Role of Extracellular Vesicles in Tumor Microenviornment and Systemic Effects of Tumors in Head and Neck Cancer

K. Gauch[1], S. Bala[1], S. K. Dubey[1], F. Momen-Heravi[1,2]

[1]College of Dental Medicine, Columbia University, New York, New York

[2]Herbert Irving Comprehensive Cancer Center, Columbia University Medical Center, Columbia University, New York, New York

INTRODUCTION

- **Extracellular Vesicles (EVs):** Membrane-bound vesicles involved in cell growth and communication[1]
- Different cells produce unique EVs and associated contents based on cells characteristics and microenvironment[2]
- **Advantages:**
  - Cargo dependent on and high conservation of cell origin[1,2]
  - Alter and adapt contents based on microenvironment in stress/disease states[1,2]
- Emerging a means for early detection of malignant tumors due to role in intracellular signaling and cellular homeostasis[3,4]

METHODS & MATERIAL

Proteins Quantified
- Volcano Plot
- ELISA

Functional analysis
- Platelet Activation
- Blood Clotting

Bioinformatic Analysis
- Gene Set Enrichment Analysis (GSEA)
- The Cancer Genome Atlas (TCGA)

OBJECTIVE

Characterize proteomic cargo and examine the role of EVs in head and neck cancer (HNSCC) pathogenesis and tumor microenvironment.

RESULTS

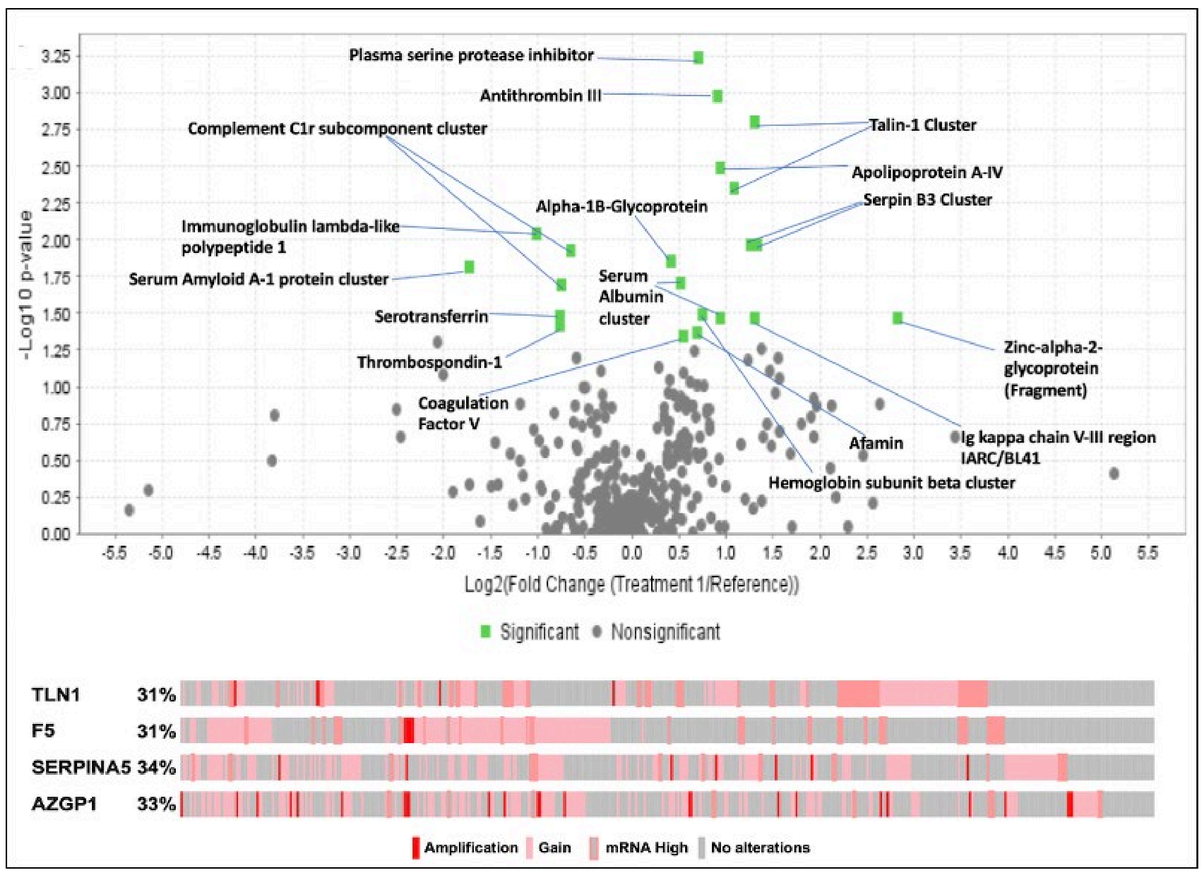

Figure 1: **EVs in HNSCC carry a specific signature of proteins enriched in hemostasis and coagulation factors.**

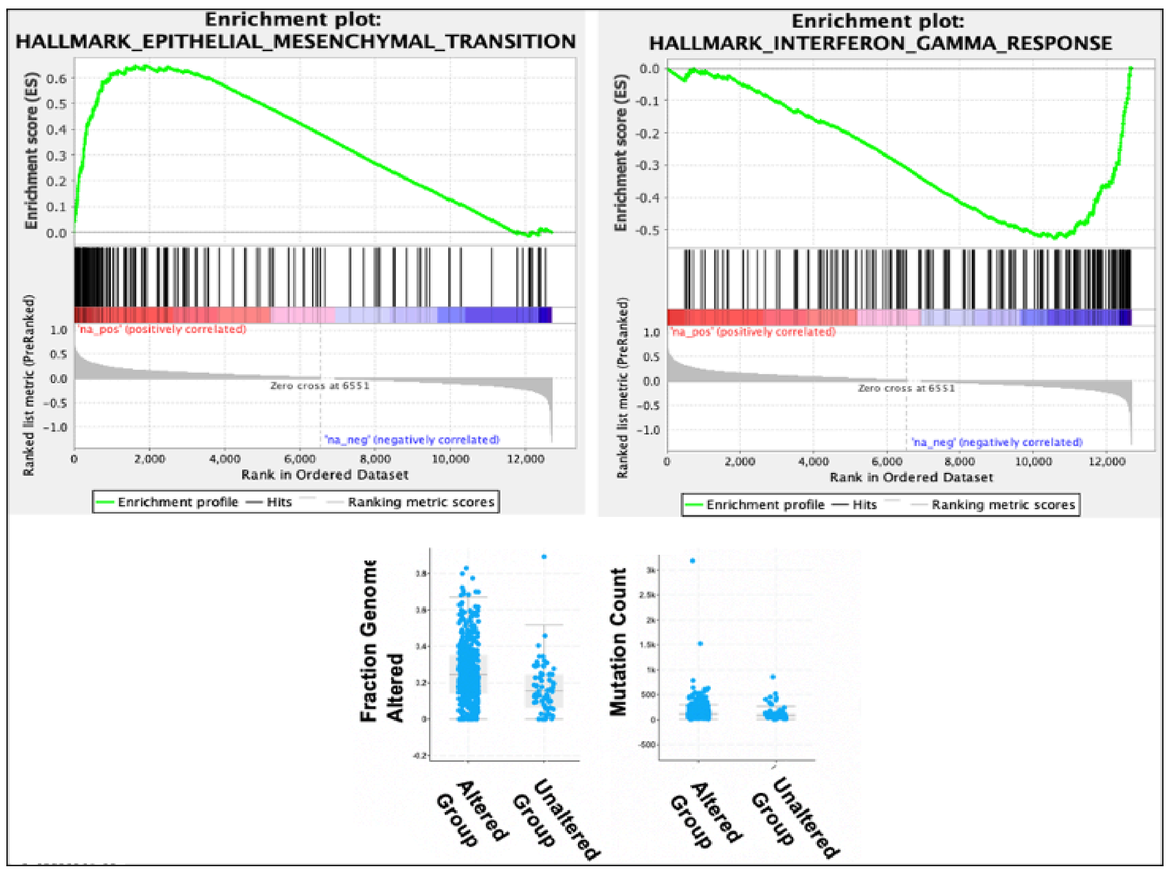

Figure 3: **GSEA analysis of patients who demonstrated high abundance of dysregulated proteins in HNSCC EVs.**

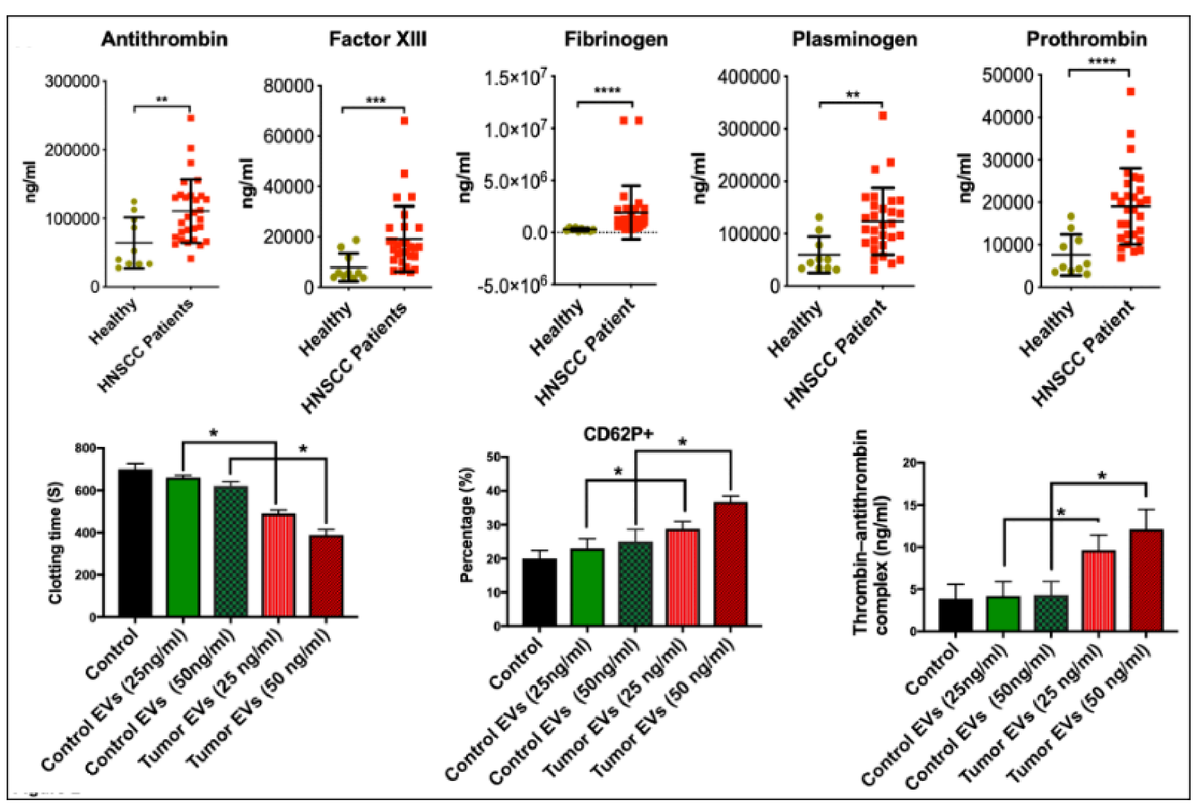

Figure 2: **Coagulation pathways active in HNSCC patients and HNSCC EVs induce Thrombin-antithrombin complex and platelet activation.**

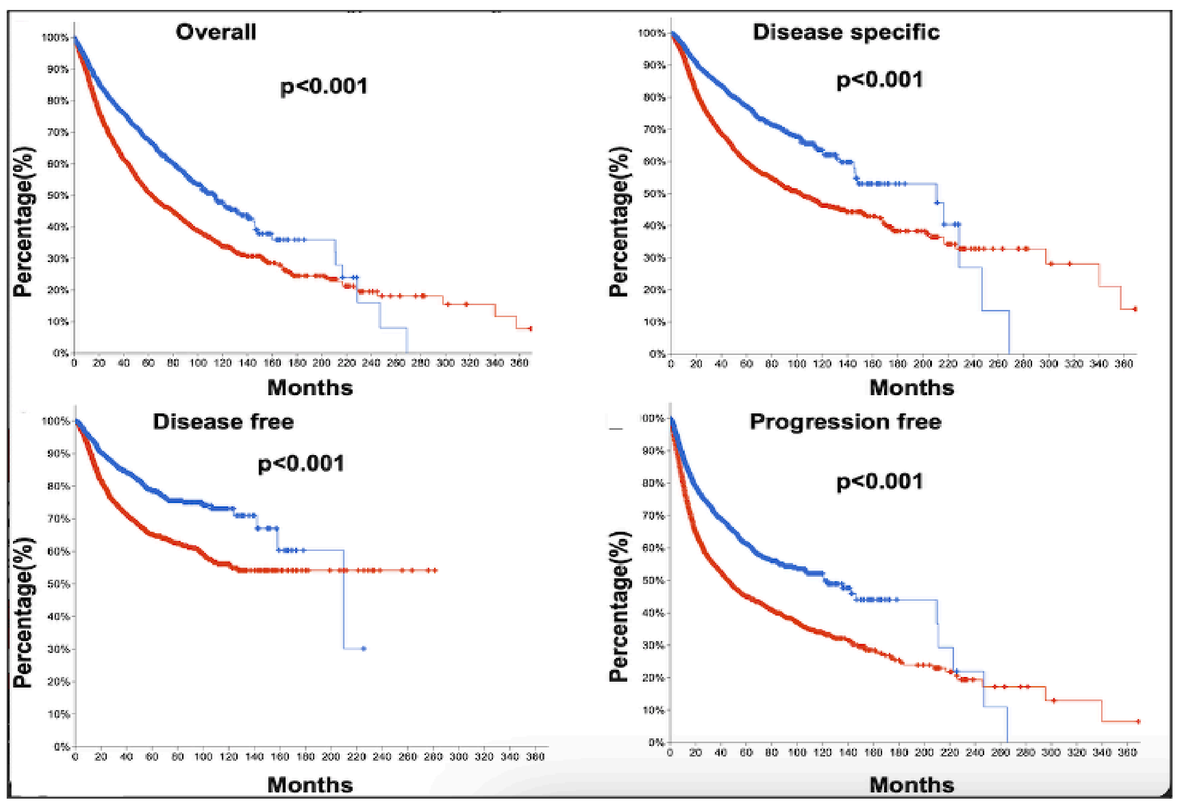

Figure 4: **Increase in HNSCC EV enriched proteins associated with lower survival in HNSCC.**

CONCLUSION

- Specific proteomic changes could be detected in EVs in HNSCC cancer
- HNSCC-derived EVs carry proteomic signature related to coagulation and hemostasis pathways
- Changes in hemostasis-related genes were associated with patient survival and patients with high levels of those transcript demonstrated activation of pathways related to immunosuppressive tumor microenvironments
- **Future use:** underlines the possibility of EV's as a platform for precision medicine and biomarker discovery as disease associated biomarkers

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