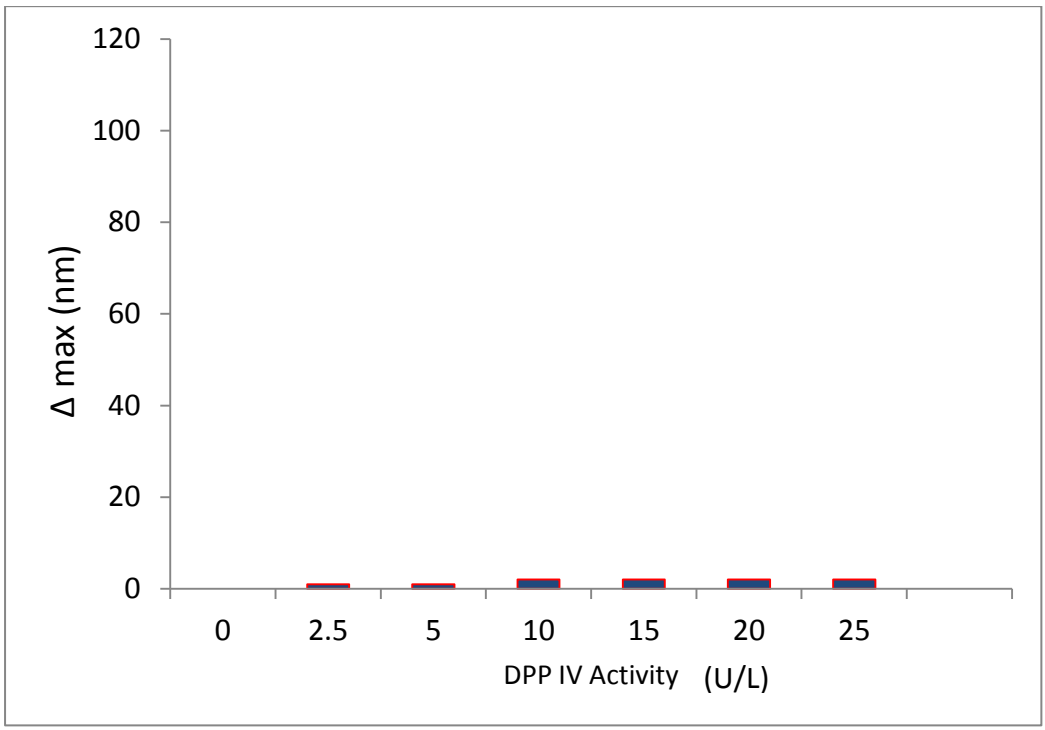
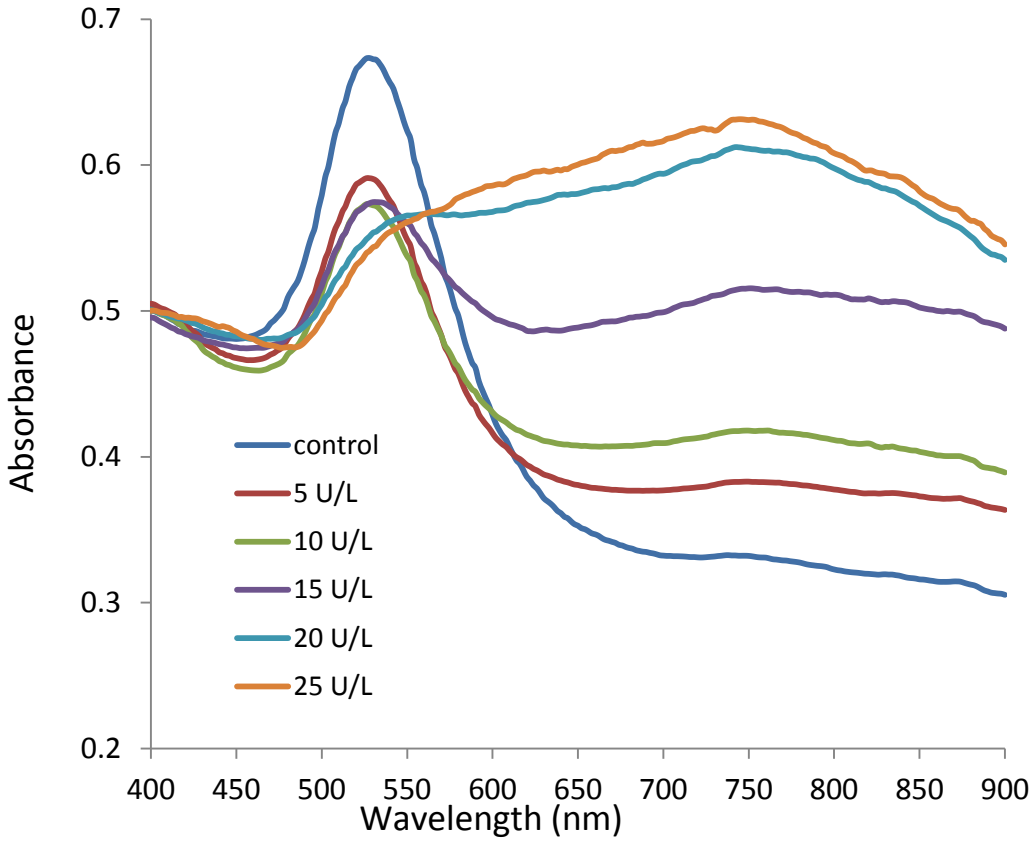

120
100
80
60
40
20
0
Δ max (nm)
0
2.5
5
10
15
20
25
DPP IV Activity (U/L)

Fig. S4


0.7
0.6
0.5
0.4
0.3
0.2
Absorbance
control
5 U/L
10 U/L
15 U/L
20 U/L
25 U/L
400
450
500
550
600
650
700
750
800
850
900
Wavelength (nm)