

**Supplementary information**

**Impact of humic acid in fate and toxicity of titanium dioxide nanoparticles in  
*Tetrahymena pyriformis* and early stage zebrafish embryos**

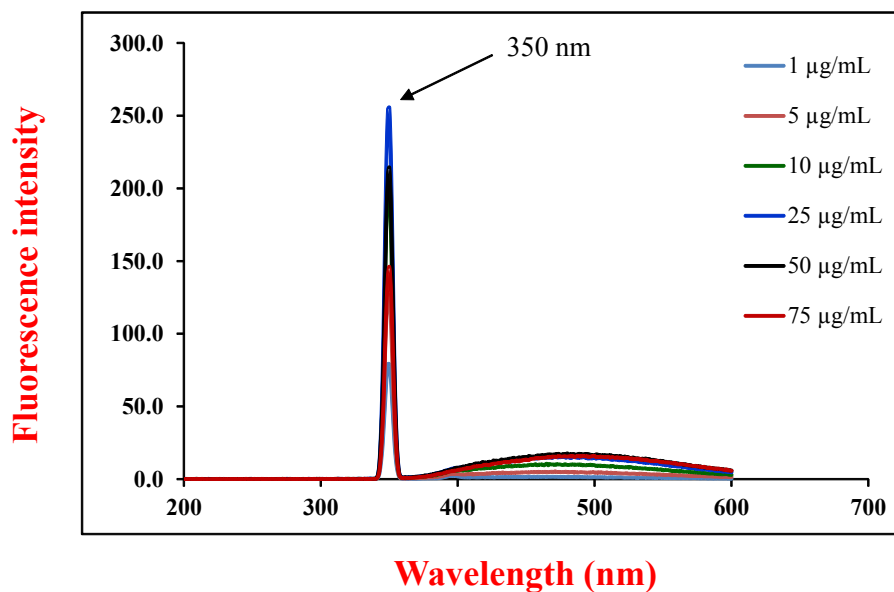
Govind Sharan Gupta<sup>†</sup>, Krupa Kansara<sup>†</sup>, Helly Shah, Ruchi Rathod, Drishti Valecha, Saurabh Gogisetty, Pankti Joshi and Ashutosh Kumar\*

Division of Biological & Life Sciences, School of Arts & Sciences, Ahmedabad University,  
Central campus, Navrangpura, Ahmedabad, 380009, Gujarat, India

<sup>†</sup>Authors contributed equal first author

\*Corresponding author

Ashutosh Kumar  
Division of Biological & Life Sciences  
School of Arts & Sciences, Ahmedabad University  
Central Campus, Navrangpura, Ahmedabad, 380009, Gujarat, India  
Email- ashutosh.kumar@ahduni.edu.in



**Figure S1:** Fluorescence emitting property of humic acid in MilliQ water.

**Table S1:** pH of TiO<sub>2</sub> NPs in different buffers in the presence and absence of humic acid.

Sample ID	pH		
	Milli – Q water	Dryl’s buffer	E3 medium
TiO <sub>2</sub> NPs (50 µg/mL)	6.73	6.86	6.91
TiO <sub>2</sub> NPs (50 µg/mL) + HA	6.75	6.86	6.85

**Table S2:** Polydispersity index of TiO<sub>2</sub> NPs (50 μg/mL) in different experimental buffers and in the presence and absence of humic acid (HA)

Time (h)	MilliQ Water		Dryl's buffer		E3 medium	
	-HA	+HA	-HA	+HA	-HA	+HA
0	0.3 ± 0.0	0.2 ± 0.0	0.2 ± 0.0	0.2 ± 0.0	0.4 ± 0.1	0.3 ± 0.1
1	0.2 ± 0.0	0.2 ± 0.0	0.2 ± 0.0	0.2 ± 0.0	0.4 ± 0.1	0.3 ± 0.0
2	0.3 ± 0.0	0.2 ± 0.0	0.2 ± 0.0	0.3 ± 0.1	0.4 ± 0.1	0.2 ± 0.0
3	0.2 ± 0.0	0.2 ± 0.0	0.2 ± 0.0	0.3 ± 0.0	0.4 ± 0.2	0.4 ± 0.1
4	0.3 ± 0.0	0.2 ± 0.0	0.2 ± 0.0	0.3 ± 0.1	0.3 ± 0.1	0.3 ± 0.1
24	0.3 ± 0.0	0.2 ± 0.0	0.2 ± 0.0	0.3 ± 0.1	0.3 ± 0.0	0.2 ± 0.1
48	0.3 ± 0.0	0.3 ± 0.0	0.3 ± 0.0	0.4 ± 0.0	0.3 ± 0.1	0.3 ± 0.1
96	0.2 ± 0.0	0.2 ± 0.0	0.3 ± 0.1	0.2 ± 0.0	0.3 ± 0.0	0.3 ± 0.1