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## Potential human health risks of micro and nanoplastic particles

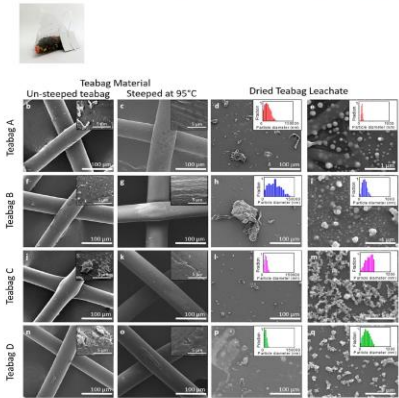
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1

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### Human exposure to micro- and nanoplastics *via* food packaging: the contentious matter of plastic particles released from tea bags

- Hernandez et al. (2019) found that commercial tea bags steeped in water at 95°C released billions of micro- and nanoplastic particles into a single cup of tea.
- The composition of the released particles matched that of the tea bags (nylon and polyethylene terephthalate, PET).
- The tea bag leachates affected the behavior of the water flea, *Daphnia magna*.
- However, other authors were critical of the results and argued that the "particles" were crystallized oligomers (Busse et al., Environ Sci Technol. 2020).



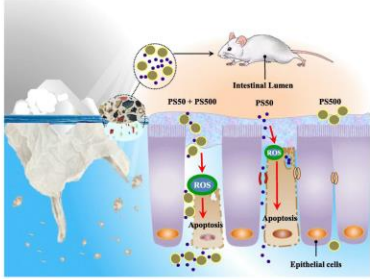
[Hernandez LM, et al. Environ Sci Technol. 2019;53(21):12300-10]

2

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### Underestimated health risk? polystyrene micro + nanoplastics jointly induced intestinal barrier dysfunction in a mouse model

- The current “microplastic exposure” is in fact a mixture of micro- and nanoplastic exposures, yet most studies on these materials have been conducted using a single particle size.
- To study the *combined* toxicity of PS micro- and nanoplastics, the authors conducted a 28-day repeated dose oral toxicity study in mice using a range of doses (2.5–500 mg/kg body weight). ROS generation was found at 2.5 mg/kg body weight. Increased epithelial cell apoptosis was found at concentrations over 50 mg/kg body weight.

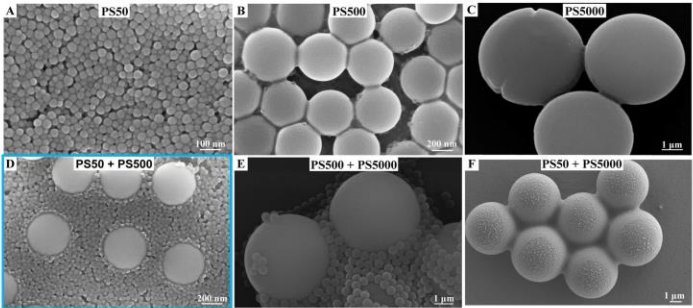


[From: Liang B. et al. Part Fibre Toxicol. 2021;18(1):20]

3

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### Underestimated health risk? polystyrene micro + nanoplastics jointly induced intestinal barrier dysfunction in a mouse model



- The mixture of PS50 and PS5000 caused more severe dysfunction of the intestinal barrier in mice than PS50 or PS5000 alone [Liang B. et al. 2021].

4

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### Evidence of atmospheric fallout of microplastics in a remote mountainous region: potential for inhalation of microplastics

(a) MP potential transport trajectories Snow and Rain events  
 (b) MP potential transport trajectories Wind events >2m/s  
 (c) Wind events  
 (d) Rainfall events  
 (e) Snowfall events

[Allen et al. Atmospheric transport and deposition of microplastics in a remote mountain catchment. Nature Geoscience. 2019;12:339-44]

5

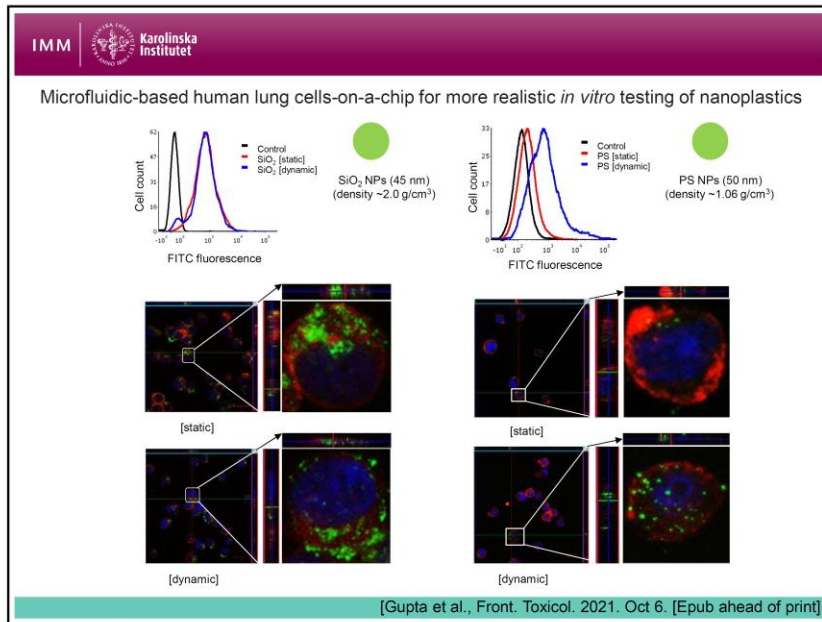
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FORSKA UTAN DJURFÖRSÖK

[A] Positive pressure source  
 [B] Pressure controller  
 [C] Input media reservoirs  
 [D] Fluidic connect pro  
 Cells-on-Chip  
 Apical chamber  
 Cells  
 Basal chamber  
 BEAS-2B  
 [E] Outlet media reservoir

[Gupta et al., Front. Toxicol. 2021. Oct 6. [Epub ahead of print]]

6



7

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- FP7-NANOMMUNE
- FP7-MARINA
- FP7-NANOREG
- FP7-NANOSOLUTIONS
- FP7-SUN
- FP7-eNANOMAPPER
- H2020-BIORIMA [biomaterial risk management]

Mistra  
**Environmental NanoSafety**  
Phase II

**GRAPHENE FLAGSHIP**

8