Supplementary Information

Assessment of the Cytotoxicity Micro- and Nano-Plastic on Human Intestinal Caco-2 Cells and the Protective Effects of Catechin

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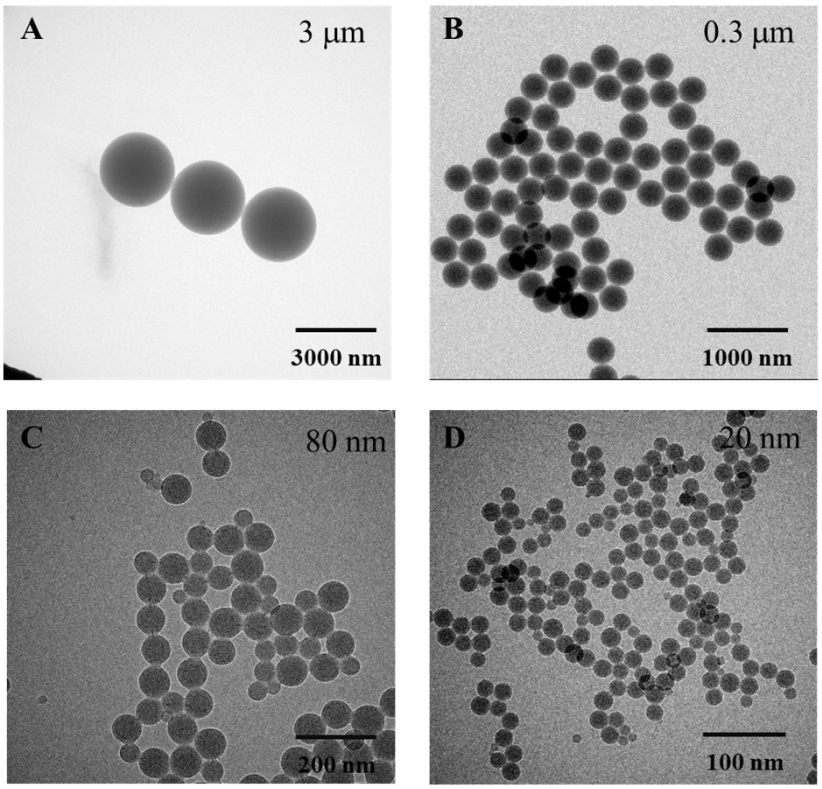

Figure S1. The morphology of PS plastic particles used in this study. (A) TEM image of 3 μm PS-NP in culture medium; (B) TEM image of 0.3 μm PS-NP in culture medium, (C) TEM image of 80 nm PS-NP in culture medium, (D) TEM image of 20 nm PS-NP in culture medium.

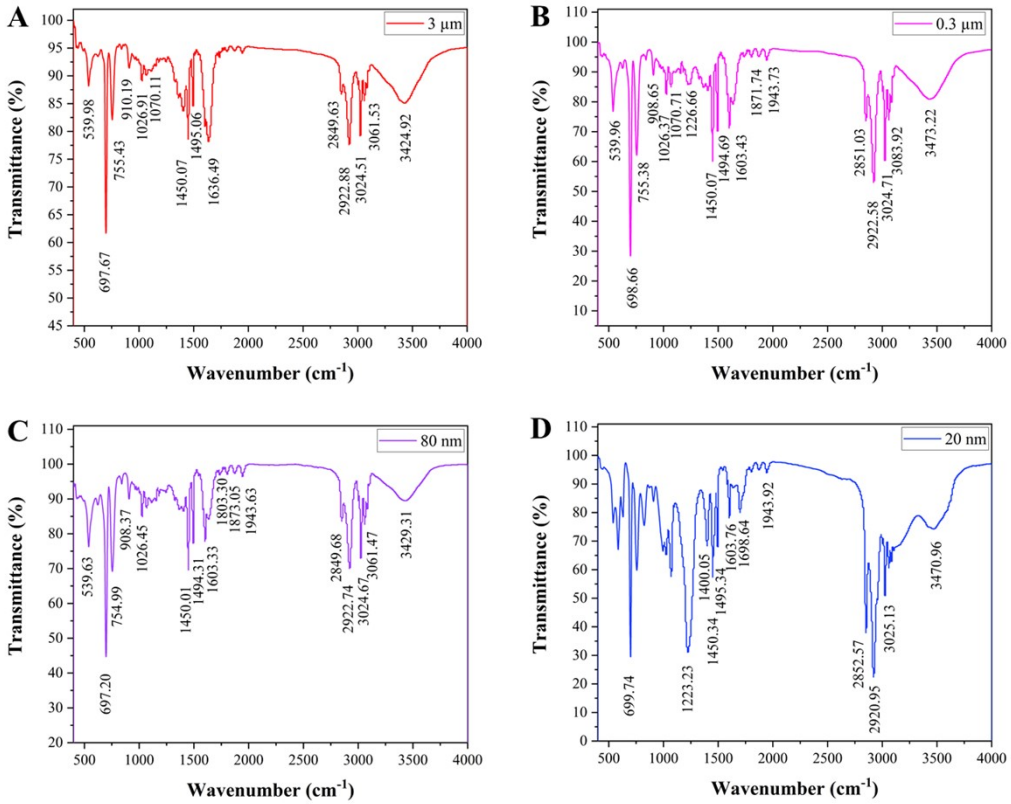

Figure S2. The composition of PS plastic particles used in this study. (A) FTIR spectrographs for the 3 μm PS plastic particles, (B) FTIR spectrographs for the 0.3 μm PS plastic particles, (C) FTIR spectrographs for the 80 nm PS plastic particles, (D) FTIR spectrographs for the 20 nm PS plastic particles.

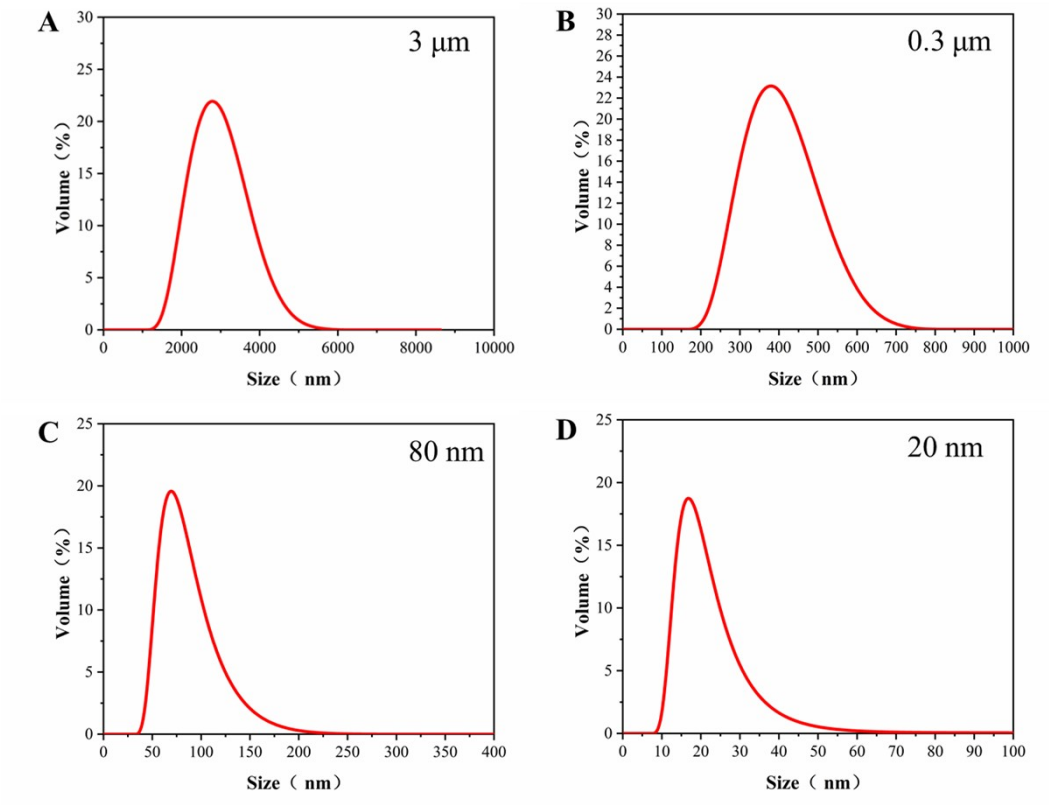

Figure S3. The particle sizes distributions of the four types of PS plastic particles in culture medium. (A) The particle sizes distribution for 3 μm PS-MP; (B) The particle sizes distribution for 0.3 μm PS-MP, (C) The particle sizes distribution for 80 nm PS-NP; (D) The particle sizes distribution for 20 nm PS-NP.

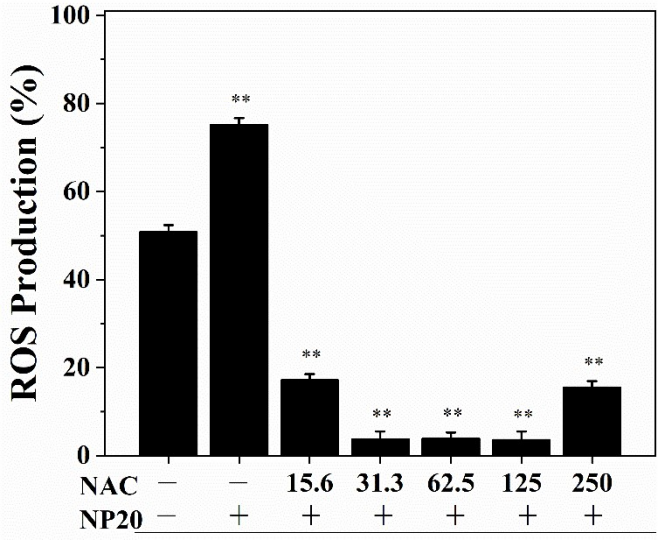

Figure S4. Scavenging effect of different concentrations of N-acetyl-L-cysteine (NAC) on ROS induced by 20 nm polystyrene nano-plastics. The results presented are the means ± SD from three independent experiments. * means $p < 0.05$ (** means $p < 0.01$), compared with the negative control group.

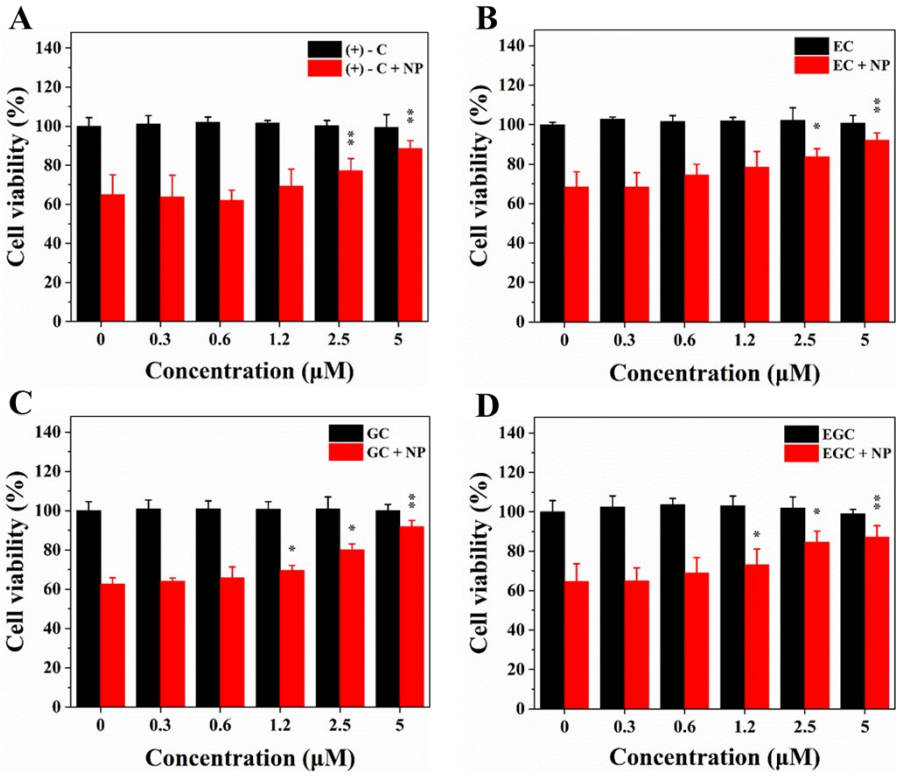

Figure S5. The protective effects of the four catechins against cytotoxicity induced by 20 nm polystyrene nano-plastics at a concentration of 20 mg/mL. The results presented are the means ± SD from three independent experiments. * means $p < 0.05$ (** means $p < 0.01$), compared with the negative control group.

Text S1. Hazard quotient (HQ).

The hazard quotients (HQ) were calculated as follows [1-2]:

HQ = Measured serum level × Uncertainty factor (UF) / PoD

PoD is the lowest observed adverse effect level (LOAEL) (3 μm: 0.01 μg/mL, ~ 674 items/mL; 0.3 μm: 0.01 μg/mL, ~674,000 items/mL;80 nm: ~ 35.5 million items/mL; 20 nm: ~ 2.27 billion items/mL). The generally accepted default UF = 300 (3 × for inter-species interpolation, 10 × for human variability, and 10 × for LOAEL to NOAEL extrapolation), and that was used. An HQ below 1 indicates an absence of risk for the particular endpoint considered, whereas HQ greater than 1 indicates exposure that may be regarded as being of concern.

REFERENCES:

1. Stoner, K. A.; Eitzer, B. D., Correction: Using a Hazard Quotient to Evaluate Pesticide Residues Detected in Pollen Trapped from Honey Bees (Apis mellifera) in Connecticut. *PLoS One* **2016,** *11* (7), e0159696.

2. Ludwicki, J. K.; Goralczyk, K.; Strucinski, P., et al., Hazard quotient profiles used as a risk assessment tool for PFOS and PFOA serum levels in three distinctive European populations. *Environ. Int.* **2015,** *74*, 112-8.