

Submitter Name: Meena Kumari
Submitted email: mkumari@vet.k-state.edu

Do exosomes hold the key to genetic and epigenetic modifications in drug addiction?

Meena Kumari¹ and Antje Anji¹

¹Department of Anatomy and Physiology, Kansas State University

Mutations in genes are permanent changes in DNA sequence resulting in variations in gene expression. However, gene expression can be altered without changes in DNA sequence and such changes in gene expression are collectively described as epigenetic modifications. Addiction to certain drugs of abuse causes epigenetic modifications in neurons. Drug-induced epigenetic changes in neurons may not entirely be inherent to neurons but a result of communication with neighboring cells in brain. Cell-cell communication has reached new heights after the discovery of exosomes as they transfer macromolecules from parent to recipient cells thus allowing genetic and epigenetic alterations in recipient cells. To date exosomes studies have not been fully exploited to understand role(s) of exosomes in the drug addiction field. We hypothesize that exosomes from drug-exposed astrocytes carry a subset of unique microRNAs (and other macromolecules) that have the ability to alter gene expression in neurons. We have employed P19 cells (undifferentiated and differentiated into P19 neurons) to isolate and characterize exosomes from their conditioned medium. Our data demonstrated that transcripts in exosomes from these two cell populations range between 10 to >800 nt. Although several transcripts appear to be common to exosomes from both cell types there are subsets of transcripts that are unique to undifferentiated P19 cells and P19 neurons. This is interesting data as P19 neurons originate from the same lineage yet they exhibit differential transcript cargo.