Supplementary Material for:

Nanoplastic-Induced Nanostructural, Nanomechanical, and Antioxidant Response of Marine Diatom *Cylindrotheca closterium*

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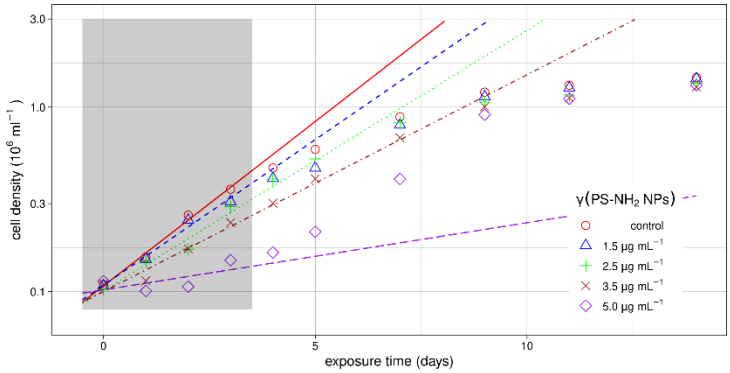
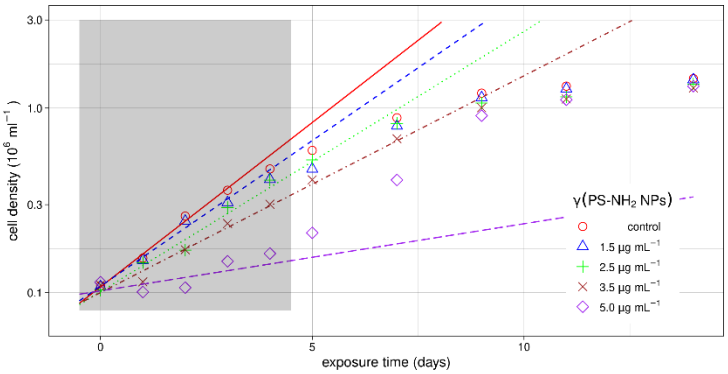
(a)



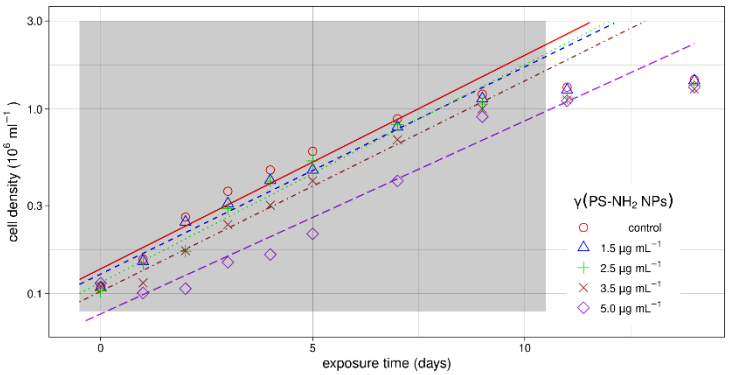
γ (NP) / µg mL^{-1}	N_0 (f) ± SD (×10^6)	µ (f) ± SD
0	0.071 ± 0.005	0.41 ± 0.03
1.5	0.075 ± 0.007	0.36 ± 0.03*
2.5	0.07 ± 0.01	0.33 ± 0.05*
3.5	0.08 ± 0.01	0.27 ± 0.06*
5.0	0.09 ± 0.02	0.08 ± 0.07*

(b)



γ (NP) / µg mL^{-1}	N_0 (f) ± SD (×10^6)	µ (f) ± SD
0	0.076 ± 0.006	0.38 ± 0.03
1.5	0.079 ± 0.007	0.34 ± 0.02
2.5	0.071 ± 0.007	0.34 ± 0.02
3.5	0.076 ± 0.008	0.27 ± 0.03*
5.0	0.01 ± 0.01	0.11 ± 0.04*

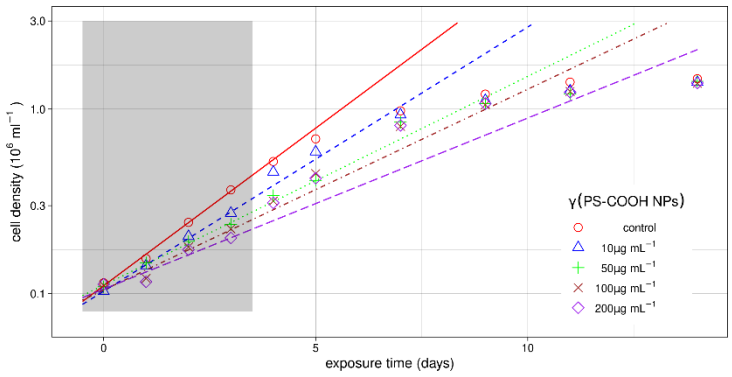
(c)



γ (NP) / µg mL^{-1}	N_0 (f) ± SD (×10^6)	µ (f) ± SD
0	0.11 ± 0.01	0.27 ± 0.02
1.5	0.099 ± 0.009	0.26 ± 0.02
2.5	0.09 ± 0.01	0.27 ± 0.02
3.5	0.079 ± 0.005	0.26 ± 0.01
5.0	0.06 ± 0.01	0.24 ± 0.03

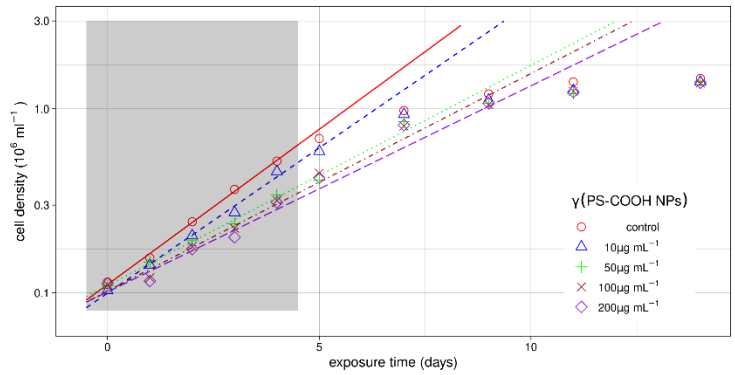
Figure S1. Results of fit to the exponential function (Eq. 3) of growth curves of *C. closterium* exposed to different PS-NH$_2$ nanoparticle concentrations in the different parts of exponential growth phase marked by grey rectangles (**a**) first 3 days (D3) (**b**) first 4 days (D4) and (**c**) first 9 days (D9) (* statistically significant difference)

(a)



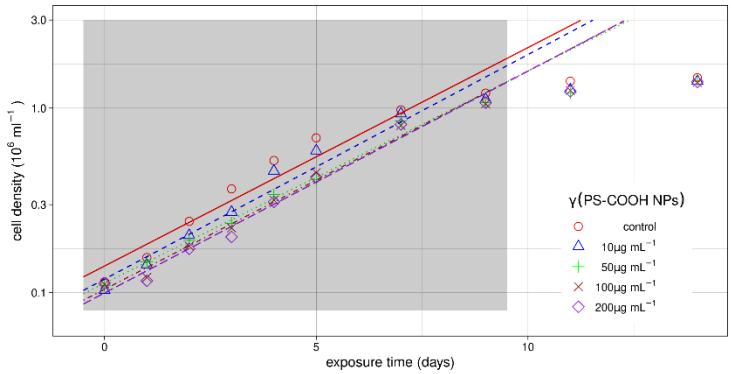
γ (NP) / µg mL^{-1}	N_0 (f) ± SD (×10^6)	µ (f) ± SD
0	0.075 ± 0.004	0.39 ± 0.02
10	0.074 ± 0.002	0.33 ± 0.01*
50	0.086 ± 0.003	0.26 ± 0.01*
100	0.082 ± 0.009	0.25 ± 0.04*
200	0.09 ± 0.01	0.21 ± 0.05*

(b)



γ (NP) / µg mL^{-1}	N_0 (f) ± SD (×10^6)	µ (f) ± SD
0	0.075 ± 0.003	0.39 ± 0.01
10	0.069 ± 0.005	0.36 ± 0.02*
50	0.083 ± 0.006	0.28 ± 0.01*
100	0.078 ± 0.007	0.27 ± 0.03*
200	0.08 ± 0.01	0.26 ± 0.04*

(c)



γ (NP) / µg mL^{-1}	N_0 (f) ± SD (×10^6)	µ (f) ± SD
0	0.11 ± 0.02	0.27 ± 0.03
10	0.09 ± 0.01	0.28 ± 0.02
50	0.086 ± 0.006	0.26 ± 0.01
100	0.079 ± 0.006	0.27 ± 0.01
200	0.076 ± 0.007	0.28 ± 0.02

Figure S2. Results of fit to the exponential function (Eq. 3) of growth curves of *C. closterium* exposed to different PS-COOH nanoparticle concentrations in the different parts of exponential growth phase marked by red rectangles (rectangles (a) first 3 days (D3) (b) first 4 days (D4) and (c) first 9 days (D9) (* statistically significant difference).

Table S1. Physicochemical characterization of PS-NH_2 and PS-COOH nanoplastics (50 μg mL^{-1}) in ultrapure water (UPW) and filtered natural seawater (FSW) by dynamic (DLS) and electrophoretic light scattering (ELS) and atomic force microscopy (AFM).

Nanoplastics	**Time / h**	**Zeta potential (ζ) / mV**		**Particle hydrodynamic diameter (d_h) as measured by DLS / nm (vol. %)**		**Particle height as measured by AFM / nm**	
		UPW	FSW	UPW	FSW	UPW	FSW
PS-NH_2	0	52.5 ± 1.4	15.1 ± 2.2	48.5 ± 0.4	55.4 ± 1.1	47.9 ± 6.2	55.4 ± 1.1
	24	47.7 ± 1.3	9.1 ± 0.9	49.1 ± 0.6	91.3 ± 5.1 (98%) 4892.2 ± 167.0 (2%)	*	51.7 ± 6.5**
PS-COOH	0	-44.2 ± 3.1	-12.3 ± 1.6	54.5 ± 0.4	1282.0 ± 59.7 (83.6 %) 4967.5 ± 813.1 (15.8 %)	51.8 ± 10.6	100 - 200*** 900-1500 (width)
	24	-45.7 ± 5.2	-8.3 ± 1.0	55.8 ± 1.2	2554.3 ± 576.0 (13.6%) 5102.6 ± 296.9 (86.4)	*	100 - 350 nm*** 3500-5200 (width)

*not measured; **smooth layer around some particles; ***aggregates

Table S2. Average Young modulus values obtained for *Cylindrotheca closterium* (5 cells) in the three different conditions tested in this study (control condition, exposure to 5 μg mL^{-1} PS-NH_2 and to 200 μg mL^{-1} PS-COOH). Results are given in kPa.

Cell	Control condition	Exposure to PS-NH_2	Exposure to PS-COOH
Cell 1	1039.7 ± 167.4	675.9 ± 192.5	1112.5 ± 157.6
Cell 2	988.6 ± 304.0	1354.0 ± 150.6	883.6 ± 283.4
Cell 3	1818.0 ± 573.8	540.0 ± 307.1	518.5 ± 140.8
Cell 4	1195.8 ± 612.8	1135.1 ± 171.0	715.4 ± 324.4
Cell 5	698.8 ± 231.8	1468.9 ± 778.7	501.5 ± 85.3