Supplementary Information

Graphene oxide is degraded by neutrophils and the degradation products are non-genotoxic


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Fig. S1. AFM imaging of GO-S and GO-L. AFM images of GO samples before and after acellular biodegradation in the presence of MPO + NaCl + H$_2$O$_2$. GO-L before (a-b) and after 12 h (c-d) biodegradation. GO-S before (e) and after 12 h (f) biodegradation. Abbreviations (panel e): GO, graphene oxide; M, mica substrate; S, (probable) salt crystal.
Figure S2
Figure S2
Fig. S2. Mass spectrometry of small GO sheets. (a) MALDI-TOF MS spectra of GO-S (top panel), MPO (middle panel) and GO-S incubated for 12 h in the presence of MPO and H₂O₂ (bottom panel). Inset in top panel displays zoom-in view of spectra from m/z = 550 to 620. Peaks spaced by 12 Da across the mass spectra correspond to carbon atoms of GO. (b) Mass spectrometry shows breakdown of GO. GO-S was incubated with MPO + NaCl + H₂O₂ for 0-12 h and MALDI-TOF MS spectra were taken at the indicated time-points. The spectrum at 0 h revealed the presence of GO. The inset shows peaks separated by 12 Da corresponding to carbon atoms of GO. From 3 h to 12 h, GO peaks were no longer observed in the spectra. Inset in the top panel displays a zoom-in view of spectra from m/z = 550 to 620. (c) MALDI-TOF spectra of 0 h (top panel) and 12 h degradation (bottom panel) samples (GO-S + MPO + NaCl + H₂O₂) in m/z range of 100-500.
**Fig. S3. Genotoxicity assessment.** (a) H$_2$O$_2$ (50 µM, 5 min exposure) was used as a positive control and was shown to trigger DNA damage in BEAS-2B cells. Catalase prevented DNA damage of 1.2 mM H$_2$O$_2$, corresponding to the amount of H$_2$O$_2$ added to the reaction mixtures during a 12 h biodegradation experiment (refer to Figure 6). (b) B[a]P, a known carcinogen, induced DNA damage in BEAS-2B cells at 200 µM. The addition of B[a]P to cells together with GO-S or GO-L (25 µg/mL) did not affect the DNA damaging effect of B[a]P (200 µM), showing that the GO sheets did not interfere with the assay.