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Supplementary information

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

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

**Table S1:** pH of TiO2 NPs in different buffers in the presence and absence of humic acid.

| Sample ID                  | Milli – Q water | Dryl’s buffer | E3 medium |
|---------------------------|-----------------|---------------|-----------|
| TiO$_2$ NPs (50 µg/mL)    | 6.73            | 6.86          | 6.91      |
| TiO$_2$ NPs (50 µg/mL) + HA | 6.75            | 6.86          | 6.85      |
**Table S2**: Polydispersity index of TiO$_2$ 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 |