# Supplementary information for

# Dextran Coated Cerium Oxide Nanoparticles: A Computed Tomography Contrast Agent for Imaging the Gastrointestinal Tract and Inflammatory Bowel Disease

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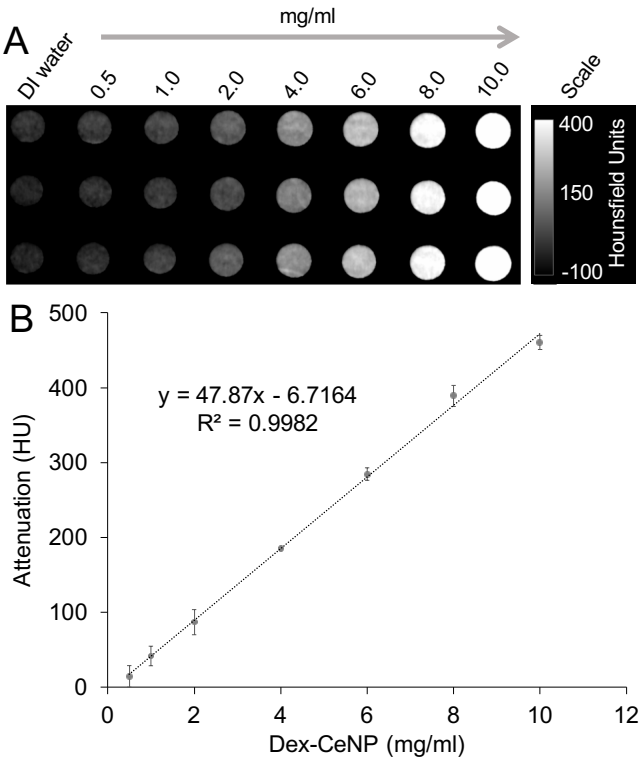


Figure S1. A) MicroCT image (Molecubes) of a phantom composed of varying concentrations of Dex-CeNP. B) Analysis of the attenuation generated from different Dex-CeNP concentrations from microCT images.

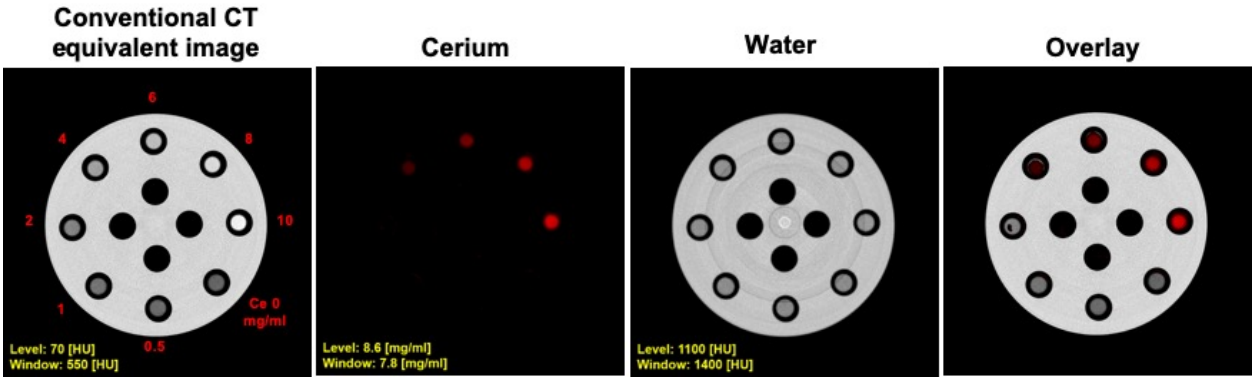


Figure S2. Spectral photon counting CT images of Dex-CeNP.

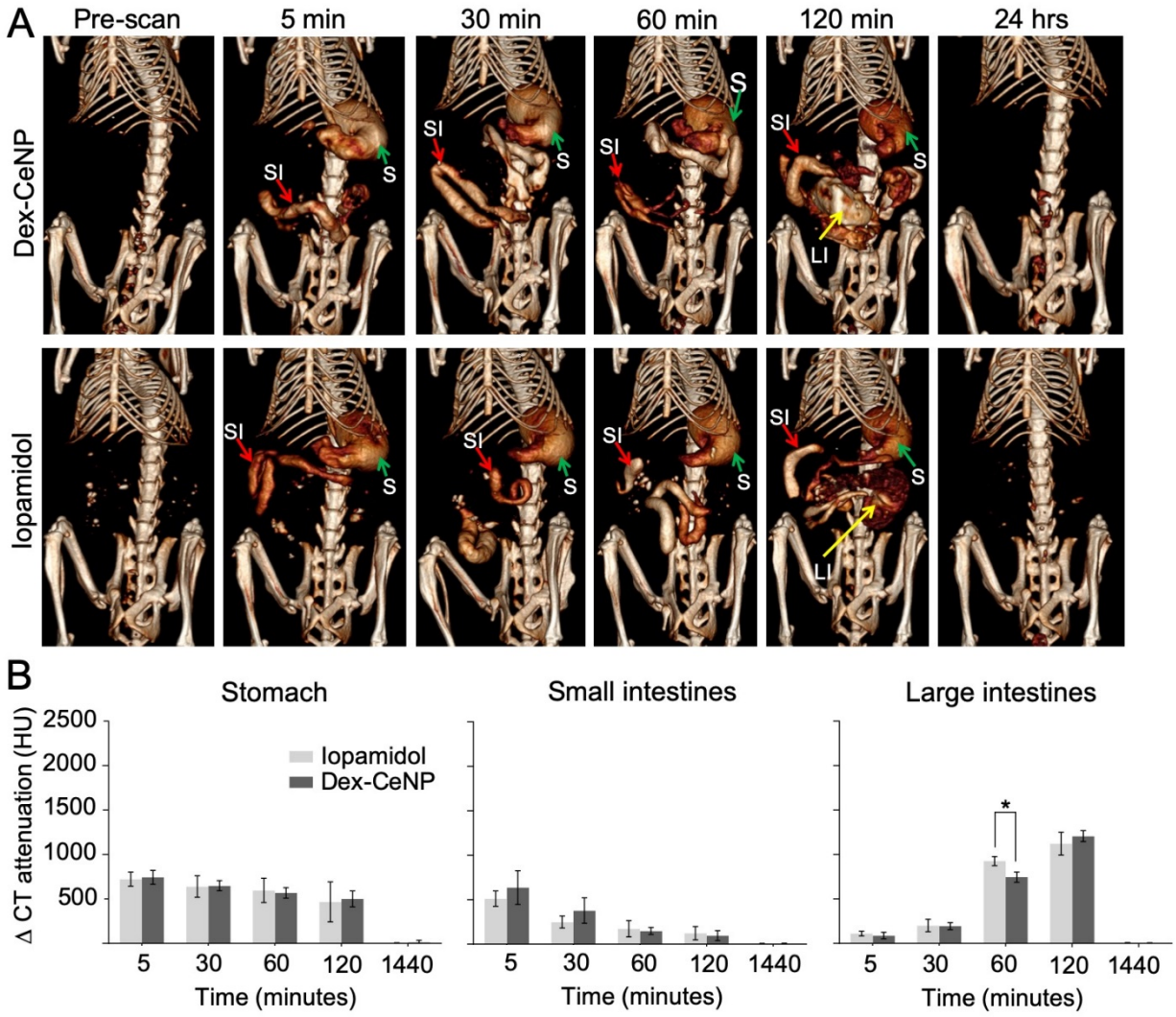


Figure S3. *In vivo* CT imaging of healthy mice that had been administered Dex-CeNP or iopamidol orally. A) Representative micro-CT images of healthy mice, pre and post oral administration of Dex-CeNP or iopamidol. 'S' indicates stomach; 'SI' indicates the small intestine; and 'LI' indicates the large intestine (images displayed with a window width of 240 HU and a window level of 380 HU). B) Quantitative analysis of the CT images acquired from healthy mice administered Dex-CeNP or iopamidol at different time points. A significant difference in CT contrast was observed in the large intestine of mice receiving Dex-CeNP and

iopamidol, at the 60 minutes time point. * indicates statistically significant differences at $p <$ 0.05. Error bars are standard deviation.

| | p-value | | | | |
|---|---|---|---|---|---|
| | 5 mins | 30 mins | 60 mins | 120 mins | 1440 mins |
| *Small intestines* | | | | | |
| Iopamidol | 0.064 | 0.425 | 0.683 | 0.037 | 0.988 |
| Dex-CeNP | 0.955 | 0.678 | 0.076 | 0.269 | 0.054 |
| *Large intestines* | | | | | |
| Iopamidol | 0.005 | 0.024 | 0.001 | 0.085 | 0.487 |
| Dex-CeNP | 0.531 | 0.930 | 0.043 | 0.010 | 0.001 |
| *Stomach* | | | | | |
| Iopamidol | 0.468 | 0.593 | 0.197 | 0.503 | 0.541 |
| Dex-CeNP | 0.336 | 0.050 | 0.047 | 0.020 | 0.118 |

Supporting Table 1. P-values of healthy *vs*. DSS-colitis mice for each agent and in each organ for CT attenuation changes over the 24 hours imaging time points.

| | **p-value** | | | | |
|---|---|---|---|---|---|
| | 5 mins | 30 mins | 60 mins | 120 mins | 1440 mins |
| *Small intestines* | | | | | |
| Healthy | 0.189 | 0.084 | 0.551 | 0.491 | 0.648 |
| Colitis | 0.001 | 0.202 | 0.519 | 0.001 | 0.063 |
| *Large intestines* | | | | | |
| Healthy | 0.264 | 0.827 | 0.001 | 0.189 | 0.955 |
| Colitis | 0.626 | 0.345 | 0.004 | 0.015 | 0.001 |
| *Stomach* | | | | | |
| Healthy | 0.652 | 0.877 | 0.656 | 0.746 | 0.187 |
| Colitis | 0.687 | 0.179 | 0.358 | 0.242 | 0.215 |

Supporting Table 2. P-values of iopamidol *vs*. Dex-CeNP for each mouse status and in each organ for CT attenuation changes over the 24 hours imaging time points.

| | **p-value** | | | | |
|---|---|---|---|---|---|
| | 5 mins | 30 mins | 60 mins | 120 mins | 1440 mins |
| *Small intestines* | | | | | |
| Mice | 0.333 | 0.926 | 0.129 | 0.209 | 0.055 |
| Agents | 0.002 | 0.025 | 0.934 | 0.158 | 0.158 |
| Mice#Agents | 0.287 | 0.424 | 0.374 | 0.012 | 0.053 |
| *Large intestines* | | | | | |
| Mice | 0.030 | 0.389 | 0.225 | 0.001 | 0.001 |
| Agents | 0.691 | 0.382 | 0.032 | 0.002 | 0.001 |
| Mice#Agents | 0.255 | 0.305 | 0.001 | 0.021 | 0.001 |
| *Stomach* | | | | | |
| Mice | 0.219 | 0.069 | 0.021 | 0.047 | 0.177 |
| Agents | 0.551 | 0.419 | 0.357 | 0.738 | 0.569 |
| Mice#Agents | 0.837 | 0.297 | 0.857 | 0.367 | 0.074 |

Supporting Table 3. Two-way ANOVA test to analyze the interaction between mouse status (healthy *vs*. DSS-colitis) and agent types (iopamidol *vs*. Dex-CeNP) and the effect of both factors on CT attenuation changes over the 24 hours imaging time points in each organ.

| p-value | | | |
|---|---|---|---|
| | Small intestines | Large intestines | Stomach |
| Mice | 0.719 | 0.027 | 0.001 |
| Agents | 0.001 | 0.001 | 0.365 |
| Time | 0.001 | 0.001 | 0.001 |
| Mice#Agents#Time | 0.260 | 0.001 | 0.869 |

Supporting Table 4. Three-way ANOVA test to analyze the interactions among mouse status (healthy *vs*. DDS-colitis), agent types (iopamidol *vs*. Dex-CeNP) and time points (5 to 1440 minutes) and the effect of all three factors on CT attenuation changes in each organ.

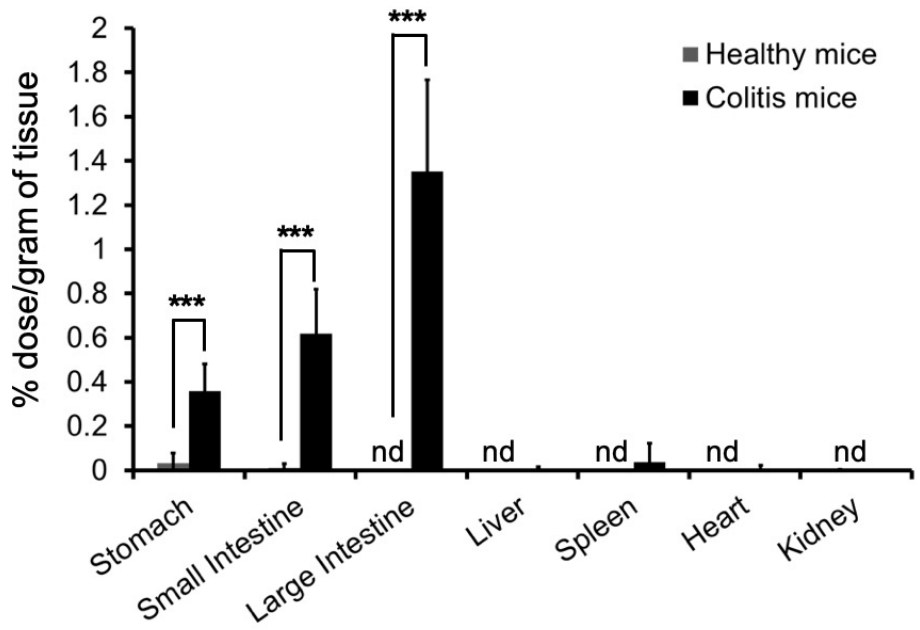


Figure S4. Biodistribution of Dex-CeNP in healthy and DSS-colitis mice at 24 hrs post administration. *** indicates statistically significant differences in at $p < 0.001$. 'nd' stands for not detected. Error bars are standard deviations.