

1 – Descrivere il Neuroblastoma ed il ruolo degli esosomi nella metastasi.

2 – Quali sono i principali vantaggi delle tecniche microfluidiche nelle applicazioni biomediche.

3 – Vantaggi e svantaggi delle tecniche di colture cellulari in 3D

Competenze informatiche:

Sistemi di gestione dei materiali e reagenti in laboratorio, ordini, giacenze e inventario.

Conoscenza della lingua inglese:

van Niel et al., *Nature Reviews – Molecula Biology*, 2018.

Even though the generic term extracellular vesicles is currently in use to refer to all these secreted membrane vesicles, they are in fact highly heterogeneous (FIG. 1), which has largely hampered their characterization and manipulation of their properties and functions. Insights into the biogenesis of secreted vesicles were provided by transmission and immuno-electron microscopy and by biochemical means⁸⁻¹⁰. Based on the current knowledge of their biogenesis, extracellular vesicles can be broadly divided into two main categories: exosomes and microvesicles (FIG. 1 a).

- 1 – Descrivere le principali tecniche di screening per il neuroblastoma.
- 2 – Descrivere i principali vantaggi dell'utilizzo dei bioreattori nei processi di colture cellulari
- 3 – Descrivi la tecnica dell'SDS-PAGE e *western blot*.

Competenze informatiche:

Descrivi i principali software per l'elaborazione e presentazione dei dati.

Conoscenza della lingua inglese:

van Niel et al., *Nature Reviews – Molecular Biology*, 2018.

First, cargoes scheduled for secretion within extracellular vesicles must be targeted to the site of production, either at the plasma membrane (for microvesicles) or at the limiting membrane of the MVE (for exosomes). Second, cargoes are enriched in the forming vesicles by a stepwise mechanism of clustering and budding followed by fission and vesicle release (FIG. 2).

- 1 – Descrivere le potenzialità delle colture 3D nello studio del Neuroblastoma.
- 2 - Quali sono i principali vantaggi delle tecniche microfluidiche nello studio del neuroblastoma.
- 3 – Descrivi brevemente la tecnica del *Next Generation Sequencing* (NGS)

Competenze informatiche:

Elencare i principali programmi per l'analisi statistica dei dati.

Conoscenza della lingua inglese:

van Niel et al., *Nature Reviews – Molecular Biology*, 2018.

The discovery of the ESCRT machinery as a driver of membrane shaping and scission was the first breakthrough in uncovering the mechanisms involved in the formation of MVEs and ILVs⁴¹. The ESCRT machinery acts in a stepwise manner wherein ESCRT-0 and ESCRT-I subunits cluster ubiquitylated transmembrane cargoes on microdomains of the limiting membrane of MVEs and recruit, via ESCRT-II, the ESCRT-III sub-complexes that perform budding and fission of this microdomain (FIG. 2). Accordingly, HRS (ESCRT-0; also known as HGS) appears to be required for exosome formation and/or secretion by dendritic cells⁴².