

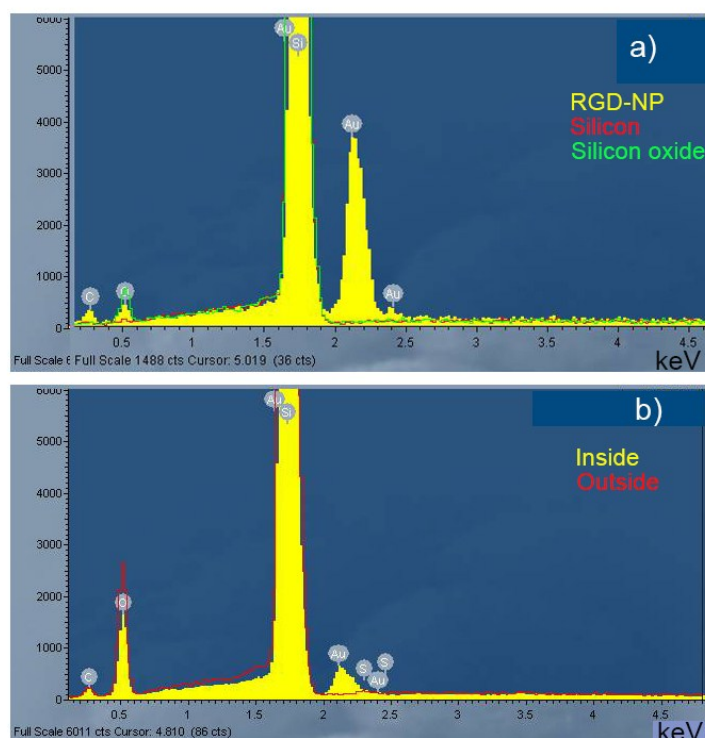
Electronic Supplementary Information (ESI)

ESI Table 1. Geometrical characteristics of the micropatterned silicon substrates

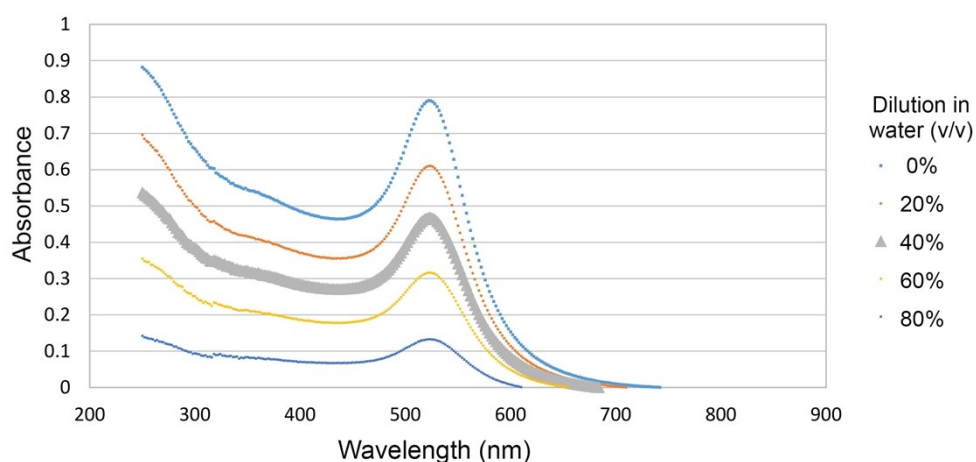
Roughness ratio, $r \pm \text{SD}$	Height, $h \pm \text{SD} (\mu\text{m})$	Intercone distance, $c \pm \text{SD} (\mu\text{m})$
1.74 ± 0.23	1.26 ± 0.28	2.59 ± 0.72

ESI Table 2. Wetting contact angle measurements of the micropatterned silicon substrates at the different treatment steps.

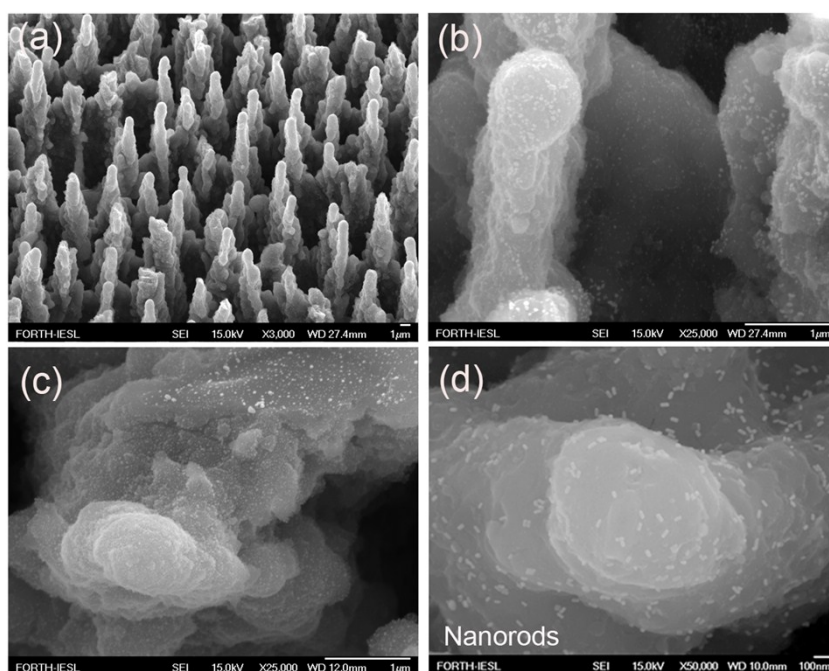
Treatment steps	Contact angle $\pm$ S.D. ($^\circ$)
After laser processing	116.8 ± 1.9
After oxidation	60.9 ± 6.2
After MPTMS silane treatment	122.4 ± 3.0
After drop evaporation of CALNNRGD gold nanoparticle solution	89.7 ± 6.4



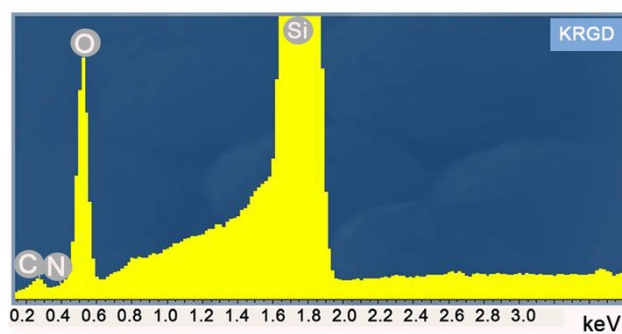
ESI Figure 1. SEM-EDS spectra of the micropatterned Si substrates decorated with gold nanoparticles using the ‘drop evaporation after surface functionalization’ protocol: a) SEM-EDS spectra at the different treatment stages, i.e. after laser processing (red line), after oxidation (green line) and after surface functionalization with MPTMS and drop evaporation of the RGD-terminated AuNPs (yellow). b) EDS spectra of micropatterned Si substrates activated and functionalized with MPTMS silane inside the region of the nanoparticle drop (yellow) and in the region outside (red) the nanoparticle drop of the same substrate. No peak for gold atom is shown in the second case.



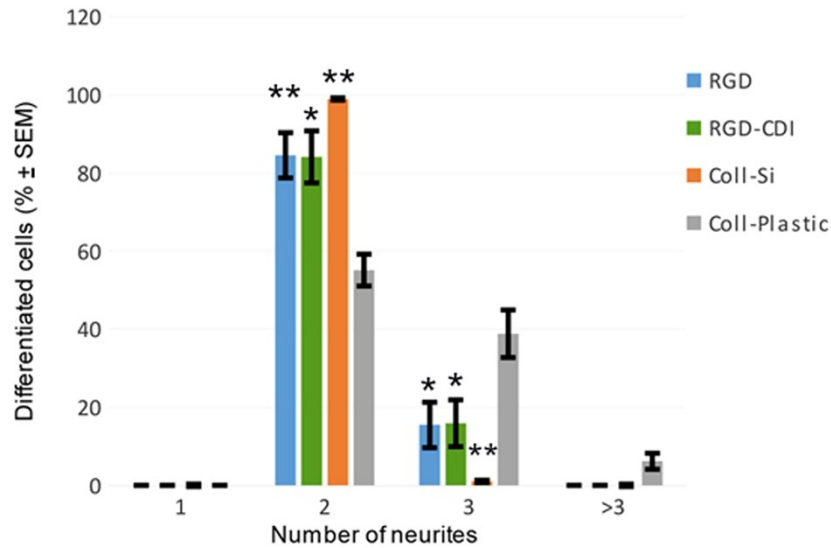
ESI Figure 2: UV-Vis spectrum of the Au-NP solution diluted in increasing percent of water (v/v).



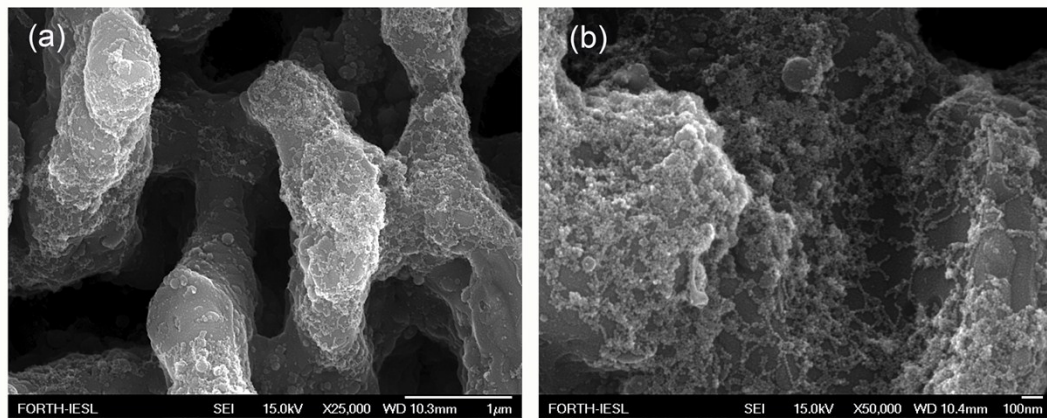
ESI Figure 3: (a-c) SEM images of the nano-micropatterned silicon substrates of high roughness decorated with citrate-terminated gold nanospheres via drop evaporation after surface functionalization; (d) SEM image of the nano-micropatterned silicon substrates of high roughness decorated with gold nanorods functionalized with PEG-COOH using the ‘drop evaporation after surface functionalization’ protocol.



ESI Figure 4. SEM-EDS spectrum from the micropatterned Si substrates after immobilization of KRGD oligopeptide via reaction with carbonyldiimidazole (CDI).



ESI Figure 5. PC12 cell differentiation on the different substrates after treatment with NGF: Graph showing the number of neurite extensions of the differentiated PC12 cells grown on the nano-micropatterned silicon (RGD-NP), micropatterned silicon (RGD-CDI and Coll-Si) and flat control (Coll-Plastic) substrates for 4DIV. The results represent statistics from three to five experiments - The significance level (p) was calculated using the student's t-test between the different substrates and the control plastic (Coll-PI) (*: $p < 0.05$, **: $p < 0.01$).



ESI Figure 6: (a-b) SEM images of the micropatterned silicon substrates of silicon micropatterned substrates decorated with RGD-terminated gold nanoparticles using the ‘drop evaporation after surface functionalization’ protocol. The substrates have been imaged after 4 days in culture of PC12 cells and sequentially fixation, dehydration and critical point drying treatment.