

## Structure and Elasticity of Composite Nanoparticle/Polymer Nanoshells (hybridosome®)

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### 1. Re-swelling of the hybridosomes after osmotic compression

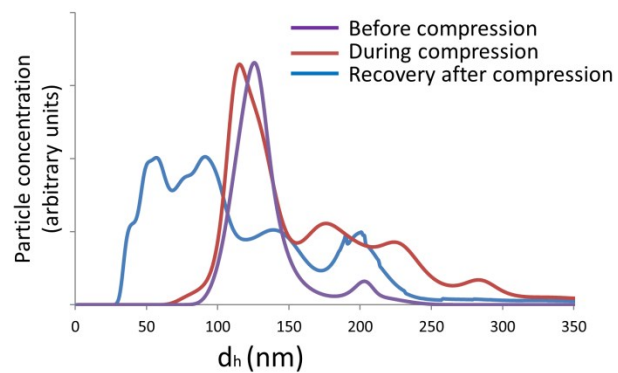


Figure S1: Size distribution of SPION hybridosomes before compression, during osmotic compression (PEG 10k, 150 g/L) and after magnetic separation and washing.

## 2. Fit of the linear compression domain.

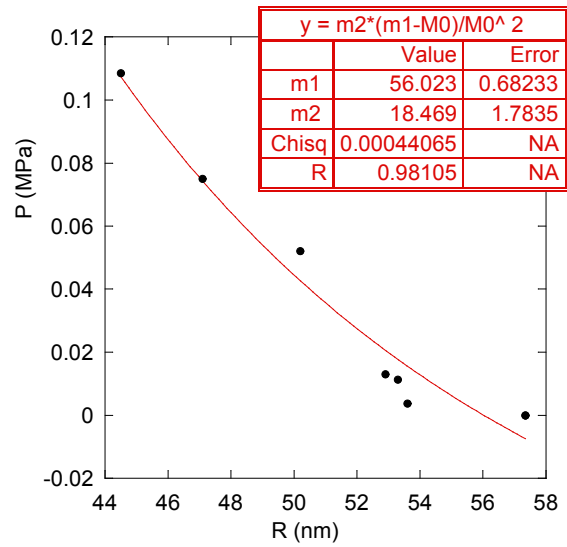


Figure S2: The data of figure 4a were merged for PEG 10K, and 20K and plotted as Pressure vs Radius and then fitted with Eq. 1.

## 3. Liquid AFM: Imaging applying increasing tip-sample interaction forces

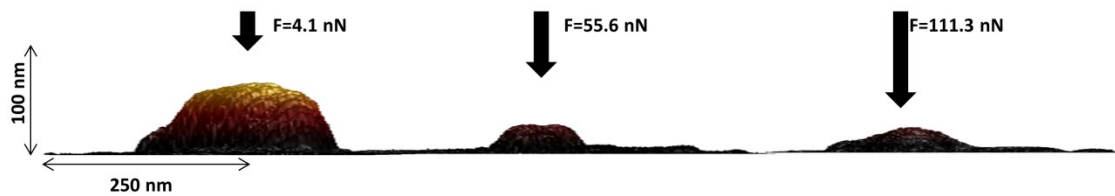


Figure S3: Height AFM images showing the evolution of the morphology of a single hybridosome at increasing values of loads from around 4 nN to 111 nN.

#### 4. Influence of the IONPs composition of the membrane on susceptibility to osmotic pressure

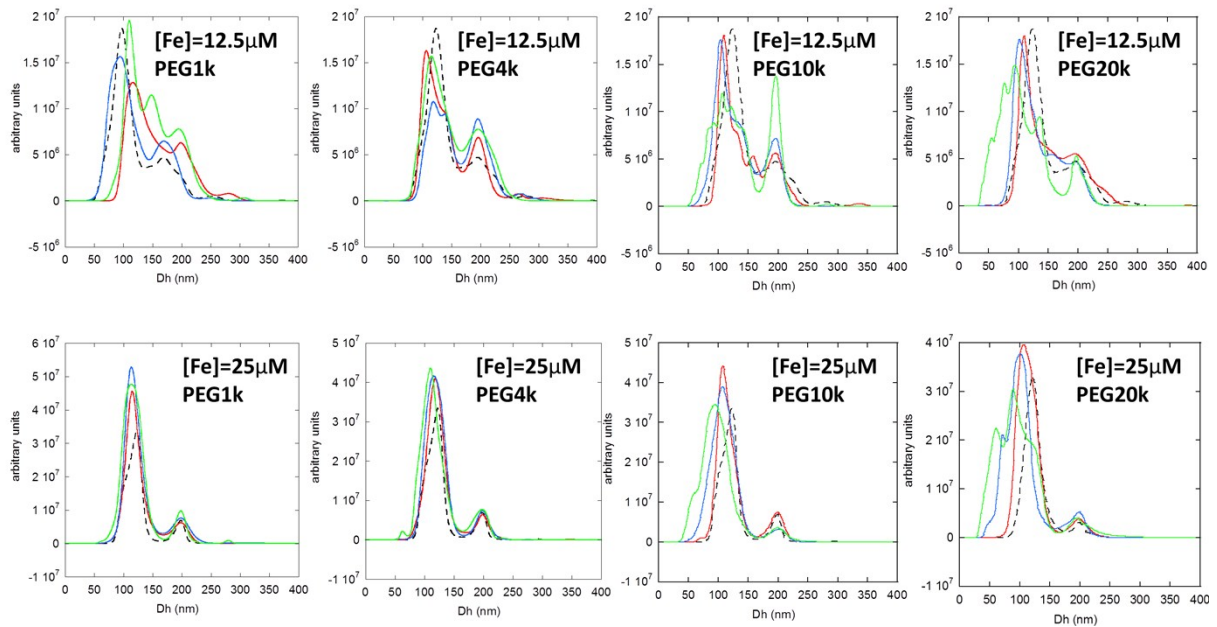


Figure S4: Osmotic compression of hybridosomes prepared from two different concentrations of IONPs ( $[AA]=2.25mM$ ) :  $[Fe]=12.5\mu g/ml$  (top row) and  $[Fe]=25\mu g/ml$  (bottom row), using PEG of different molecular weights: 1k; 4k; 10k; 20k, as indicated on graph. PEG concentrations: 0 g/L (black, dashed), 15 g/L (red), 50 g/L (blue), 75 g/L (green).