CHRD 2021: Abstract & Poster Submission Form

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Research Category:

- ◉ Basic Science
- ○ Clinical
- ○ Community Health / Policy

What was your role in the project?

- ☐ Design
- ☑ Perform Experiments
- ☑ Analyze Data
- ☑ Write Abstract
- ☐

Presenter Status:

- ○ Undergraduate Students
- ◉ Masters Student
- ○ PhD Student
- ○ Post-Doctoral Fellows
- ○ Residents
- ○ Non-Trainee

Title

Frailty status alters the biophysical composition of extracellular vesicles

Background

Frailty is characterized by a decrease in functional capacity that results in increased dependence over time. Often quantified on a spectrum of robust to pre-frail to frail, its prevalence increases with age. However, young people can also be frail if they have low functional capacity, or as a comorbidity of certain chronic diseases e.g. asthma.

Objective

Our objective was to characterize the changes in the biophysical characteristics of extracellular vesicles (EVs), small membranous nanoparticles released by all cells that are essential to cellular communication, with frailty status.

Methods

Plasma from robust, and frail women as determined by the frailty index (64±5.9 years , WARM hearts study (REB H2019:063)) was used for EV isolation through size exclusion chromatography (N=23/group). Participants were matched for age , gender, sex, ethnicity, smoking status, and personal income. EVs from robust (robust EVs) and frail (frail EVs) participants were characterized for size, zeta potential, protein yield, and markers of EV sub-types.

Results

Average EV size, size distribution and stability were not different between groups. Frail EVs had 22% more protein than robust EVs ($p<0.05$, N=23). HSP70, a marker of small EVs or exosomes, was 61% higher ($p<0.05$, N=7-8) in frail EVs vs. robust EVs. However, expression of other EV subtype markers, e.g. CD9, TSG101, and Flotillin-1 (exosomal markers), and ARF6 (microvesicle marker), were not different between groups. ApoA1, a lipoprotein and non-exosome marker, was ~1.2X higher in robust EVs vs. frail EVs ($p<0.05$, N=8).

Conclusion

Our data show that EVs isolated from frail individuals yield more protein when compared to robust individuals. Frail EVs were enriched with exosomal marker HSP70 and depleted of lipoprotein marker ApoA1. Further research on biomolecular cargo in frail EVs will elucidate the extent to which frailty status alters EV biocomposition. The effect of robust/frail EVs on recipient cell function remains to be established.

Authors

- For each author, please click "**[+] Add Item**" and provide the author's information

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