SUPPLEMENTARY INFORMATION

Hyaluronan degrading silica nanoparticles for skin cancer therapy

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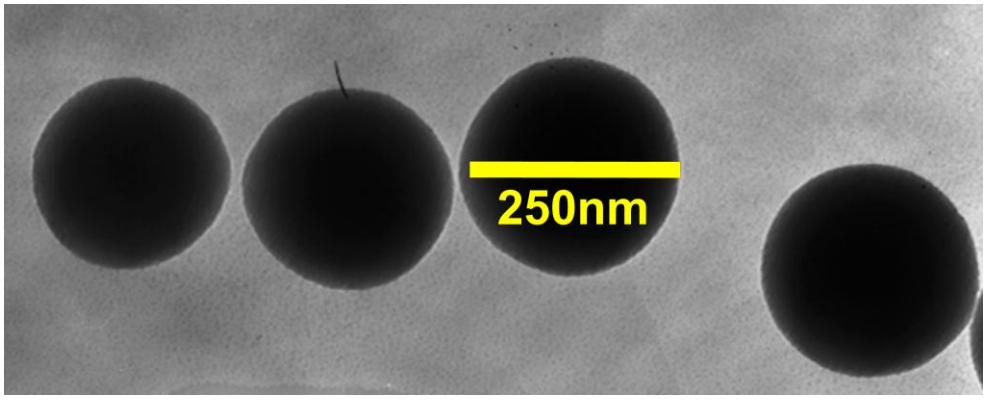
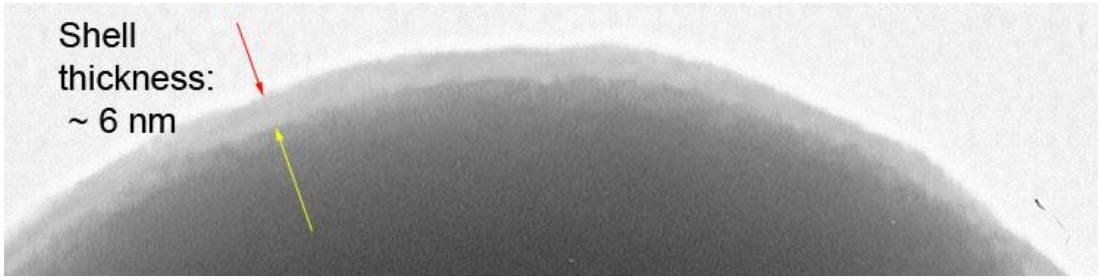
SECTION 1 - TEM OF CORE-SHELL PARTICLES

SiNp



S1. TEM image of SiNP

SiNp/PAH/Hyal

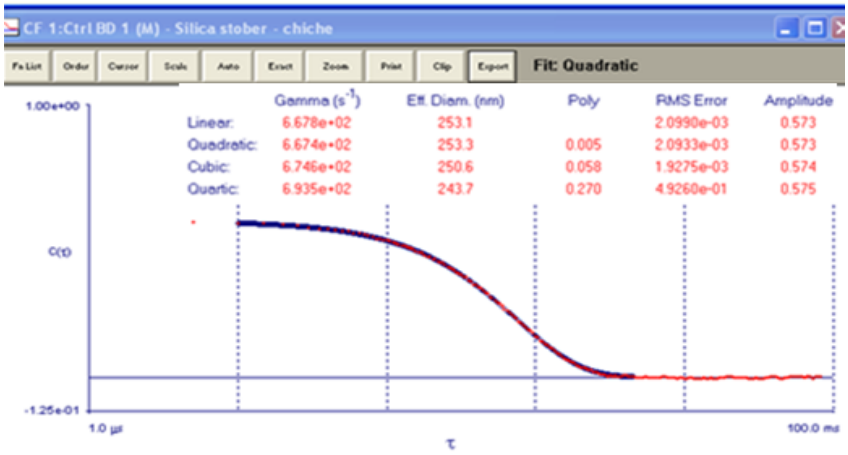


S2. TEM image of SiNp/PAH/HYAL.

SECTION 2 - DLS OF CORE-SHELL NANOPARTICLES

SiNP

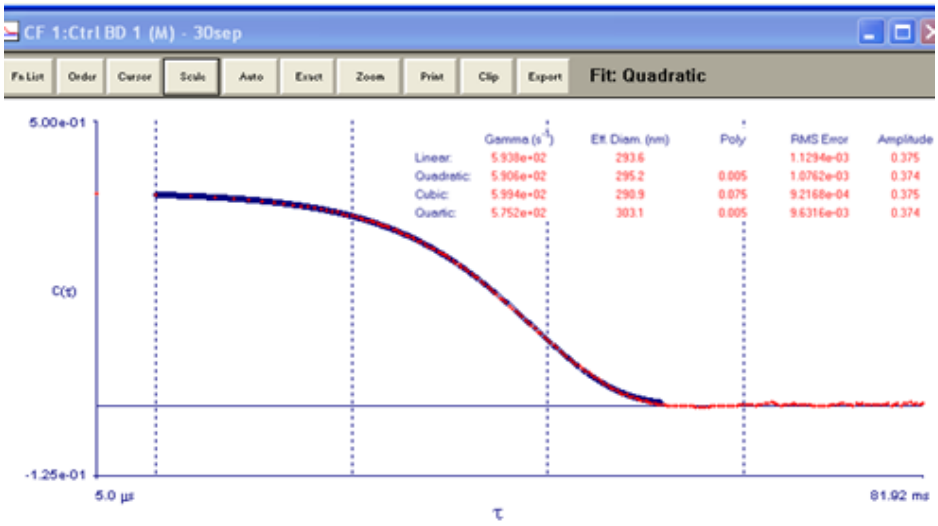
STOPPED		A CR (avg.):	43.8 kcps
Run:	12	M. Base:	5.4546e+05
First Delay:	5.0 µsec	C. Base:	5.4516e+05
Last Delay:	81.92 msec	Base diff:	0.056%
Elapsed Time:	00:01:00	Eff Dia:	253.3 nm
Angle:	90.0	Poly:	0.005
Temp:	24.8 deg C (GTE)		



S3. DLS results for SiNP.

SiNp/PAH

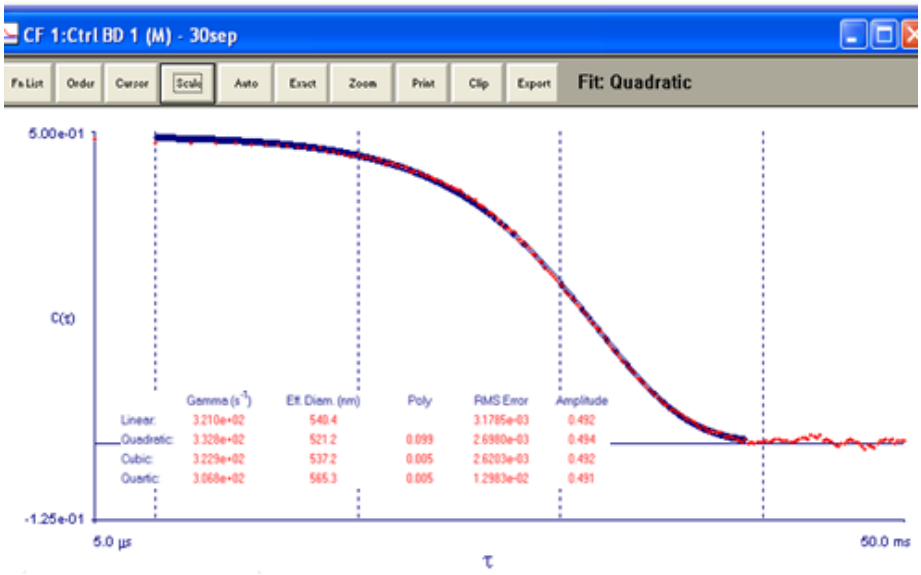
STOPPED		A CR (avg.):	141.8 kcps
Run:	44	M. Base:	5.7580e+06
First Delay:	5.0 µsec	C. Base:	5.7513e+06
Last Delay:	81.92 msec	Base diff:	0.116%
Elapsed Time:	00:01:00	Eff Dia:	295.2 nm
Angle:	90.0	Poly:	0.005
Temp:	26.2 deg C (GTE)		



S4. DLS results for SiNP/PAH.

SiNp/PAH/Hyal

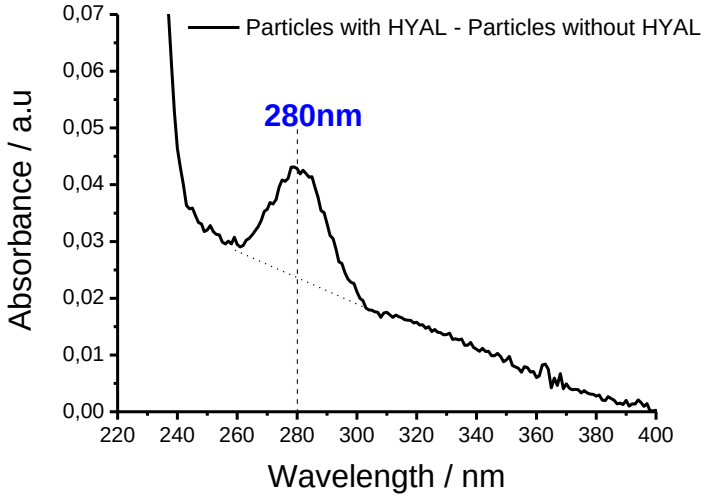
STOPPED		A CR (avg.):	55.1 kcps
Run:	31	M. Base:	4.3330e+05
First Delay:	5.0 µsec	C. Base:	4.3264e+05
Last Delay:	50.0 msec	Base diff:	0.152%
Elapsed Time:	00:00:31	Eff Dia:	521.2 nm
Angle:	90.0	Poly:	0.099
Temp:	26.0 deg C (GTE)		



S5. DLS results for SiNP/PAH/Hyal in PBS.

SECTION 3 - ESTIMATION OF AMOUNT OF PROTEIN ON PARTICLES

Taking the difference between 0.1mg.mL^{-1} SiNp/PAH/Hyal and SiNP/PAH spectra:



S6. Difference between Hyal functionalized particles, and SiNp/PAH particles.

We get a peak height at 280nm of: 0.02

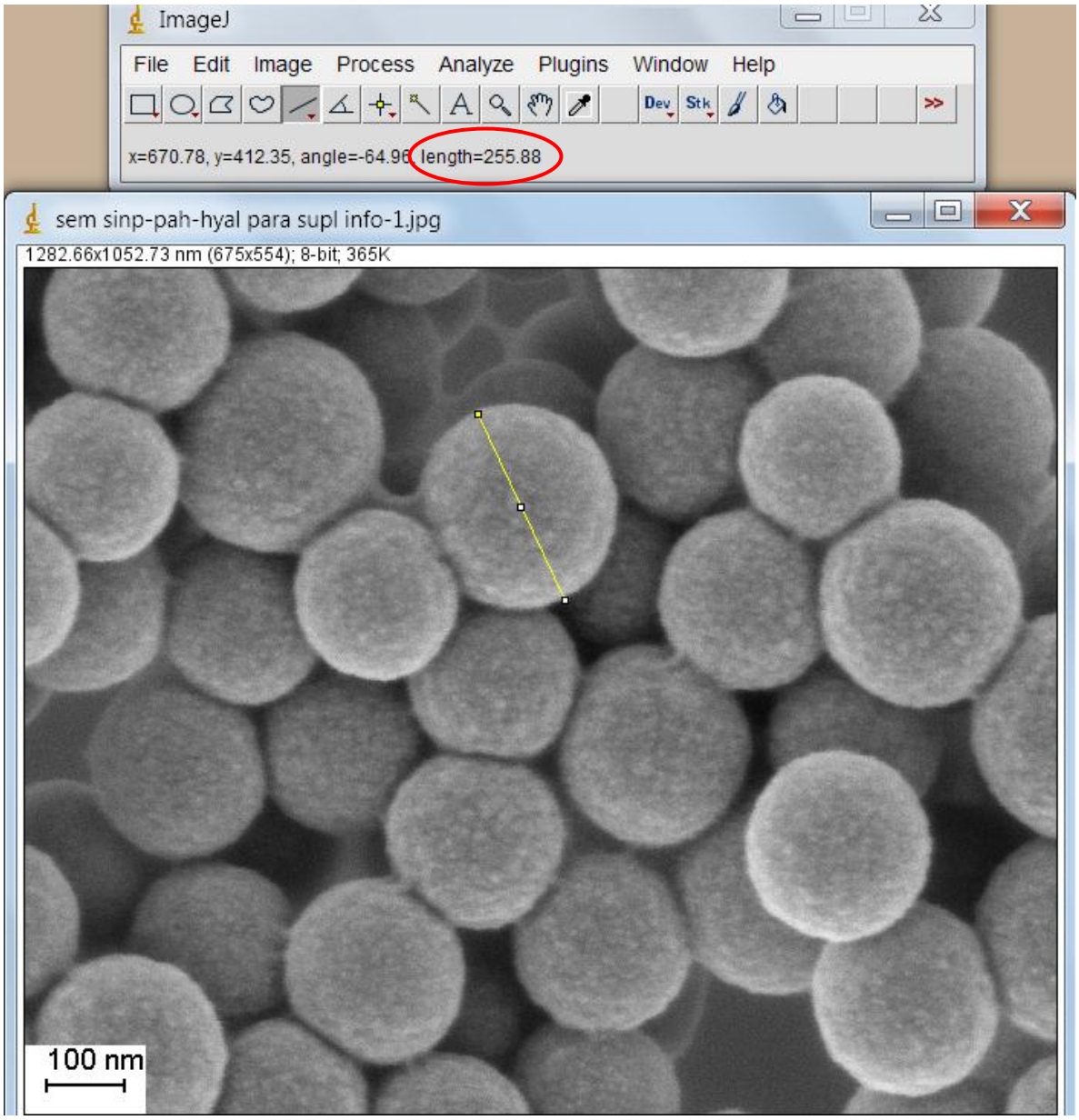
- And from UV-Vis spectrum of weighed Hyal in water, we know that:

$1mg.mL^{-1}$ protein@mQ → $A_{279nm} = 0.67$ a.u

- So 0.02 a.u corresponds to $30\mu g.mL^{-1}$
- But the dispersions of SiNP used in the treatments are $0.5mg.mL^{-1}$ so the protein concentration in them is:
- $150\ \mu g.mL^{-1}$ of protein
- Since the volumes used were 100uL, the total protein content in those sample was:
- 15µg

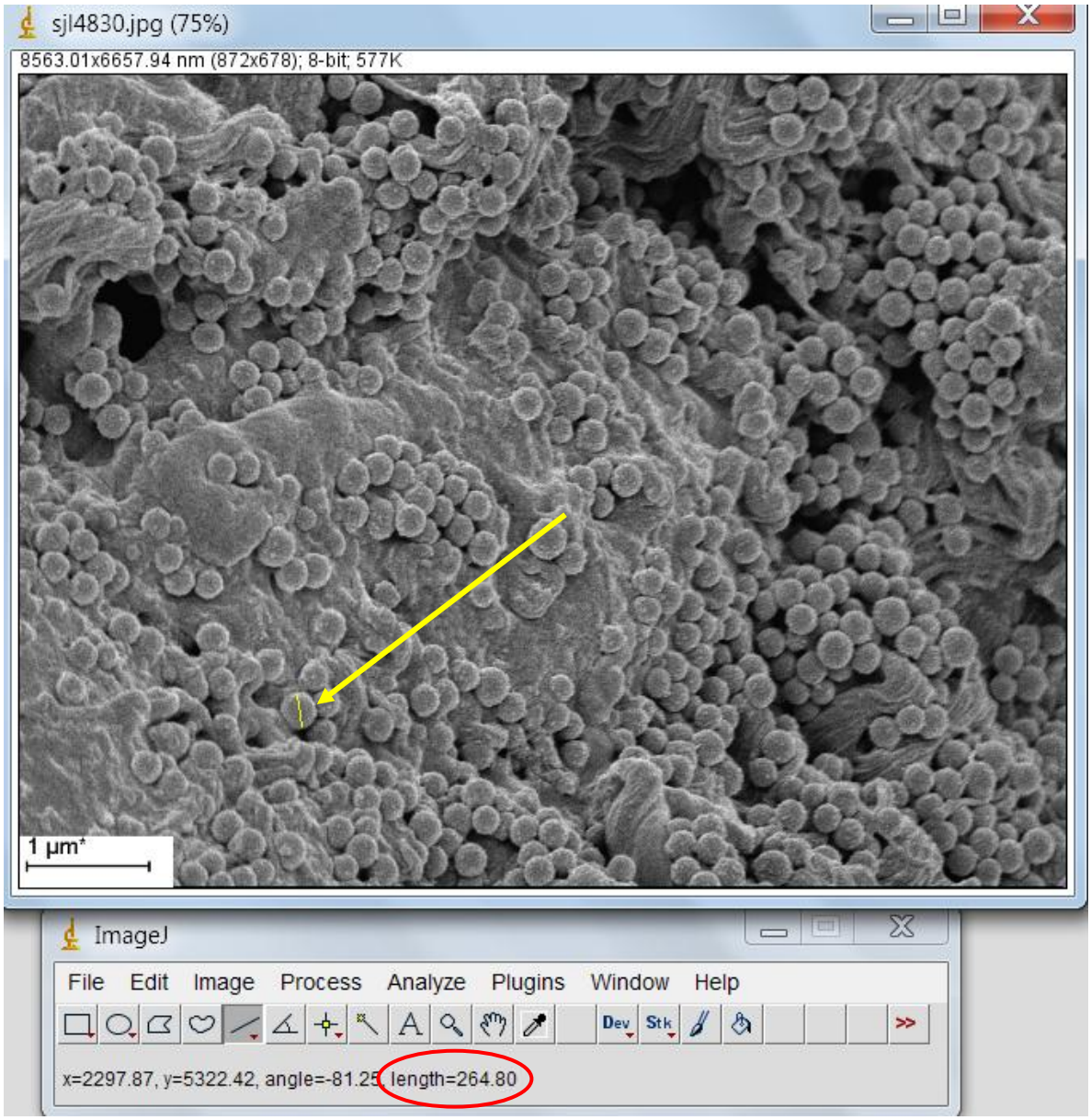
SECTION 4 - SEM CHARACTERIZATION OF CORE-SHELL PARTICLES AND TUMOR LOADED PARTICLES

SiNp/PAH/HYAL



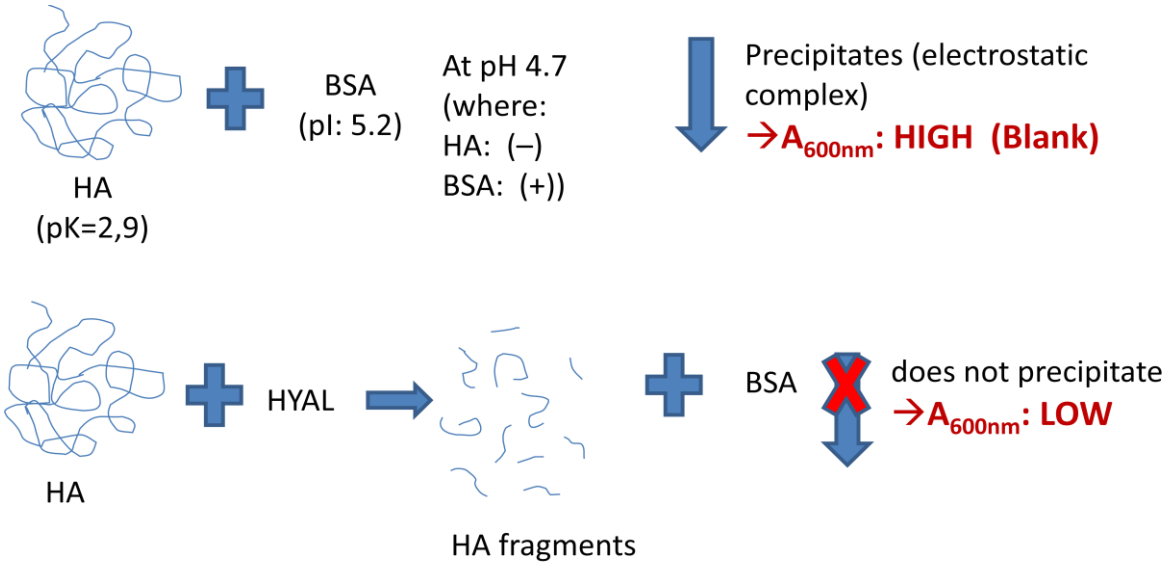
S7. SEM image of SNp/PAH/HYAL dried on a carbon substrate from a diluted dispersion in water, and further metallized. The yellow line highlights the diameter of a typical particle of 256nm.

Nanoparticle injected tumor

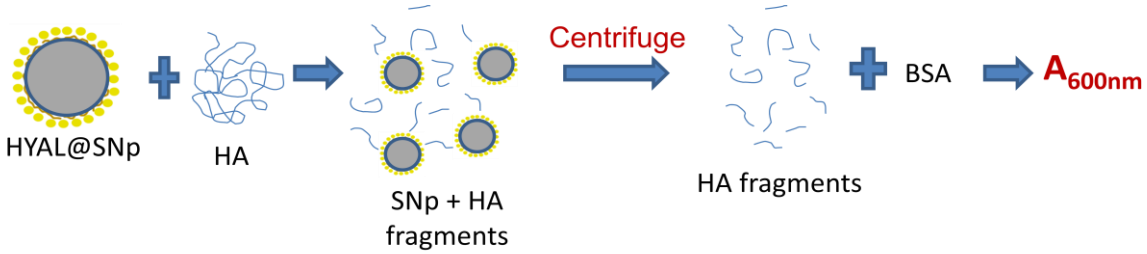


S8. Typical SEM image from a 21 days postinjection A375 tumor, excised two hours after a sole injection of 0.1mL of 23 x 10^9 NP.mL^{-1} dispersion of SiNp/PAH/Hyal. The yellow line highlights the diameter of a typical particle of 264nm.

SECTION 5 - ENZYMATIC ASSAY FOR HYAL AND HYAL CARRYING PARTICLES



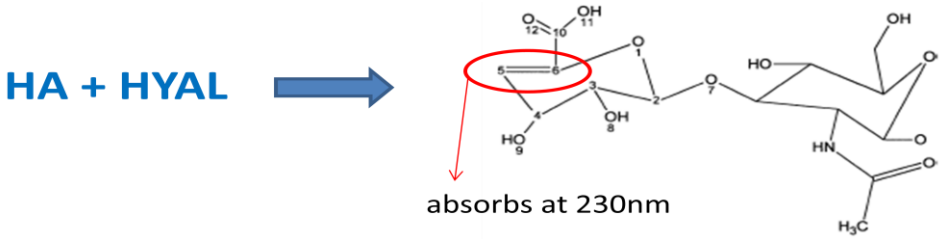
S9. Schematic diagram illustrating the typical enzymatic assay for Hyal.



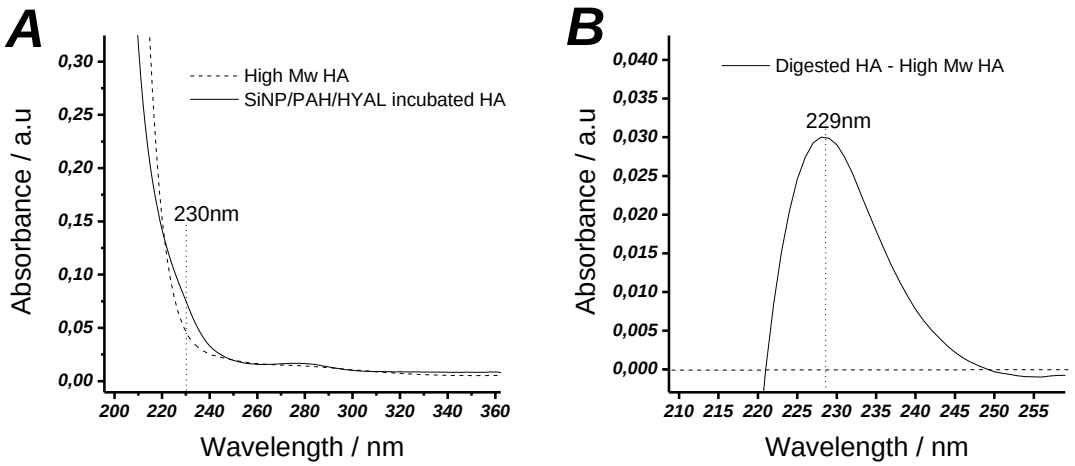
S10. Schematic diagram of the procedure used to establish enzymatic assay of SiNp/PAH/Hyall.

SECTION 6- FURTHER EVIDENCE OF HYALURONIC ACID DEGRADATION BY HYAL CARRYING PARTICLES

Absorbance at 230nm is a further evidence of HA degradation, since: [i]



Absorbance of HA, before and after incubation with SiNp/PAH/Hyal is shown in Fig. S11 A:



S11. A: UV-Vis spectra of HA before (dotted line), and after incubation with SiNp/PAH/Hyal and post removal of the particles by centrifugation (solid line). B: Difference between the spectra of panel A.

The difference in these two spectra is shown in Fig. S11B and the peak at 229nm is another evidence of HA degradation by the Hyal derivatized particles.

[i] J Pharm Biomed Anal. 2003 Mar 10;31(3):545-50. Biomacromolecules. 2007 Sep;8(9):2697-705.