DOI: 10.1002/jev2.12224

ISEV2022 Abstract Book

About ISEV

The International Society for Extracellular Vesicles is the leading professional society for extracellular vesicle research. ISEV's mission is advancing extracellular vesicle research globally. Our vision is to be the leading advocate and guide of extracellular vesicle research and to advance the understanding of extracellular vesicle biology.

ISEV2022 Annual Meeting

The ISEV annual meeting is the premier international conference of extracellular vesicle research, covering the latest in exosomes, microvesicles and more. With an anticipated 1,000+ attendees, ISEV2022 will feature presentations from the top researchers in the field, as well as providing opportunities for talks from students and early career researchers.

ISEV2022 International Organizing Committee

IOC Chairs: Lorraine O'Driscoll (Ireland), Sophie Rome (France)
IOC Members: Yu Fujita (Japan), Bernd Giebel (Germany), David Greening (Australia), Soazig Le Lay (France), Metka Lenassi (Slovenia), and Ken Witwer (USA)

Journal of Extracellular Vesicles: Editor in Chief

Jan Lötvall (Sweden)

Note from the International Organizing Committee

Names and affiliations of authors are as entered by the submitters. Some names of session chairs may be missing or incorrect because of last-minute declines, acceptances, or other changes.

Methods: We set up a method in which MSC-EV were labelled with a common fluorescent lipophilic dye, DiR (1,1-dioctadecyl-3,3,3,3-tetramethy-lindotricarbocyanine iodide), and then were extensively washed with PBS using 100kDa Amicon filters. Two different administration routes were tested in vivo, intravenous (IV) and intratracheal (IT). DiR-EV were administered in Balb/C mice (2.0x1010 EV/mice) and monitored at 1, 3 and 24h. A negative control group receiving the dye alone was included to correct for non-EV specific signal.
Results: Whole body analysis, after 3h from IV injection, showed accumulation of EV in the spleen and liver, compared to IT EV injection, where EVs localized in lungs and trachea. After 24h mice treated with IV EV injection showed a stronger positivity in the abdominal region of the body and a low signal in the low posterior region. The analyses of isolated organs confirmed the accumulation of EV in spleen, liver, and lungs. A positive signal was also detected in lymph nodes, heart, intestine and kidney. After 24h from IT EV injection a stronger positivity was detected selectively in the isolated lungs. Heart, intestine and kidney were characterized by low positive signals
Summary/Conclusion: Analysis of the in vivo imaging data, highlights a selective delivery and permanence of EV cargo in specific organs based on their route of administration. In particular, these results show that IT administration can increase the concentration of MSC-EV in the target organ, limiting their systemic biodistribution and possibly extra-pulmonary effects. This data can help both selecting the most appropriate way of administration of MSC-EV and understanding their mechanism of action for the treatment of lung diseases

PT05.06 | Evaluation of secretome enriched in human MSC-EV: characteristic's and immunomodulatory effects

Guillaume Valade[1]; Bileyle Lorenzini[2]; Marion Grosbot[3]; Bastien Rival[3]; Sylvie Goulinet[4]; Philippe Mauduit[4]; Marina Trouillas[3]; Sébastien Banzet[3]; Juliette Peltzer[3]
[1]Institut de Recherche Biomédicale des Armées - INSERM UMR-MD 1197, Clamart - (92140), France; [2]INSERM UMR-MD 1197, Villejuif, France; [3]Institut de Recherche Biomédicale des Armées / INSERM UMR-MD 1197, Clamart, France; [4]Inserm UMR-MD 1197, Villejuif, France

Introduction: Hemorrhagic shock can lead to immediate death by bleeding or later by organ failure. The early administration of mesenchymal stromal cells (MSC) moderates the immune response and reduces organ dysfunction. Here, we explore the therapeutic potential of biological products based on MSC-derived extracellular vesicles (MSC-EVs). Such products, easily stored and available immediately, would be very convenient for emergency use. Our aim is to explore in vitro, the anti-inflammatory and immunomodulatory potential of MSC secretome, more or less enriched in EV, and to evaluate the effects of the culture conditions on secretome characteristic's.
Methods: The conditioned medium (CM) enriched in MSC-EVs was obtained after 72h, from a pool of 9 donors of human bone marrow MSCs, either in depleted medium (α-MEM only) or in association with EV-free platelet lysate. The secretomes were purified by Tangential Flow Filtration (TFF) +/- size-exclusion chromatography (SEC). Three types of enrichments were evaluated, depending on filtration conditions: i) purified EVs fraction, ii) soluble proteins fraction and iii) the association of EV and soluble proteins. Their immunomodulatory properties were evaluated in vitro by mixed leucocyte reaction (MLR) and anti-inflammatory assay.
Results: In EV free platelet lysate condition, we found a better cell survival and MSC-EVs secretion than in α-MEM only. Preliminary results showed a dose-dependent immunosuppressive effect in MLR and an anti-inflammatory activity of EVs fraction. Functional activity of the other different fractions is in progress.
Summary/Conclusion: These preliminary results show an improvement in the production of secretomes enriched in MSC-EVs, by reducing production times and by increasing the amount of EVs produced and ultimately, by reducing costs. We are now trying to find out which fraction would be the most efficient in our applications.

PT05.07 | EVs from Trichinella spiralis muscle larvae exert immunomodulatory potential in chronic inflammatory Th2 disorders

Sofija Glamočlija[1]; Anna Schmid[2]; Nataša Ilić[1]; Alisa Gruden-Movsesijan[1]; Saša Vasilev[1]; Irma Schabussova[2]; Maja Kosanović[1]
[1]Institute for the Application of Nuclear Energy, INEP, University of Belgrade, Belgrade, Serbia; [2]Medical University of Vienna, Vienna, Austria

Introduction: Excretory-secretory products of Trichinella spiralis muscle larvae (ES L1) have immunomodulatory properties i.e. reduce hypersensitivity to both allergens and autoantigens. Recently, we have shown that extracellular vesicles isolated from ES

L1 (TsEVs) exert immunomodulatory properties on human monocyte derived dendritic cells. Now, we aim to investigate whether TsEVs can also exert beneficial immunomodulatory effects in murine model of ovalbumin (OVA)-induced allergy.
Methods: TsEVs were enriched from ES L1 by differential centrifugation and ultrafiltration. Experimental allergic airway inflammation was induced in BALB/c mice by intraperitoneal injection of OVA in alum on days 1 and 14. On days 21-24 mice were challenged with intranasal application of OVA, 30 min after intranasal administration of TsEVs or PBS and sacrificed two days later. Blood samples were taken for serum IgE determination. Lungs and spleens were extracted for the isolation of immune cells. Phenotype of immune cells was determined by flow cytometry and their cytokine production by ELISA assays.
Results: TsEVs treatment of allergic mice lead to diminished numbers of alveolar macrophage and CD103+ dendritic cells (DC) in lungs compared to allergic control while numbers of CD11b+ DCs and their Ly6C+ subset was increased, along with CD8+ and CD19+ T cells. Upon restimulation with OVA, splenocytes and lung immune cells of TsEVs-treated mice produced lower levels of Th2 cytokines, while the production of IFN-g was elevated only in lung immune cells. Lower IgE levels were found in TsEVs-treated mice compared to sham-treated controls.
Summary/Conclusion: TsEVs exert immunomodulatory properties in murine model of allergic airway inflammation by diminishing inflammation and thus they may represent the basis for novel allergen-independent therapeutics in treatment of respiratory allergies.

PT05.08 | Exploring the potential of mesenchymal stem cell extracellular vesicles as novel therapeutics for inflammatory bowel disease

Mona Belaid[1]; Giorgia Pastorin[2]; Driton Vllasaliu[3]
[1]King's College London (KCL) and National University of Singapore (NUS), London, United Kingdom; [2]National University of Singapore, Singapore, Singapore; [3]King's College London, London, United Kingdom

Introduction: Mesenchymal stem cell (MSC) extracellular vesicles (EVs) show great promise for repair and regeneration of injured tissues and their immunomodulatory effect makes them strong potential therapeutics for inflammatory bowel disease (IBD), which was the focus of this work.
Methods: Conditioned medium (CM) was harvested from cultured human bone marrow MSCs to isolate EVs. CM was precleared of dead cells and cellular debris by differential centrifugation at 4°C at 500g for 5 min twice then 2000g for 15 min. The recovered supernatant was filtered through 0.22 μm filters and subjected to ultracentrifugation onto a 25% (w/w) sucrose cushion prepared in deuterium oxide. After centrifugation at 100,000g at 4°C for 1.5 h, the sucrose layer was resuspended in phosphate-buffered saline (PBS) and washed by ultracentrifugation at 100,000g at 4°C for 1.5 h to pellet the EVs. The EVs were then resuspended in PBS and stored at − 80°C for further use. Isolated MSC EVs were characterised for yield, size and protein marker expression using bicinchoninic acid assay, nanoparticle tracking analysis and the Exo-Check antibody array kit, respectively. A wound healing (scratch) assay evaluated the effect of MSC EVs on the proliferation of intestinal epithelial Caco-2 cells, while the anti-inflammatory activity of MSC EVs was determined in LPS-activated macrophages via nitrite quantitation.
Results: MSC EVs were < 200 nm in diameter and EV protein marker expression was confirmed by the presence of tetraspanins CD63 and CD81 and cytosolic proteins TSG101 and ALIX. The scratch assay showed that Caco-2 cells treated with MSC EVs demonstrated accelerated wound closure over time compared to control. Furthermore, an effect of MSC EVs on nitrite concentrations in activated macrophages was apparent.
Summary/Conclusion: In conclusion, MSC EVs exhibit wound repair and anti-inflammatory activity which could have potential therapeutic applications in IBD.

PT05.09 | Extracellular vesicles from senescent mesenchymal stromal cells preserve their senoprotective effect in osteoarthritis

Jérémy Boulestreau[1]; Marie Maumus[2]; Christian Jorgensen[3]; Daniele Noël[1]
[1]Inserm, Montpellier, France; [2]Bauerfeind, Montpellier, France; [3]University of Montpellier, Montpellier, France

Introduction: Osteoarthritis (OA) is the most prevalent rheumatic disease characterized by progressive loss of cartilage and alterations in all compartments within joints. The highest risk factor in this degenerative disease is age and an accumulation of senescent cells in cartilage and synovium has been shown to contribute to the functional decline of joints. We previously demonstrated that extracellular vesicles (EVs) from mesenchymal stromal cells (MSCs) largely mediate the therapeutic effect of parental cells in OA. Here, we investigated whether EVs from adipose tissue-derived MSCs (ASC-EVs) possess senoprotective effects in a new model of induced senescence in OA chondrocytes.
Methods: Human chondrocytes isolated from OA patients and ASCs from healthy donors were induced to senescence using 25μM etoposide for 24 hours. Senescence was assessed by quantifying proliferation rate, SA-βGal activity, nuclear γH2AX foci