**Supporting information**

**Phosphonate Coating of SiO2 Nanoparticles Abrogates Inflammatory Effects and Local Changes of the Lipid Composition in the Rat Lung: A Complementary Bioimaging Study**

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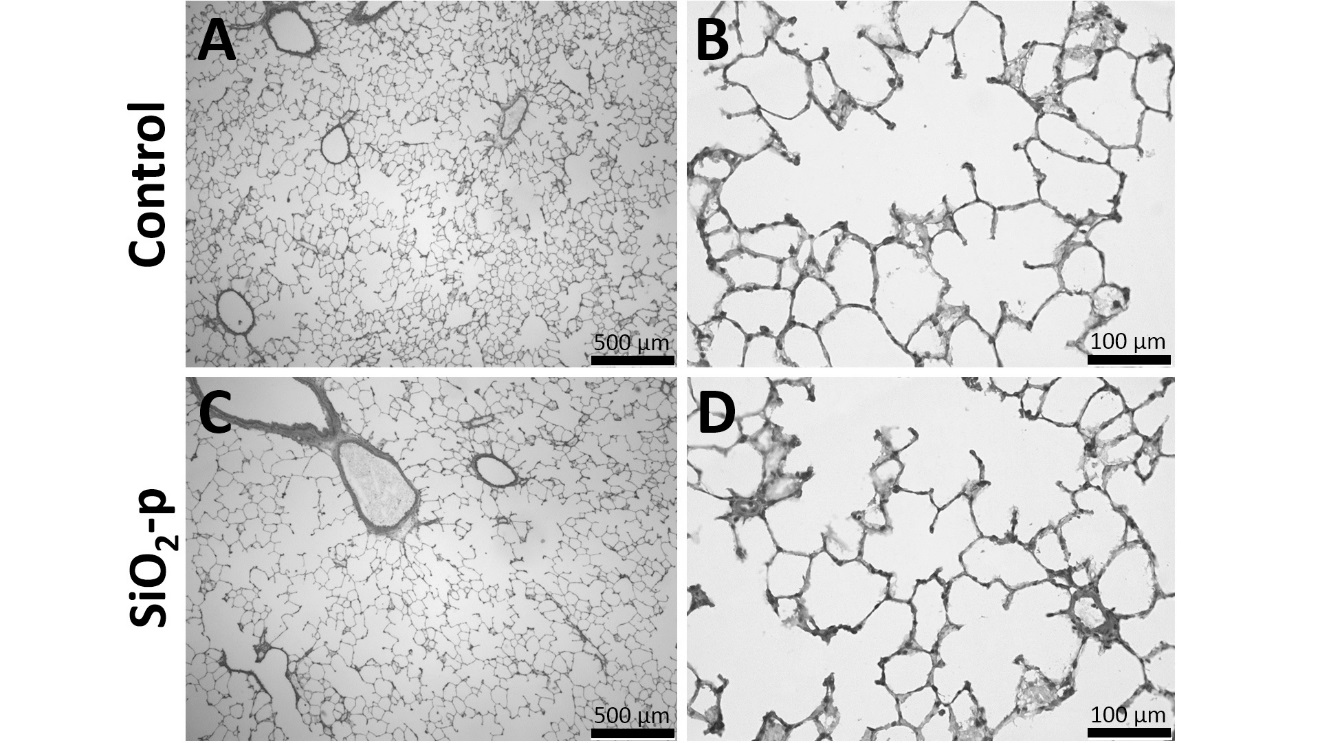
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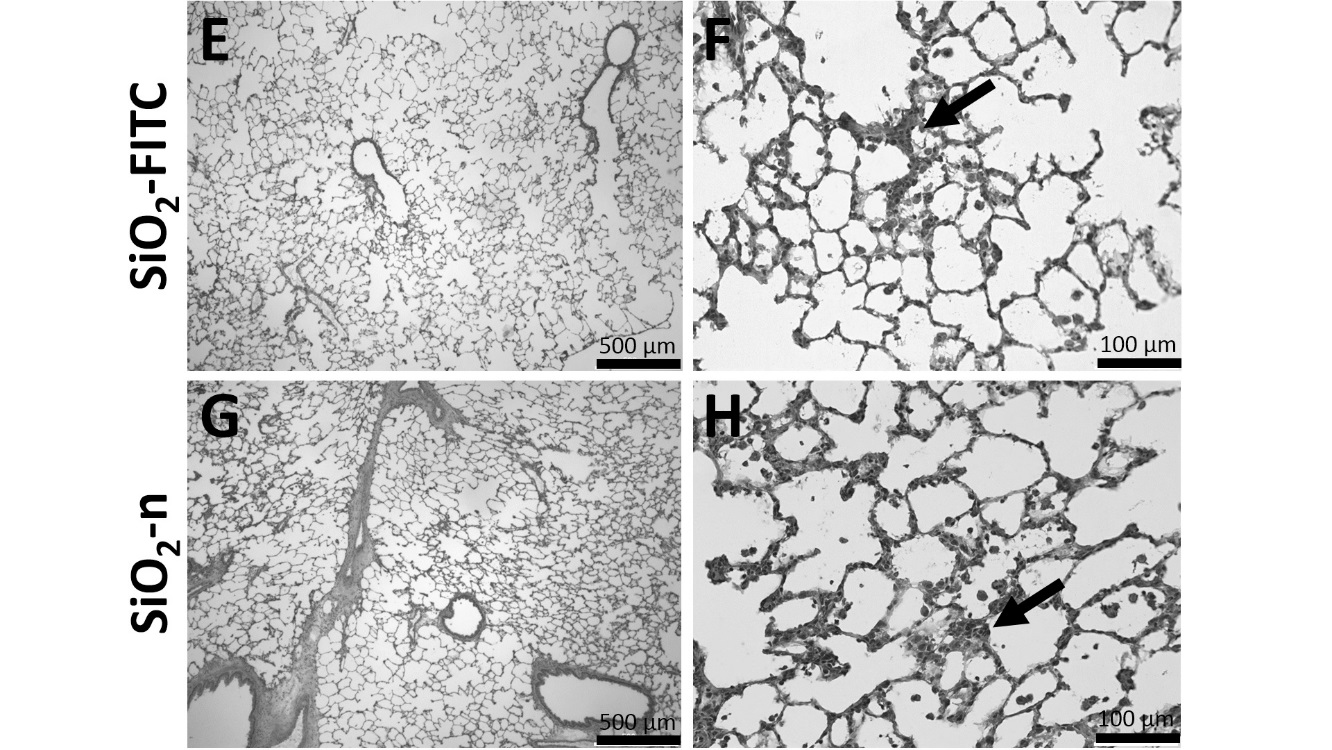
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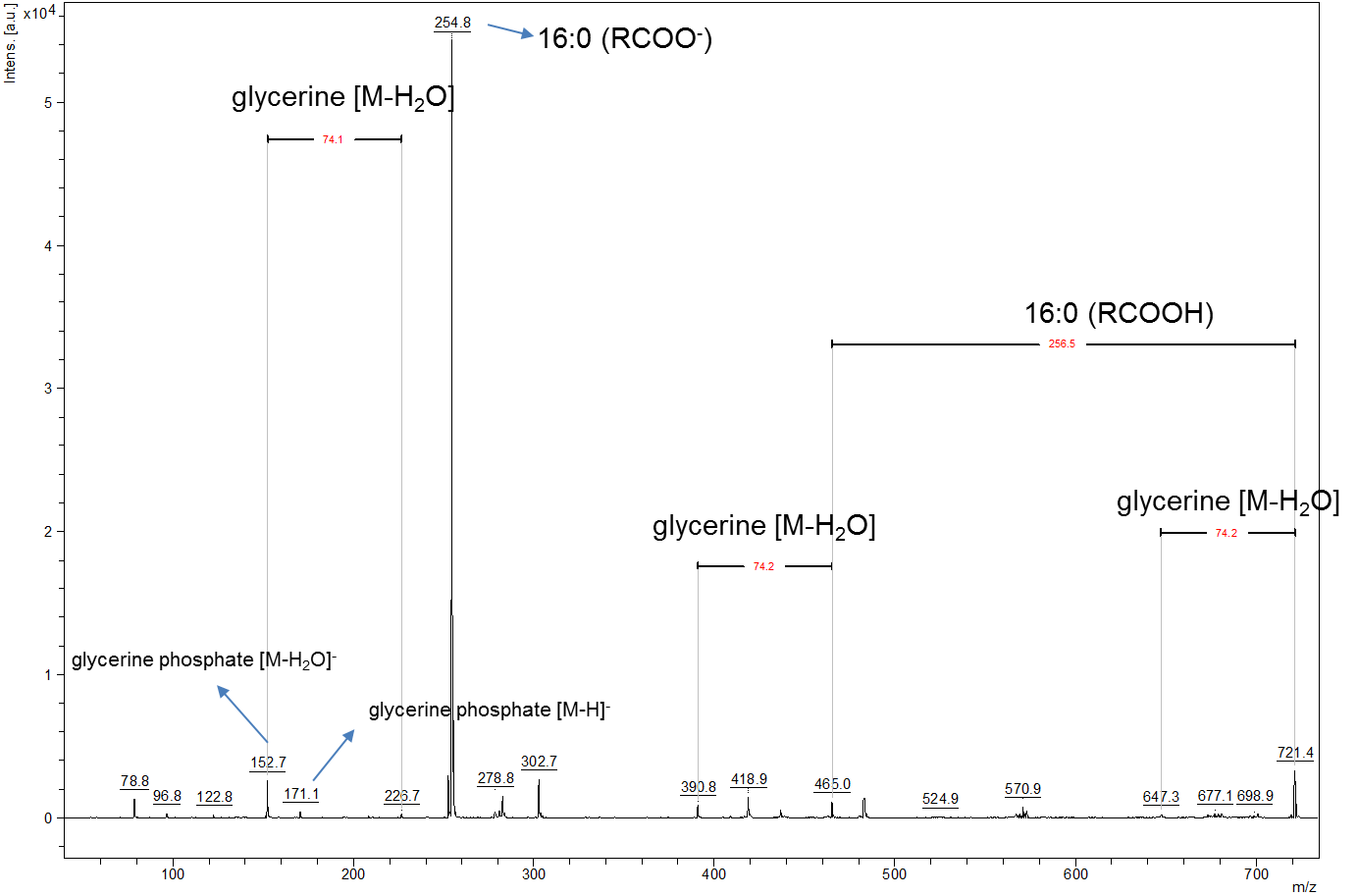
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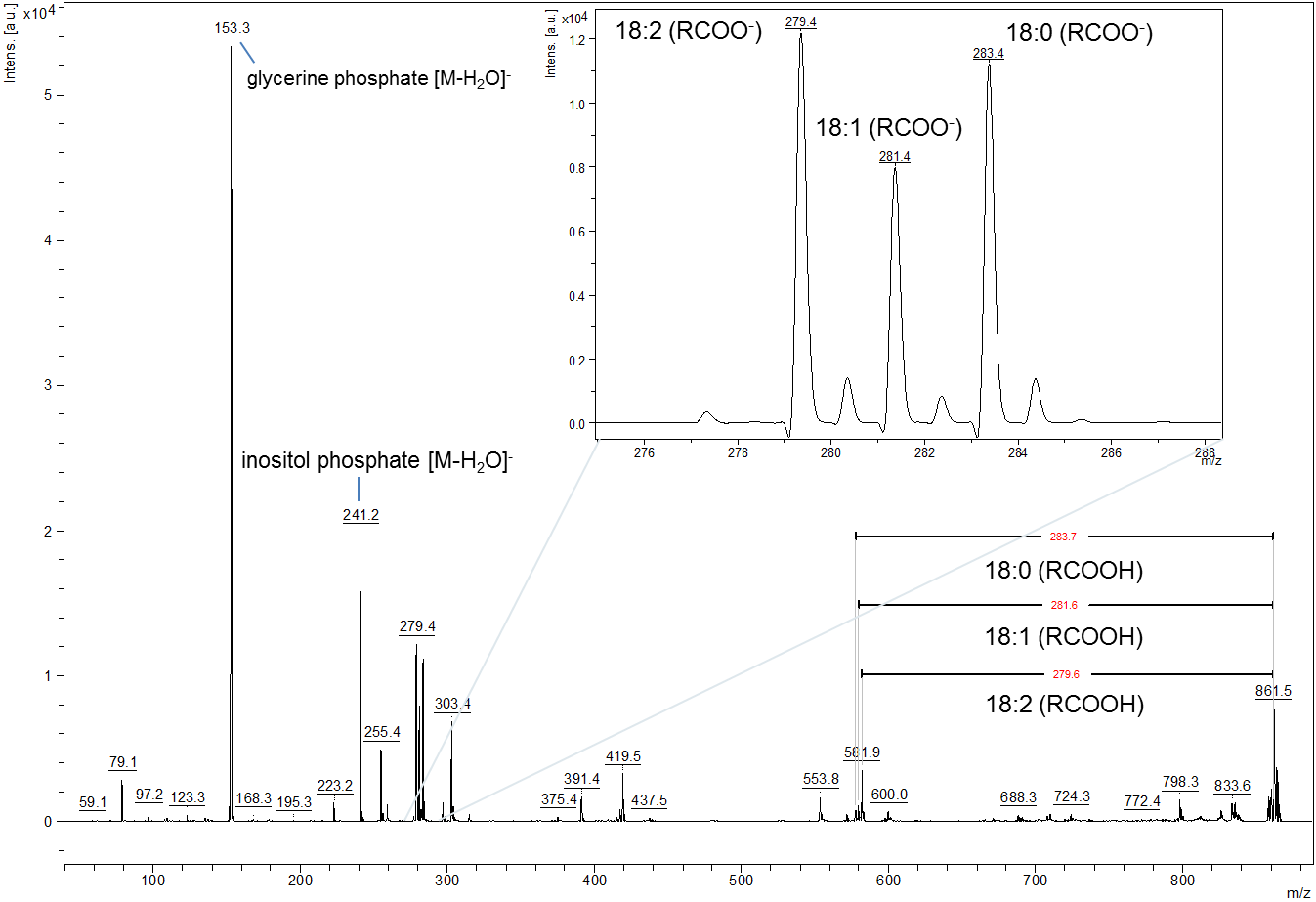




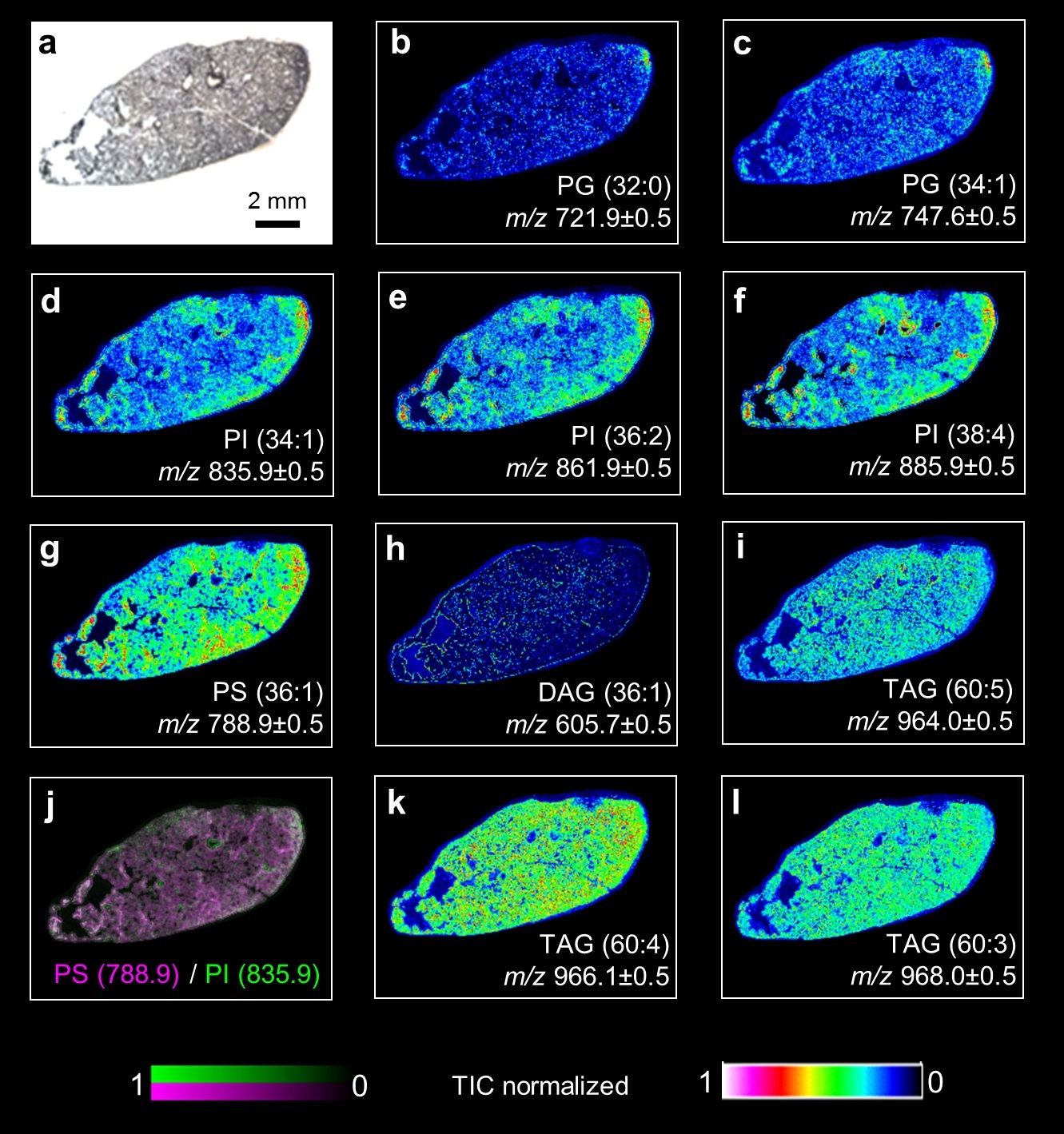
**Figure S1.** Effect of different SiO2 NP on lung histology. Typical aspects from lung parenchyma 3 days after intratracheal instillation of 0.5 mL vehicle control fluid (A, B), 0.36 mg SiO2-p (C, D), 0.36 mg SiO2-FITC (E, F), or 0.36 mg SiO2-n (G, H). Hematoxylin-eosin stained cryo-sections. Note that SiO2-FITC (F) and SiO2 (H) leads to confined regions with increase macrophage numbers, slightly deteriorated septal structures and focal hypercellularity (arrows in F and H). These changes were largely absent in lungs treated with vehicle control (B) or SiO2-p (D).

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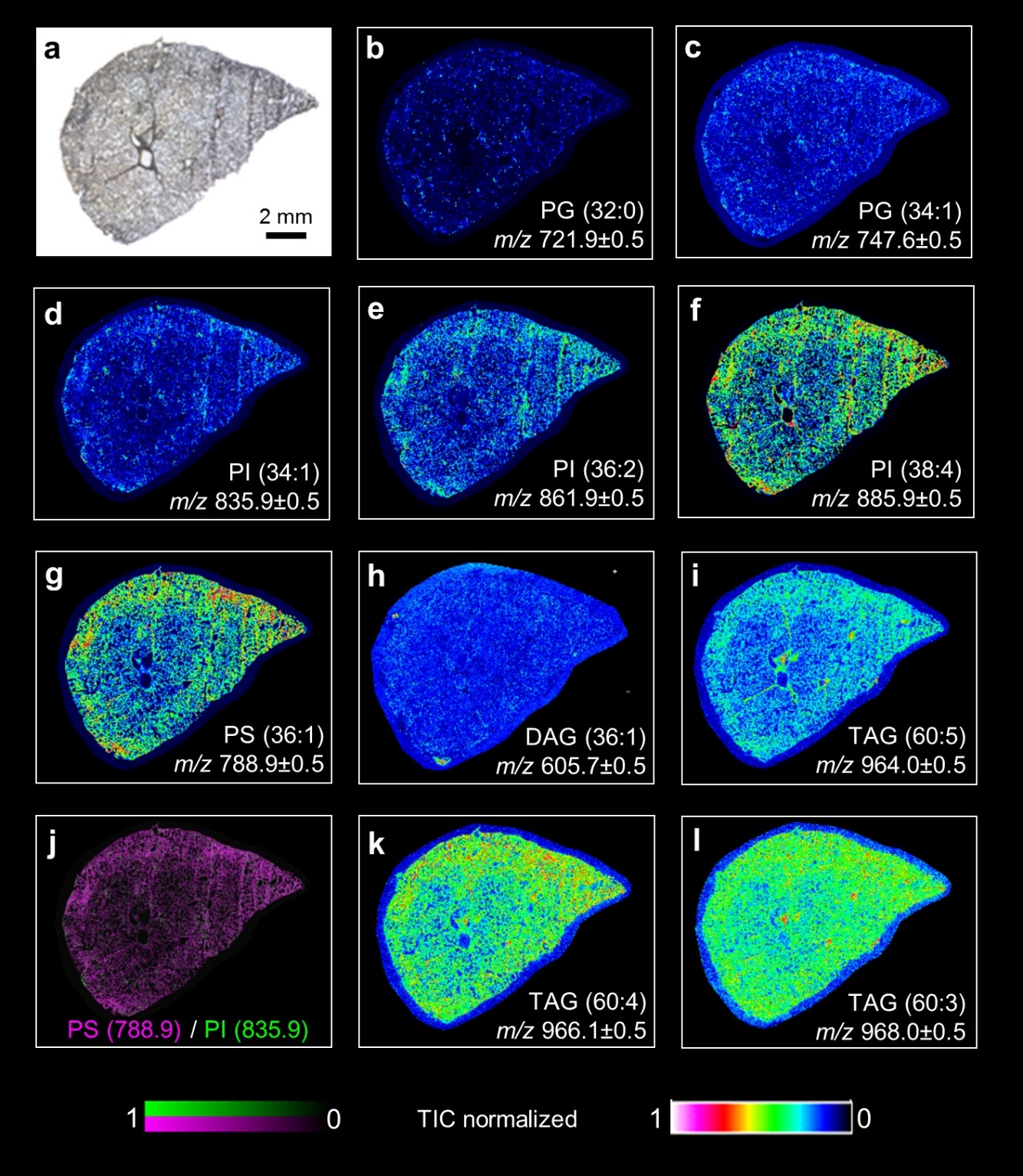
**Figure S2.** MALDI-MS/MS spectrum resulting from the fragmentation of precursor *m*/*z* 721.4. Fragment ions confirm the assignment of the respective MS ion image to PG (32:0) and indicate a fatty acyl composition of two (16:0) chains.

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**Figure S3.** MALDI-MS/MS spectrum resulting from the fragmentation of precursor *m*/*z* 861.5. Fragment ions confirm the assignment of the respective MS ion image to PI (36:2), whereby both fatty acyl compositions, PI (18:1|18:1) and PI (18:0|18:2) are deduced.

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**Figure S4**. Ion images from a vehicle-treated control lung. *m/z* values are shown underneath each panel and were measured in the negative ion mode, except *m/z* 605.7 which was measured in the positive ion mode. Data were normalized by division through the total ion current (TIC). (a) microscopic image, (b, c) phosphatidylglycerol (PG), (d-f) phosphatidylinositol (PI), (g) phosphatidylserine (PS), (h) diacylglycerol (DAG)-like fragment, (j) overlay from (d) and (g), (i, k ,l) triacylglycerol (TAG)-like fragments. Note that all analytes are evenly distributed unless compression or damage of the tissue slice, as obvious from (a), has led to an irregular color coding.

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**Figure S5.** Ion images from a SiO2-p-treated control lung. *m/z* values are shown underneath each panel and were measured in the negative ion mode, except *m/z* 605.7 which was measured in the positive ion mode. Data were normalized by division through the total ion current (TIC). (a) microscopic image, (b, c) phosphatidylglycerol (PG), (d-f) phosphatidylinositol (PI), (g) phosphatidylserine (PS), (h) diacylglycerol (DAG)-like fragment, (j) overlay from (d) and (g), (i, k ,l) triacylglycerol (TAG)-like fragments. Note that all analytes are evenly distributed unless compression or damage of the tissue slice, as obvious from (a), has led to an irregular color coding.