Electronic Supplementary Material (ESI) for Biomaterials Science.

SUPPLEMENTARY FILES

Supplementary File 1. Selected strains from the phytoplankton culture collections at IT Sligo and CCAP. [a] Indicates that the genome of the species has been sequenced.

Supplementary File 2. Decision grid for the selection of EV-producing microalgae strains. Legend to the table - W=weight of criterion (1=low; 2=medium; 3=high impact); A=Assessment of option (1=low; 2=medium; 3=high adherence to criteria); Result=AxW.

Supplementary File 3. SEM images of a sample process control carried out with PBS instead of microalgal EV preparations showing small amounts of residual spherical osmium nanoprecipitates (as suggested by separate energy dispersive X-ray spectroscopy), which can be caused by aldehyde and alcohol containing reagents.

Supplementary Files 4-9. Microalgal EV identity cards: characterisation of extracellular nanoparticles isolated from conditioned media of the indicated microalgal strains. (A) summary scheme on the taxonomy of the microalgal strain; (B) total protein quantification and number of particles of sEV and lEV fractions (data were calculated in triplicate cultures; results are presented by the average value ± standard deviation); (C) nanoparticle tracking analysis (NTA) of sEVs (the distribution error, in red, is calculated using 5 measurements of the same sample); (D) dynamic light scattering (DLS) analysis of sEVs (the distribution error, in red, is calculated using 3 measurements of 3 different samples); (E) representative images of SEM of the sEV fractions; (F) a representative immunoblot of a positive control (lysate of a mammalian cell line, C2C12), microalgal cell lysate, sEV, and lEV fractions.

Supplementary File 10. Correlation matrix for the selection of EV-producing microalgae strains over the following variables: (1) EVs protein content with respect to culture medium in terms of BCA assay, (2)-(4) the amount of EV markers for enolase, Alix, b-Actin in terms of band densitometry, (5) the total scattering signal for sEV sample (with equal protein concentration), (6) the average size, (7) the size range, in terms of Polydispersity Index, PDI (measured as the ratio of the variance and the square average of the size distribution). Given the vector X_i (i=1,..7) including the N=18 values for each of the 7 variables considered, one may derive a centered and normalised vector $Z_i = [X_i - \text{mean}(X_i)]/\text{variance}(X_i)/\text{sqrt}(N-1)$, and the (18x7) data matrix Z, whose columns are the vectors Z_i. Given Z' as the transpost of Z, the correlation matrix is defined as the product Z'Z. In the table, the values are reported in terms of percentage.