Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

RGD-modified dihydrolypoamide dehydrogenase conjugated to titanium dioxide nanoparticles – Switched on integrin-targeted photodynamic treatment of melanoma cells

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TiO_2 mode of administration: Discs, nanotubes and nanoparticals

TiO_2 plates were prepared by heating of amorphous titanium disks (13 mm diameter), anatase for 2 h at 250°C, rutile for 5 h at 850°C. Glass disks (13 mm diameter), were covered with anatase nanotubes (A-NTs), by dipping into Titan-Shield® solution (EcoWays, Jülich, Germany) and drying for 15 min at 100°C. The anatase nanoparticles (A-NPs) were purchased from Sigma-Aldrich (St. Louise, MO). The different preparations are shown in **Figure S-1A** and were characterized by ESEM (**Figure S-1B)** and XRD (data not shown). In order to assess ROS production of the TiO_2 preparations, MB photodegradation assays were carried for up to 3 hrs. Optical densities of the supernatants (0.5 ml) were determined at 663. As shown in **Figure S-1C**, A-NP was the most photocatalytic form of TiO_2.

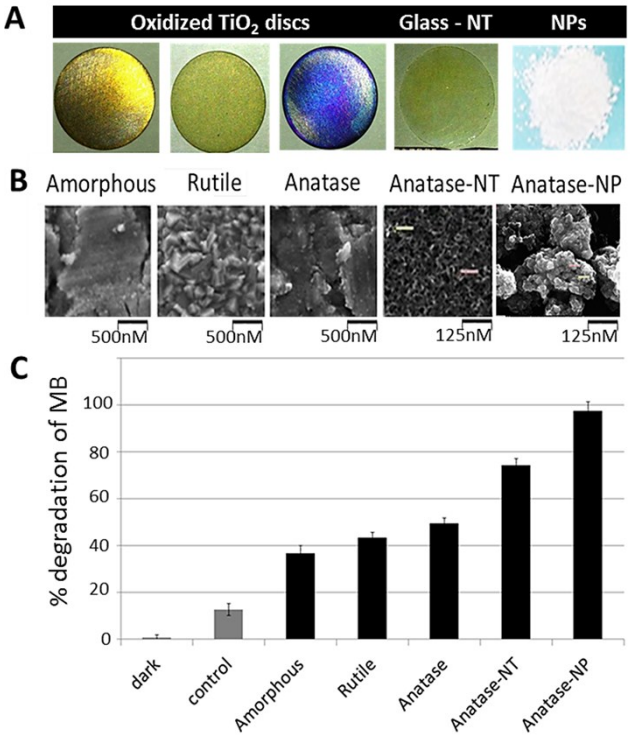

Figure S-1: **Different TiO_2 preperations examined for photodegradation of methylen blue.** The various TiO_2 preperations are shown by **(A)** Micrograph and **(B)** ESEM **(C)** MB photodegradation after 3h UVA (365 nm) illumination.

ROS production by A-NPs in different media

Prior to cell assays, ROS generation by Cyt C reduction in the test tubes was mesured by A-NPs suspended in different buffers (**Figure S-2**), under the same illumination condition. Similar values for ROS production are observed in the different media, including cell cultures media (DMEM) under UVA illumination. Illumination of Cyt C alone, without A-NPs, produces minute amounts of ROS (photolysis). No ROS production was observed in the dark with or without A-NPs or Cyt-C.

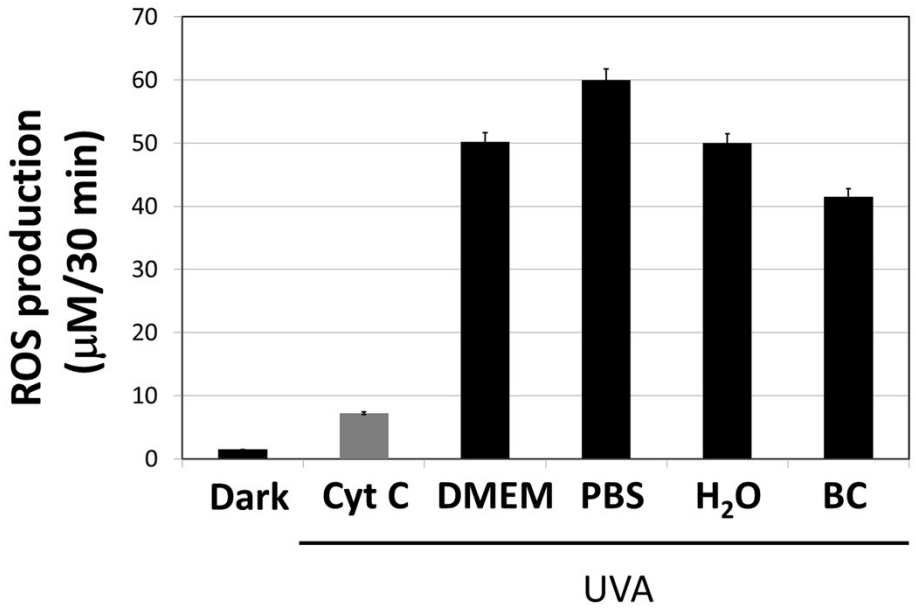

Figure S-2: **ROS production in different media.** ROS production was determined by Cyt C assay under UVA illumination (30 min) in the present of A-NPs (black). In gray, ROS production by Cyt C in the absence of A-NPs.

Integrin expression of cancer and normal Cells

Flow-cytometry analysis using (**Figure S-3)** established that mice cutaneous melanoma cells (B16F10 cells) highly express integrin αvβ3 on their surface (gray), while normal HEK293 cells lack the expresion of this integrin**.** Isotype IgG is shown in black.

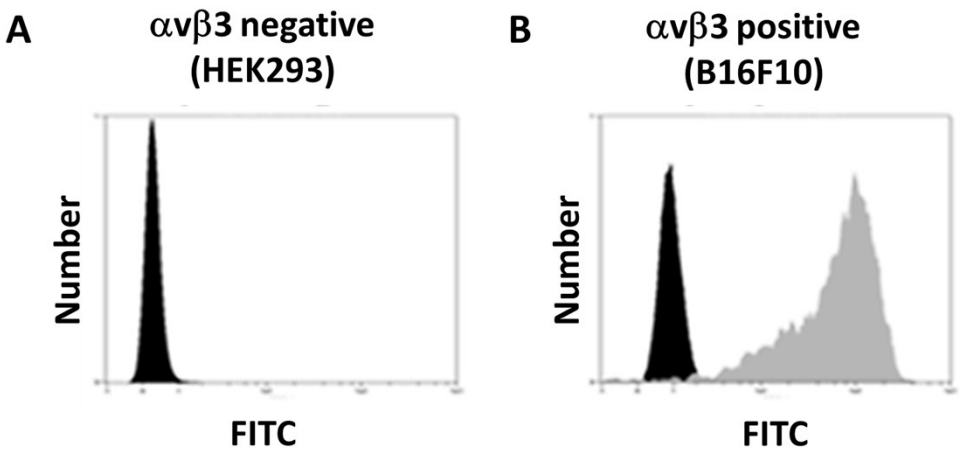

Figure S-3: αvβ3 integrin expression on cells surface. (**A**) HEK293 cells. (**B)** B16F10 cells.