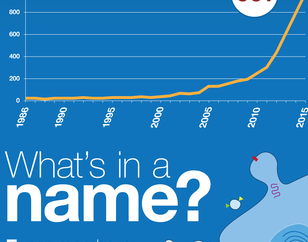
BECKMAN COULTER Life Sciences

EXPLORING EXOSOMES

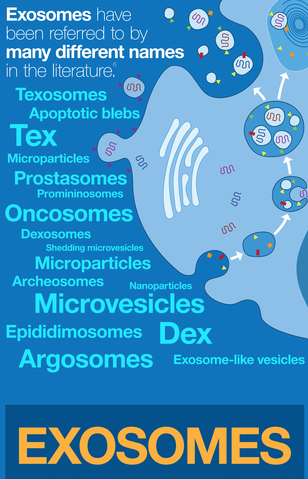
Exosomes are small (30-100 nm) secreted extracellular microvesicles involved in the transport of bioactive molecules between cells. First described as prostasomes in 1977[1], and further characterized in the early 1980s as secretory vesicles in cultured reticulocytes[2,3], the term exosome was applied to these extracellular microvesicles in 1987.[4] In the last 30 years, exosome research has exploded.

Number of publications on "**exosome**" in PubMed[5]



What's in a name?

Exosomes have been referred to by **many different names** in the literature.[1]



EXOSOMES

...contain various molecular constituents of their cell of origin, including:

- **Lipids**
- **Proteins**
- **DNA**
- **RNA**
- **MicroRNA**
- **Long Non-coding RNA**

...are secreted by most cells and can be isolated from nearly all tissue samples and body fluids, including:

- **Plasma**
- **Urine**
- **Saliva**
- **Semen**
- **Cell Culture Media**

From what **sample types** do researchers most **commonly study** exosomes?

59% Cell Culture
24% Plasma
9% Tissue
2% Urine

Emerging roles for Exosomes

Neuroscience

Exosomes facilitate the transfer of information between all neural cell types and are involved in normal development and intercellular communication. Exosomes have also been implicated in neurodegenerative disorders, such as Alzheimer's disease, Parkinson's disease, and prion diseases.[8]

Oncology

Exosomes are enriched in the tumor microenvironment, and cancer cells secrete exosomes that influence tumor development and metastasis.[9]

Immunology

A wide range of immune cells secrete exosomes, including macrophages, dendritic cells, B cells, T cells, mast cells, natural killer cells, and macrophages. Exosomes have been implicated in immune activation, immune suppression, immune surveillance, and antigen presentation.[10]

Infectious Disease

Pathogen-derived materials, including viruses, bacteria, fungi, and particles, have been identified packaged in exosomes. These exosomes can modulate the immune response and, in some cases, may function to help the pathogen evade or inhibit the host's immune system.[11]

Exosomes as Biomarkers

Exosomes contain a great wealth of molecular information from their cell of origin. Scientists are exploring the potential to use exosomes as a non-invasive tool to diagnose and monitor patients during disease progression, including cancer, infection, neurodegeneration, and other pathologies.[12]

Exosomes and Drug Delivery

Scientists are examining the effectiveness of exosomes as a drug delivery system for the in vivo targeting of therapeutics with low immunogenicity and toxicity.[13]

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