

Supporting information

Interaction of amino acid-functionalized silver nanoparticles and *Candida albicans* polymorphs: a deep UV fluorescence imaging study

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To test the efficiency of the functionalization of the silver nanoparticles by tryptophan and its photoluminescence properties, we performed the phase transfer of the colloid from water into an organic solvent. The phase transfer was carried out by mixing 1 ml of toluene with 5 ml of Ag NPs or AgTrp2.0 colloids in the glass tubes, followed by vigorous shaking for 5 minutes. The photographs of the tubes containing Ag NPs and AgTrp2.0 colloids with and without toluene are presented in Figure S1. It can be seen that the tryptophan functionalized silver nanoparticles were transferred into the organic phase (Figure S1 d), while bare silver nanoparticles were not (Figure S1 b).

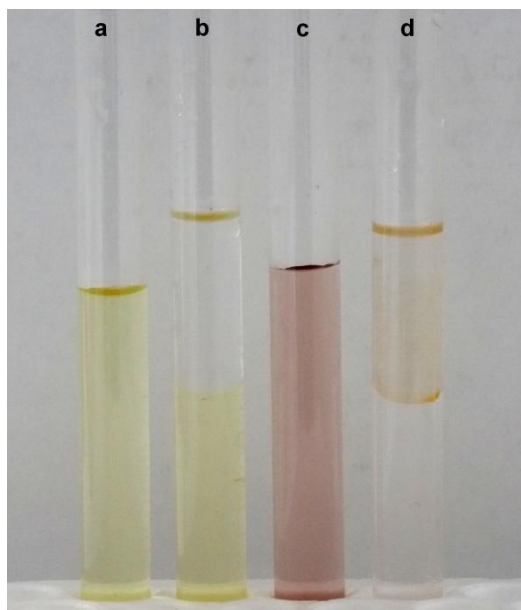


Figure S1. Photographs of vials containing (a) Ag and (c) AgTrp2.0 hydrocolloids (b) Ag and (d) AgTrp2.0 hydrocolloids mixed with toluene.

The percentage of reduction of the microbial cells ($R, \%$) was calculated using the following equation:

$$R = \frac{CFU_{cont.} - CFU_{coll.}}{CFU_{cont.}} \times 100\%$$

Where $CFU_{cont.}$ and $CFU_{coll.}$ are the numbers of colony forming units per millilitre for the control and the silver colloid solutions, respectively. The result of antimicrobial activity are shown in Figure S2.

The results of the survival of *C. albicans* incubated with AgTrp2.0 nanostructures in TSB medium for 24 hours are shown in Figure S3.

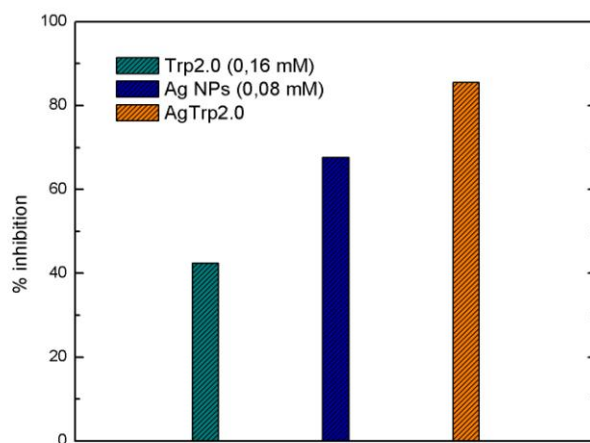


Figure S2. Antimicrobial activity of pure tryptophan (Trp2.0), bear silver nanoparticles (Ag NPs) and tryptophan functionalized silver nanoparticles (AgTrp2.0).

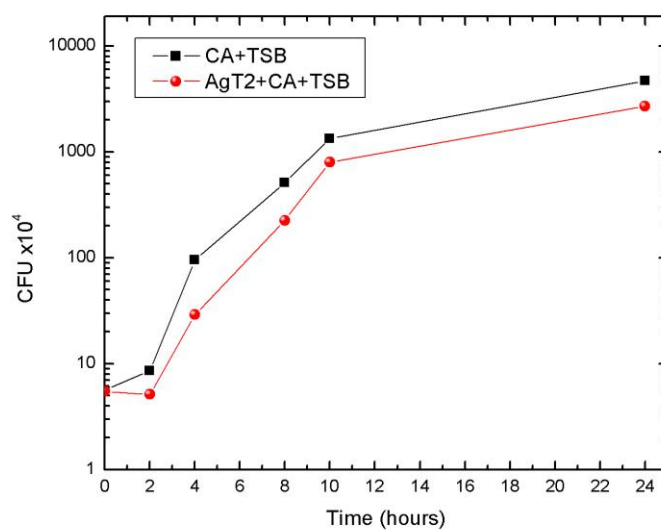


Figure S3. Survival of *C. albicans* incubated with AgTrp2.0 nanostructures in TSB medium for 24 hours.

Table S1. The optical density values at 400 nm		
Samples	Solution mixture before centrifugation	Supernatant after the centrifugation
<i>C. albicans</i>	0.11	/
AgTrp2.0 in Saline	0.64	0.63
AgTrp2.0 + <i>C. albicans</i>	0.47	0.33

Immediately after observation of *Candida albicans* biostructures under the microscope, bright field and fluorescence images of the same location were recorded by using the same set of conditions. Fiji software was used for additional analyses of the fluorescence images.

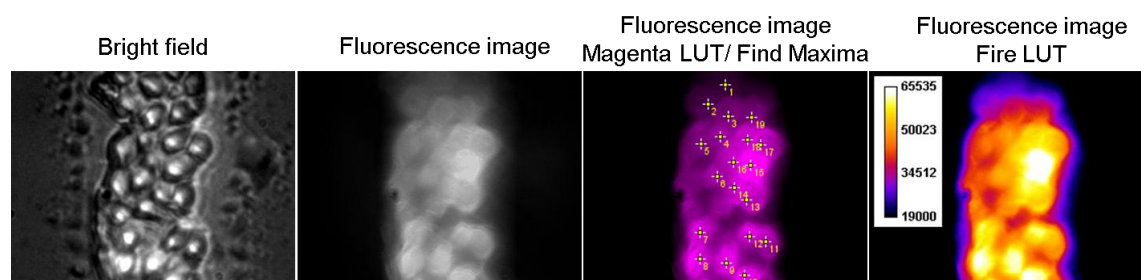


Figure S4. Step by step procedure of processing images obtained with DUV fluorescence imaging.

The first step is pseudo colouring a fluorescence image with LUT (Look Up Table) of interest. This was carried out in order to emphasize differences in intensity of fluorescence signal coming from cells. Calibration bar is indicating min and max values of intensity of pixels within the image. For a LUT coloured fluorescence image, the minimum of the intensity is assigned to the black colour and the maximum is assigned to the white colour. Intermediate colours are dependent upon choosing LUT of interest (Figure S6, Magenta and Fire LUT).

The second step is an option “Find maxima” which determines local maxima in an image. This is done in order to localize and compare decay kinetics of intensities of maxima on the fluorescence image. A threshold is set at the maximum value minus noise tolerance and the contiguous area around the maximum above the threshold is analysed.

Time constant values of the untreated cells in both spectral ranges are homogenously distributed, as it is shown in τ -map (figure S5b), with higher mean τ values of 50% in comparison to the treated cells. The autofluorescence is less affected by the bleaching.

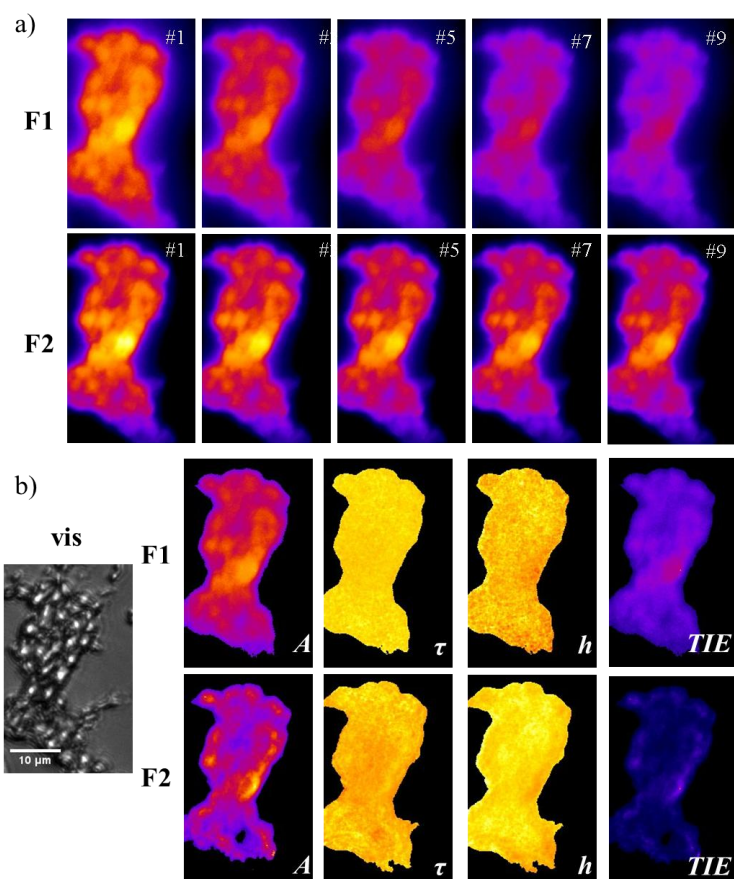


Figure S5. a) Five selected images of the untreated *C. albicans* cells obtained by time lapse imaging in [327 - 353 nm] (F1) and [370 – 410 nm] (F2) emission spectral ranges. b) VIS image of the cells and parameters from the stretch exponential fitting of the fluorescence intensity decay: A-amplitude map, τ -time constant map, h–heterogeneity map and TIE – Time integrated emission. The fluorescence intensities from time lapse images are fitted to the stretch exponential function by using PixBleach plugin (Fiji).