Supporting Information

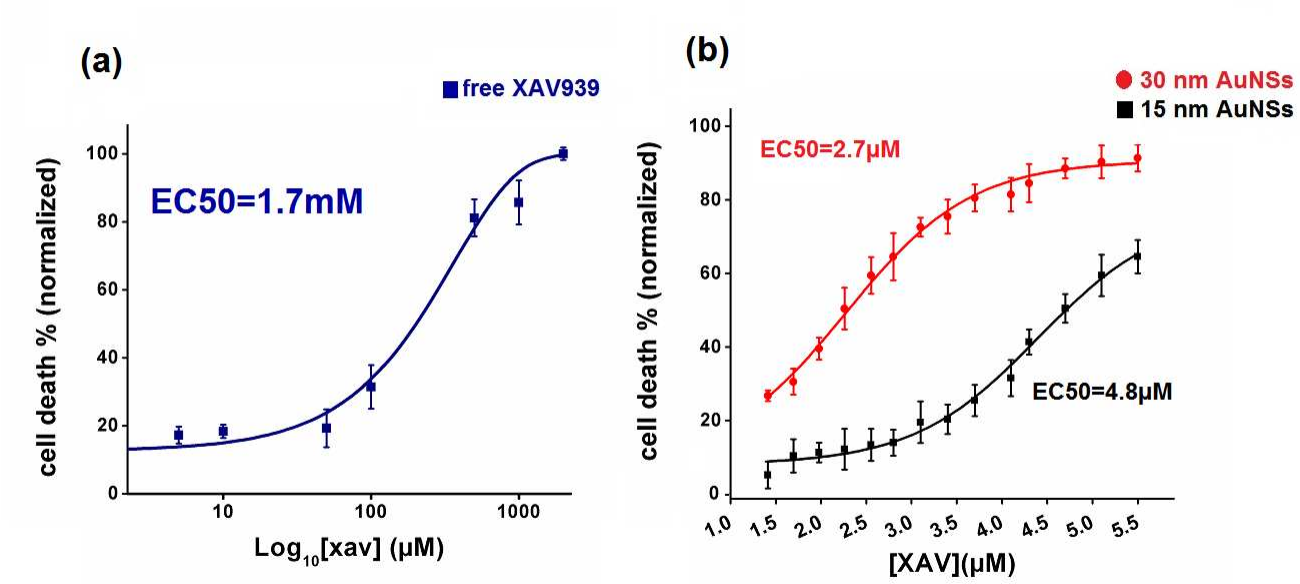

Figure S1. Drug-Dose dependent graphs showing the EC50 the HSC-3 cells incubated with free (a) and bioconjugated forms of XAV939 for 48 h. Data is represented as mean ± SD of three independent experiments. The EC50 for the cells incubated with the free XAV939 was found to be 1.7 mM compared to micoscaled value of 4.8 and 2.7 μM for those treated with the XAV939 conjugated to 15 and 30 nm respectively.

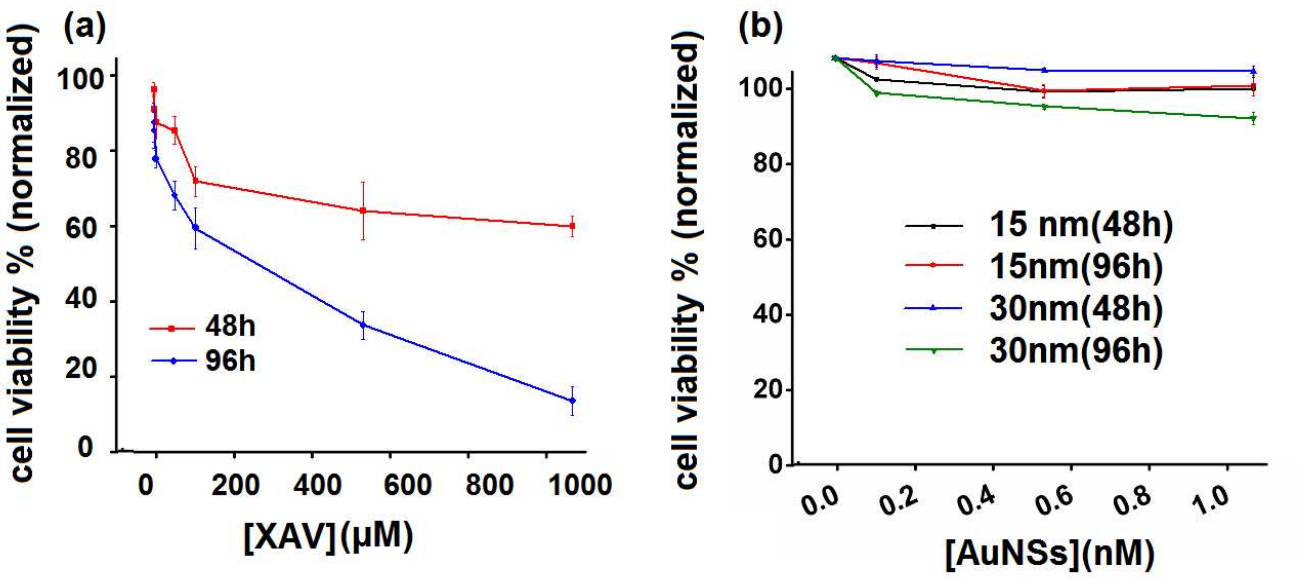

Figure S2. Drug-Dose curves showing the HaCaT cell viability when treated with free (a) and bioconjugated (b) XAV (μM) for 48 (red line) and 96 (blue line) h. FigureS2(a) shows that the cell viability of the HaCat cells treated with free XAV is greatly time dependent. HaCat cells viability drops to ca.20% after 96 h treatment compared to a ca.60% after 48 h treatment. FigureS2(b) illustrates the significantly increased HaCat cells viability after being treated with XAV bioconjugates to both sized AuNSs compared to the free form of the drug.

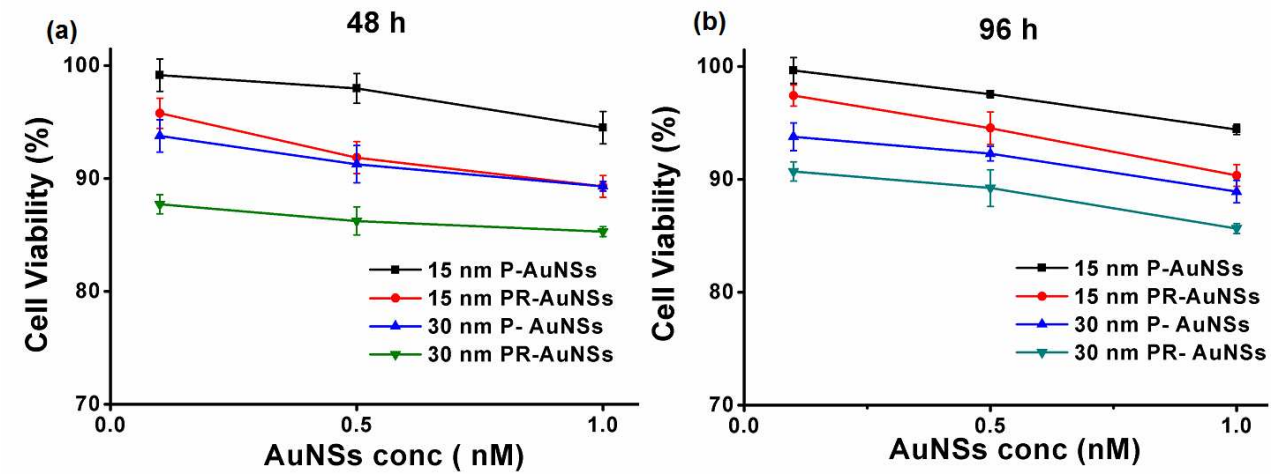

Figure S3. Drug-dose-dependent curve showing the cytotoxic effect of non XAV939 conjugated AuNSs against HSC-3 cells at 48 (a) and 96 (b) h time intervals. (a) After 48 hrs of cell incubation with PEG and RGD functionalized particles, 30 nm PR-AuNSs showed slightly higher cytotoxicity compared to 15 nm PR-AuNSs at all concentrations. While 15 and 30 nm P-AuNSs showed minimal HSC-3 cell death.(b) HSC-3 cells incubated with 15 and 30 nm PEG and RGD functionalized AuNSs for 96 h did not show any significance cytotoxicity.

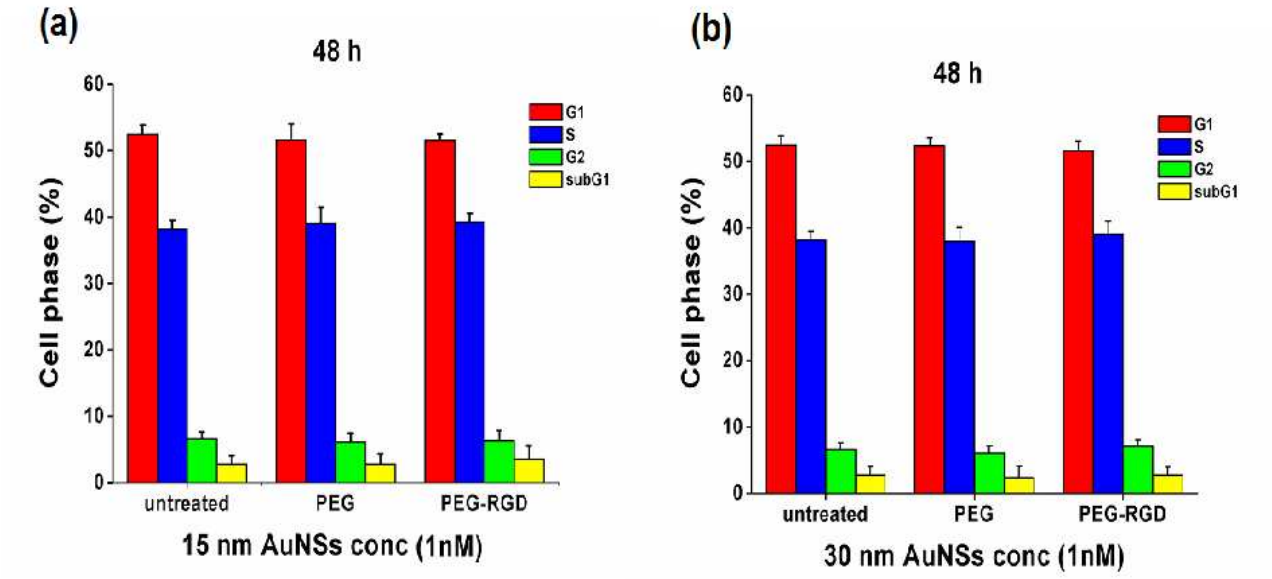

Figure S4. Cell cycle analysis of HSC-3 cells after incubation 15 nm P-AuNSs and PR-AuNSs (a) and 30 nm P-AuNSs and PR-AuNSs (b) for 48 h. Incubating HSC-3 cells with 1 nM 15 nm and 30 nm PEG and RGD functionalized AuNSs did not result in any significant cell cycle changes.

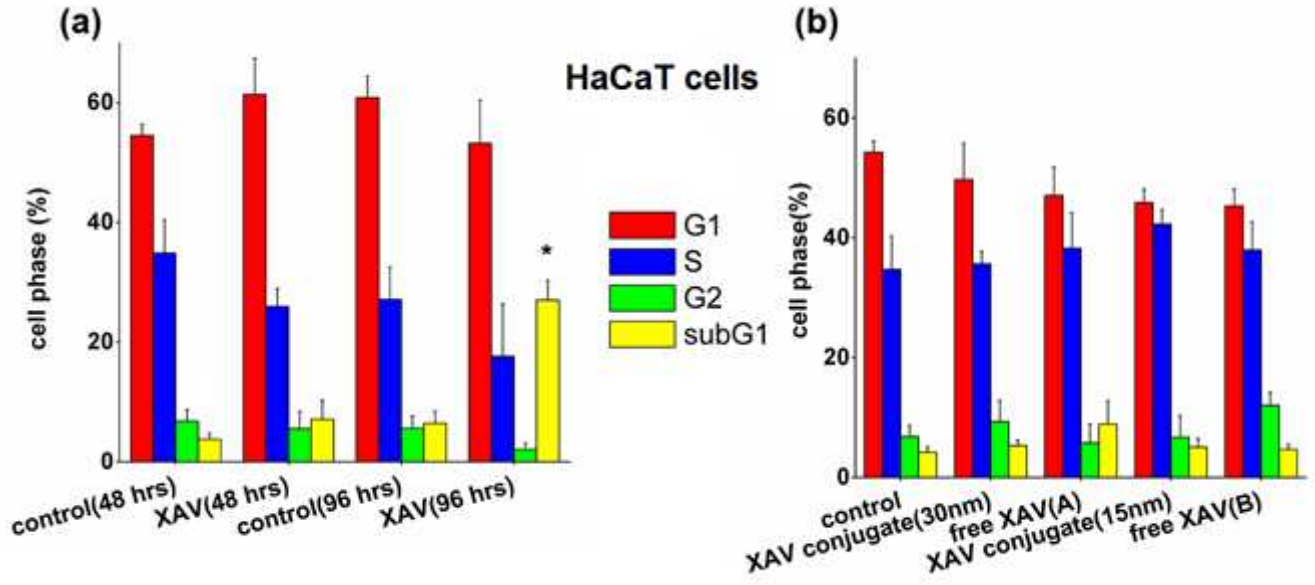

Figure S5. HaCaT cells incubated with free XAV939 (a) and functionalized 15 and 30 nm AuNSs for 48 and 96 h. (a) HaCaT cells subjected to 50 µM free XAV939 showed no significant change in the cell cycle distribution when compared to controls (untreated cells). On the other hand, 96 h time point showed marked increase in subG1 cell accumulation (black asterisk, $P<0.05$). (b) HaCaT cells incubated with XAV939 functionalized 30 and 15 nm AuNSs for 96 h showed no significant cell cyce changes from untreated cells. Data is represented as mean ± SD of three independent experiments. Error bars represent standard deviation. Statistical significance is denoted by an asterisk ($P<0.05$).

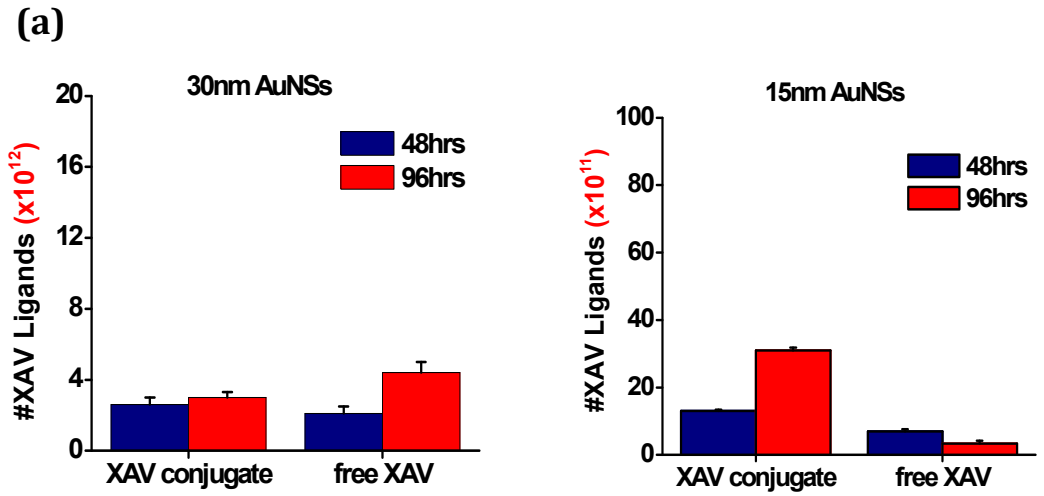

Figure S6. HaCaT cellular uptake of the XAV939 loaded on 30 (a) and 15 (b) nm AuNSs versus the free drug at the same concentration after 48 and 96 h treatment. The HaCaT cells exhibited a 6.6 and 7.5 fold decrease in 30 and 15 nm XAV-AuNSs uptake, respectively, compared to HSC-3 after 48 h. There was an equal value of 3 folds decrease for the 30 and 15 nm functionalized AuNSs after 96 h when compared to HSC-3 at the same time point. Data is represented as mean ± SD of three independent experiments. Error bars represent standard deviation.

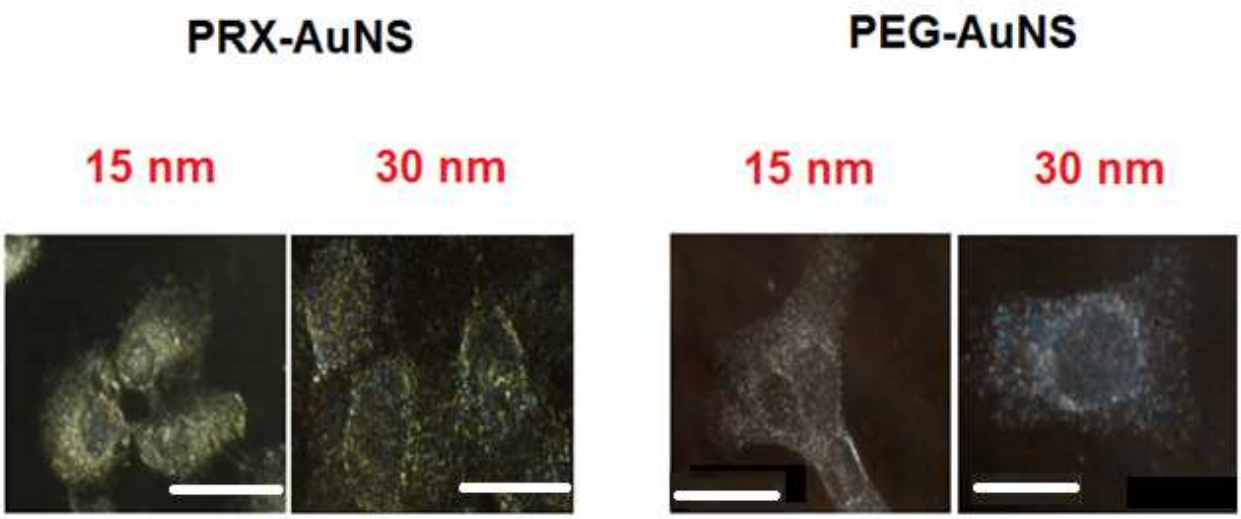

Figure S7. Dark field images for HaCaT cells incubated with 0.4 nM 15 and 30 nm (PRX-AuNSs, and PEG-AuNSs).The cells showed no internalization of both 15 and 30 nm PRX-AuNS and PEG- stabilized AuNSs. Scale bar: 10μm.

Abbreviations:

Name	Abbreviation
Nanoparticles	NPs
gold nanoparticles	AuNPs
gold nanospheres	AuNSs
human epidermal growth factor receptor	EGFR
Dulbecco's Modified Eagle's complete Medium	DMEM
adenomatous polyposis coli	APC
glycogen synthase kinase	GSK-3β
Dichloromethane	DCM
phosphate buffered saline	PBS
immortalized human keratinocytes	HaCaT