



Isolation and Characterisation of Extracellular Vesicles Isolated from Human and Feline Plasma

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BACKGROUND

- Extracellular vesicles (EVs) are nanoparticles capable of transporting biological material around the body.
- To date, studies have focused on EVs of human origin.
- As comparative medicine progresses, there has been a drive to study similarities between diseases in humans and animals.
- To successfully research EVs in felines, we must validate the isolation and characterisation in this group.

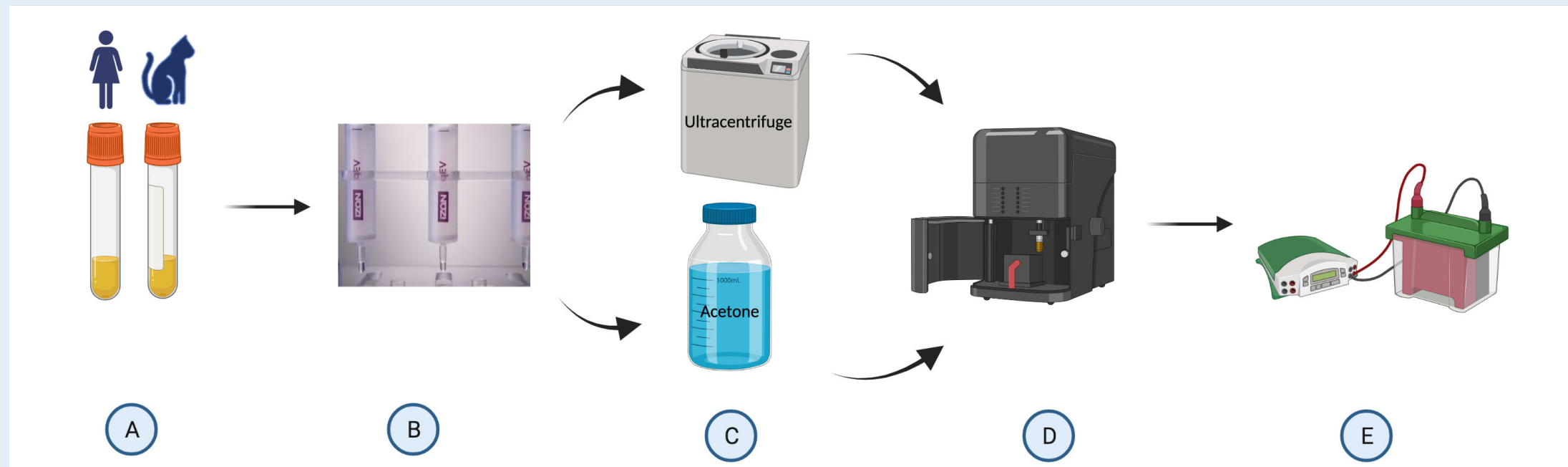
AIM

1. To isolate EVs from healthy human and feline plasma
2. To characterise them according to the Minimal Information for Studies of Extracellular Vesicles (MISEV) framework.

HYPOTHESIS

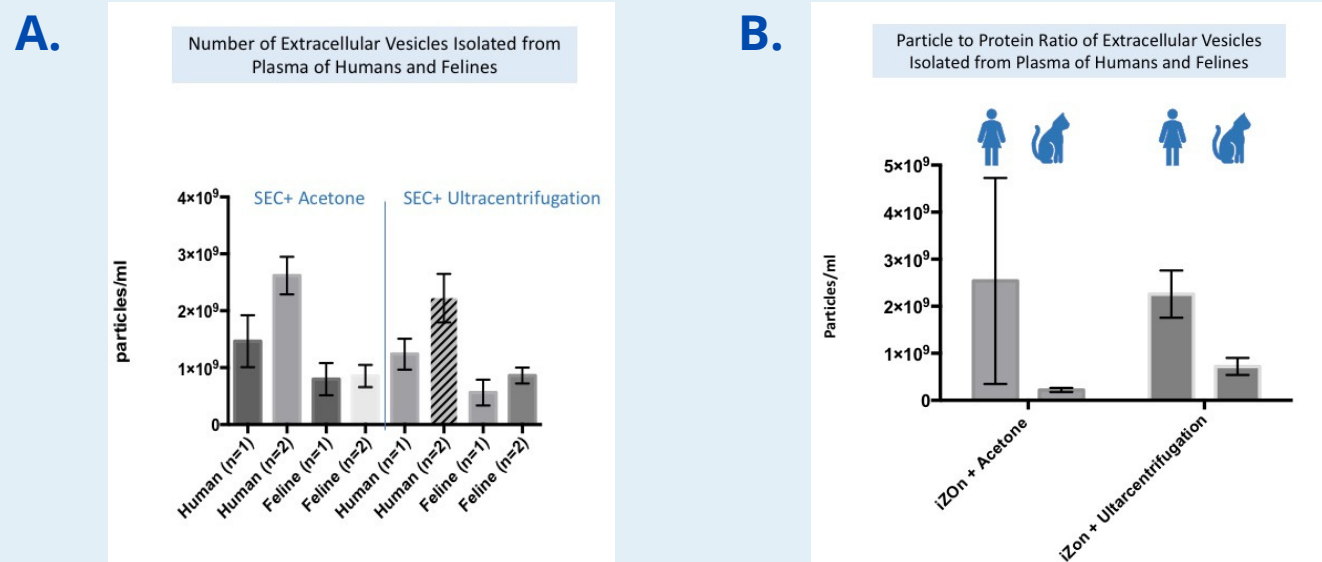
EVs can be isolated from feline plasma and have similar characteristics to human plasma

METHODS

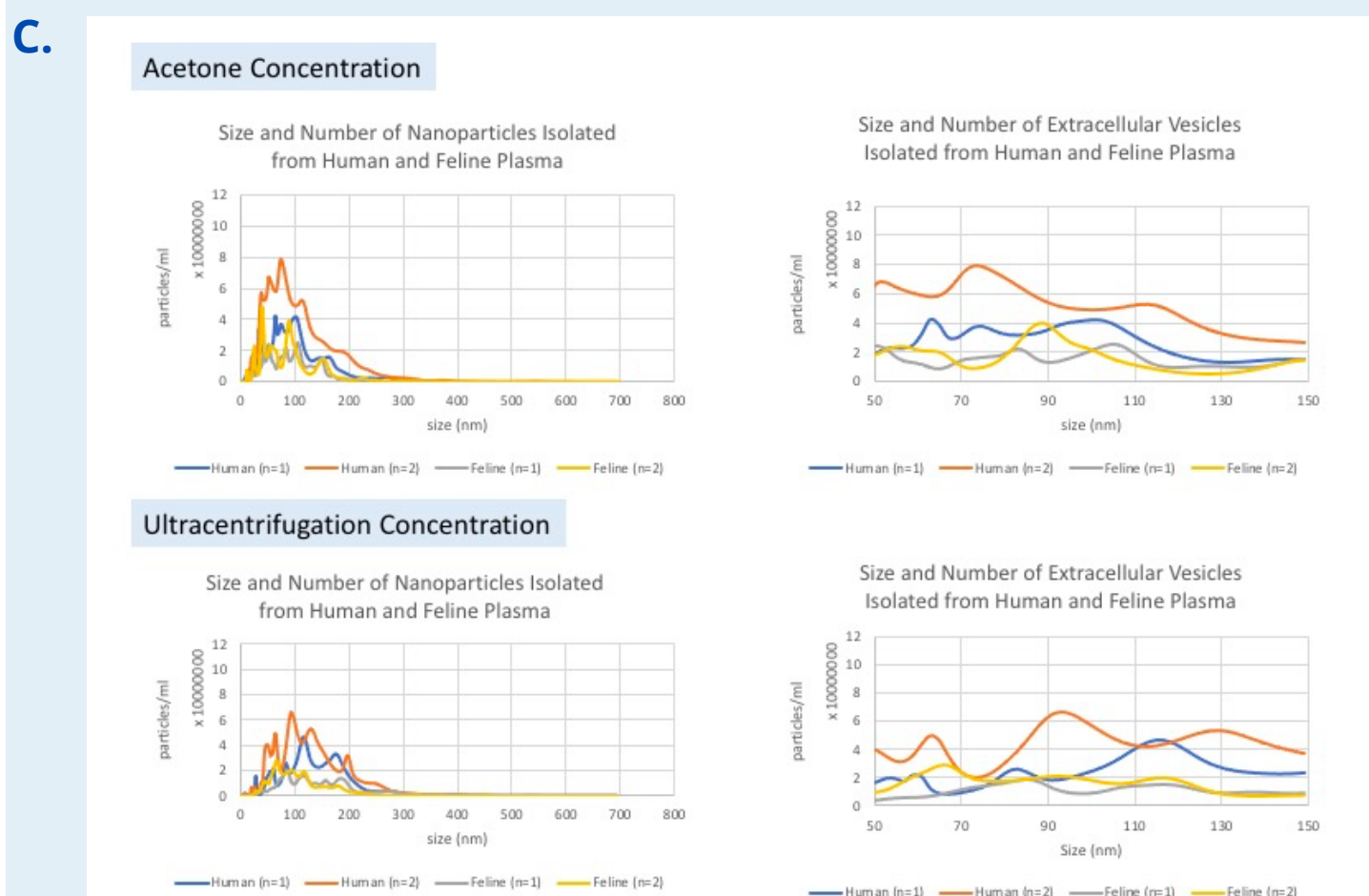


- A.** Pooled Plasma from 3 humans and pooled plasma from 20 felines was collected
- B.** EVs were isolated by Size Exclusion Chromatography
- C.** EVs were concentrated using two methods: Ultracentrifugation and Acetone Precipitation
- D.** Nanoparticle Tracking Analysis (NS300) was carried out
- E.** Isolates were analysed by Protein Assay and Western Blot

RESULTS



A. Graph showing the Number of EVs (50-150nm) isolated from Human and Feline Plasma (n=2) following concentration by Acetone Precipitation and Ultracentrifugation **B.** Graph showing the particle to protein ratio of EVs (50-150nm) isolated from Human and Feline Plasma



C. Graph showing the size profile of all particles isolated from plasma of humans and felines (0-600nm) and the size profile of EVs isolated from plasma of humans and felines (50-150nm) for each concentration method. Similar size profiles are observed for human and feline derived EVs.

CONCLUSIONS

- EVs may be isolated from plasma of humans and felines
- Human and feline plasma showed a similar concentration of EVs and analogous particle to protein ratios.
- Western blot shows a similar expression of known EV markers (CD9, CD81, CD63, HSP70)

FUTURE DIRECTIONS

Further proteomic, lipidomic and genomic studies should be carried out to provide more information on the similarity of human and feline EVs

A 'one health approach study of EVs may provide a model for studying naturally occurring diseases in both species

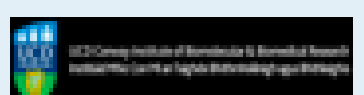
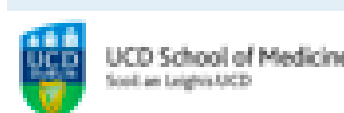
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ACKNOWLEDGEMENTS

UCD PhD Advance Core scheme

All our patients who have agreed to participate



Short Bio:

My name is Jane Howard and I am a Stage 2 PhD candidate in the UCD School of Medicine. My research focuses on triple negative breast cancer in women and cats; similar aggressive cancers with no available treatment. They are associated with poor patient outcomes. Through personal experiences, I am aware of the impact that a diagnosis of triple negative breast cancer has on families. Therefore, I have become inspired to find a cure for the disease. I hope that my research will help to develop a personalised medicine approach for people with triple negative breast cancer and eventually save the lives of patients.

I am also passionate about patient involvement in research. I am a member of the Patient Voice in Cancer Research (PVCR) steering group committee in UCD, which aims to involve patients in all aspects of cancer research. Within PVCR, I also support the social media aspects for PVCR visibility.

Funded by the UCD PhD Advance Core Scheme (2019), I am specifically, interested in the role that tiny particles called Extracellular Vesicles (EVs) play in causing cancer to spread around the body.

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