Phage display technology: a target-guided method for tumor derived exosomes characterization

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Exosomes are small extracellular vesicles that contain a wide range of RNA and proteins, playing an important role in cell-to-cell communication. Due to their naturally biocompatible characteristics, exosomes are ideal natural nanocarriers for clinical application. Phage display technology can be exploited in order to develop engineering options devoted to a target-specific release.

The Epidermal Growth Factor Receptor (EGFR) is a key regulator of tumor cell growth and progression. By phage display, we identified two peptide sequences, 01cys_EGFR and 06cys_EGFR, showing high ability binding to the EGFR expressed by MDA-MB-231, a triple-negative breast cancer (TNBC) cell line compared to EGFR-silenced negative control cells. Dedicated bioinformatics tools evaluated peptide-EGFR interaction site and binding affinity. Binding specificity of EGFR-specific peptides in TNBC cells was confirmed by confocal microscopy.

Taking advantage of this knowledge, already validated tumor-specific peptides will be/ can be employed in designing smart exosome-like nanoparticles to be validated as novel tools for precision medicine in cancer management.