EXPERIMENTAL RHEUMATOLOGY

Title

Unraveling the function of exosomes in rheumatoid arthritis patients and studying their biological effects.

Clinical Relevance

Previously exosomes were considered to be cellular waste products but nowadays it is known that they play a key role in intercellular communication [1]. They have been identified in a number of biological fluids such as blood, saliva, urine and breast milk [2] and are also detected in synovial fluid and plasma obtained from rheumatoid arthritis (RA) patients [3]. RA patients are treated with many different therapies, however it is still unknown whether a patient will react positively to the therapy of choice beforehand. Developing a non-invasive assay based on the detection of exosomal content (eg. miRNAs, proteins, etc.), which will predict the effect of specific treatments in RA-patients would be of great benefit.

1- Théry, C., et al. *Exosomes: composition, biogenesis and function.* Nature Reviews Immunology, 2002. **2**(8): p. 569-579.

2- Caby, M.-P., et al., *Exosomal-like vesicles are present in human blood plasma.* International immunology, 2005. **17**(7): p. 879-88

3- Koichi Murata, et al. *Plasma and synovial fluid microRNAs as potential biomarkers of rheumatoid arthritis and osteoarthritis.* Arthritis Research & Therapy 2010, **12**:R86

Background

Exosomes are extracellular membrane vesicles secreted by a variety of cells and are heterogeneous in size, ranging from 30-120 nm in diameter. The production of exosomes has been reported for many different cell types including macrophages, lymphocytes, dendritic cells as well as epithelial and tumor cells. There is a growing interest in the clinical applications of exosomes which carries immunoregulatory miRNAs, mRNAs and proteins, because they can be taken up by other cells. One of the most regulated factors are miRNAs which can bind to the RNA resulted in blocking of the translation of proteins with consequences on their cell function. It is known that the exosome content is different in patients and therefore it is very interesting to study the role of these exosomes in rheumatoid arthritis.

Click here for the explanation: "What is an exosome"

http://www.youtube.com/watch?feature=player_embedded&v=sE2krsErbwI

Goals

I'm developing techniques in our lab to isolate the exosomes from body fluids, characterize them as biomarkers and study their biological function *in vitro* on antigen presenting cells and *in vivo* in arthritis models. With the knowledge of the function of these exosomes I hope to develop a biomarker assay for RA-patients that can predict therapy efficiency and clinical outcome of diease.

We Offer

A passionate and creative team where you can learn a lot of different techniques (cell culturing, PCR, cloning, IHC, Reporter assays, Elisa, Gene Therapy, Nanosight, EM) and where you can develop your creativity in a new research field called exosomes.

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