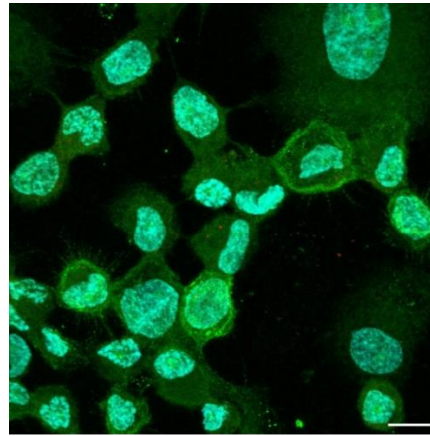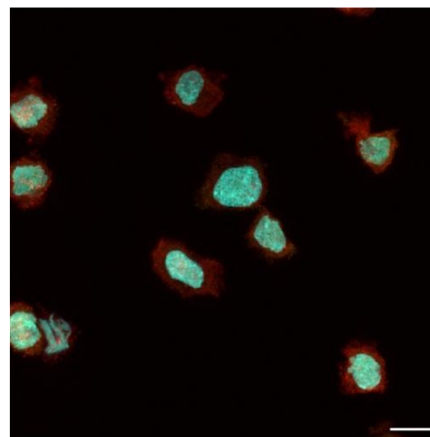*Supporting Information (SI).*

Immunofluorescence (IF)

(a)

(b)

Figure S1 a) THP-1 PMA 16h activated macrophage cells green signal for CD55 expression **b)** THP-1 not PMA treated cells (monocytes) red signal for CD33 expression.
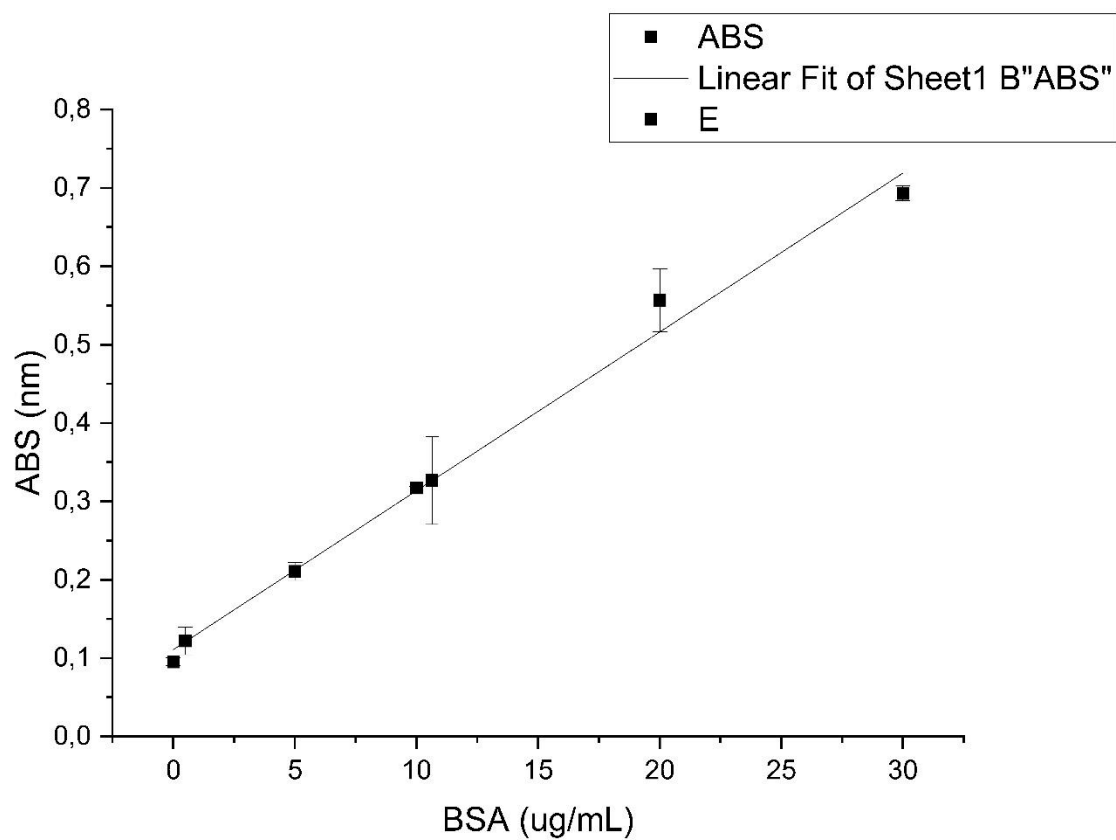
Membrane extraction and characterisation

Figure S2. BCA calibration curve.

Table S1. Data from deconvolution analysis of CD spectra for isolated plasma membrane of monocytes and macrophages.

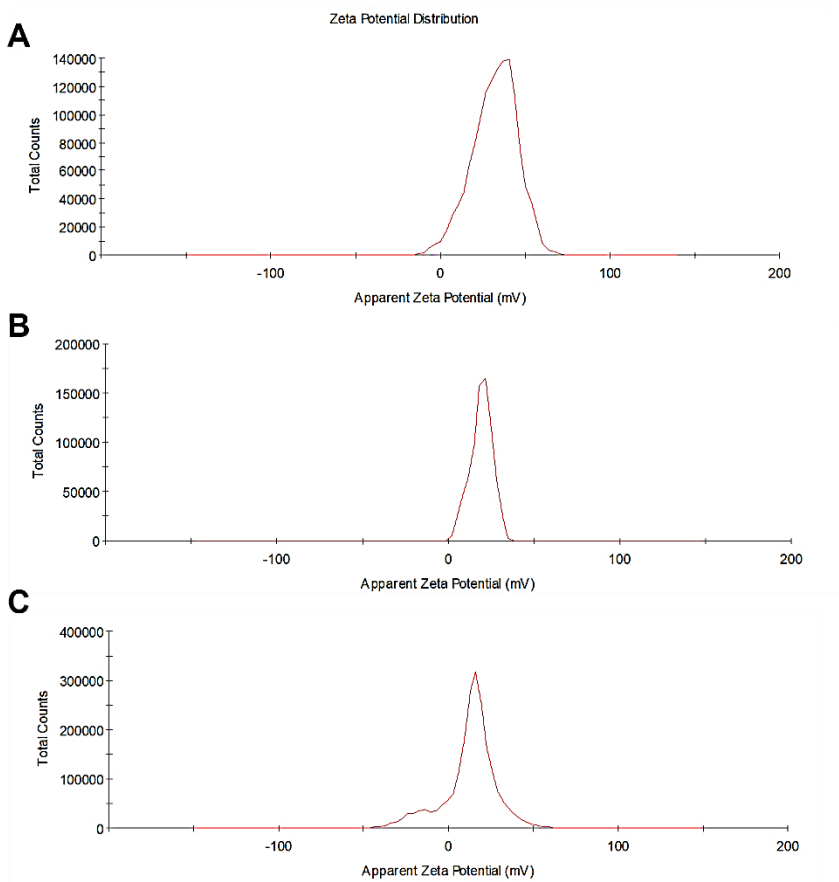| Sample	α-helix (%)	β-sheet (%)	Random (%)
Monocytes	40.7	15.0	44.3
Macrophages	36.5	16.3	47.2

Biomimetic NEsoSome development

Figure S3. ζ-potential distributions of **a)** NEsoSome, **b)** M-NEsoSome and **c)** M0-NEsoSome.
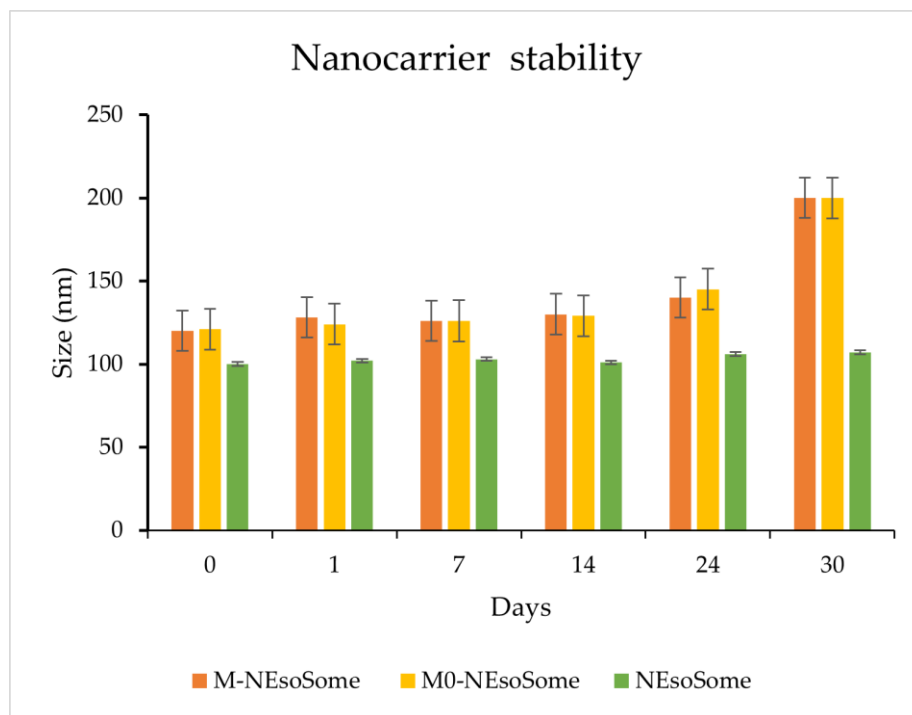
Figure S4 Dimensional stability over the time of NEsoSome, M-NEsoSome and M0-NesoSome. Data are reported as mean (n=3) ± SD.

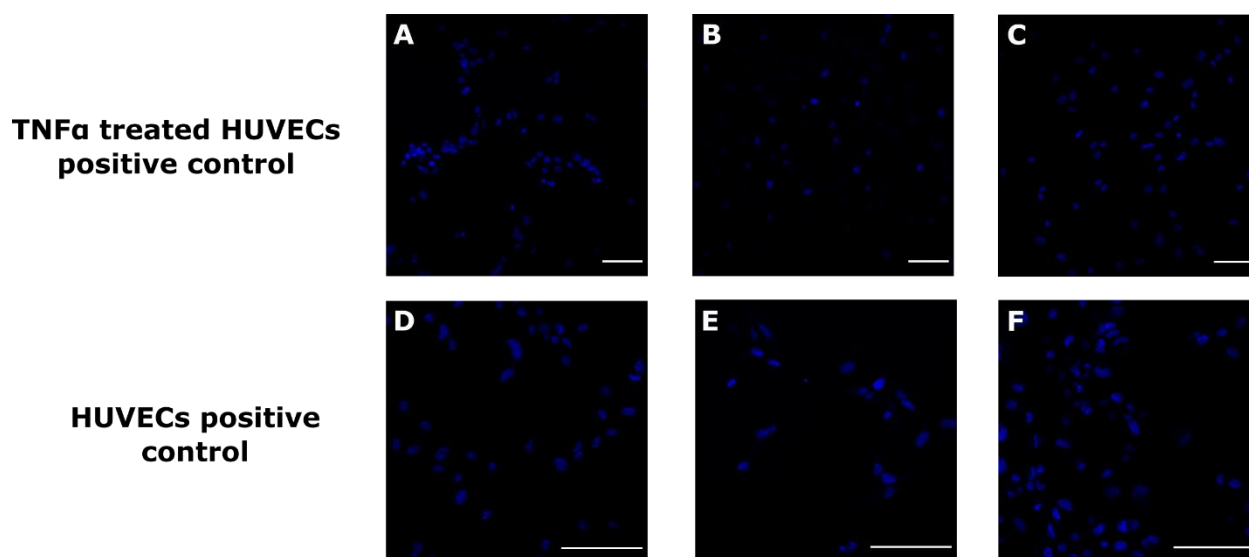## *In vitro* accumulation analysis in HUVECs

Figure S5. Positive control (treatment with cell medium) at different time points of TNFα treated HUVECs (**a**, **b**, **c**) and healthy HUVECs (**d**, **e**, **f**).

A

TNFα HUVECs

□ 30 min ■ 24h ■ 48h

%MFI/n cells

NEsoSome   M-NEsoSome   M0-NEsoSome
Time

B

HUVECs

□ 30min ■ 24h ■ 48h

%MFI/n cells
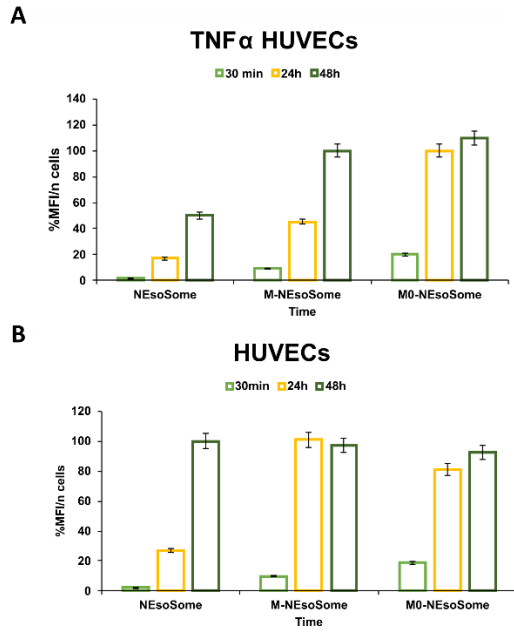
NEsoSome   M-NEsoSome   M0-NEsoSome
Time

Figure S6. Plot of mean fluorescence intensity of nanocarrier normalised to cell number. TNFα HUVECs (**a**) and HUVECs (**b**) were treated with NEsoSome, M-NEsoSome and M0-NesoSome at different time points: 30min, 24h and 48h. Data are reported as mean (n=5) ± SD.