Isolation and characterization of exosomes from plasma and saliva of glioblastoma patients

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INTRODUCTION

- Glioblastoma (GBM) is the most common primary brain tumour in adults and has a median survival of only 12-15 months.
- Current management of GBM consists of surgery, followed by radio and chemotherapy but the tumour almost invariably returns.
- There is an unmet clinical need to improve the diagnosis and monitoring of disease progression, to overcome imprecise imaging and prevent the need for repeat biopsy.
- Extracellular vesicles (EVs), including exosomes, are known to play a major role in cell-cell communication and have been pointed as a biomarker for cancer diagnosis and prognosis.
- We are studying the use of exosomes isolated from plasma and saliva of patients as an indicator of GBM progression.

METHODS

Blood and saliva from 10 GBM patients attending the Royal Brisbane and Women’s hospital were collected before and after surgery. Exosomes were isolated using serial centrifugation followed by ultracentrifugation and characterised using nanoparticle tracking analysis, western blot and transmission electron microscopy.

RESULTS

- Fig 1. Exosomes characterization using Nanoparticle tracking analysis (NTA). Size and concentration of exosomes isolated from saliva and plasma of healthy controls and GBM patients (before and after surgery).
- Fig 2. Representative images of exosomes isolated from saliva and plasma. Imaged on a JEOL JEM-1400 TEM at 100kV mounted with a 2K TVIPS CCD camera, at the Central Analytical Research Facility (CARF), QUT.
- Fig 3. Exosomes characterization using western blot. Positive and negative protein markers tested in GBM cell lines (U251MG, U87MG); exosomes isolated from saliva - healthy control (C3), and a GBM patient before surgery (02, 03); also from plasma of GBM patients before (02, 03) and after surgery (02-F1, 03-1).

CONCLUSION

Our preliminary data on exosomes is very promising and could be used as a non-invasive biomarker for tracking GBM progression.

ACKNOWLEDGMENTS

Clinical trials coordinators at RBWH (Trang Le, Jenny Edmunds, Charmaine Micklewright, Jacqui Keller); ATM LATAM QUT Postgraduate Research Scholarship. Rebecca Fieth - Central Analytical Research Facility (CARF), QUT.