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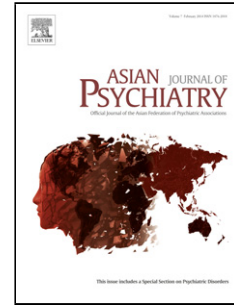
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## Role of exosomes in psychiatric disorders

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**RUNNING TITLE:** Exosomes in psychiatry

**KEYWORDS:** Exosomes; Psychiatry; Schizophrenia; Bipolar disorder

Sir,

Exosomes are small vesicles of approximately 30-100 nm in diameter covered by a lipid bilayer. Because of their endosomal origin, exosomes display hallmarks of the internal vesicles called intraluminal vesicles (ILVs). They are produced from the endosomes by an active process which can be either endosomal sorting complex required for transport (ESCRT) dependent or independent (Colombo et al., 2014). They can be distinguished from other microvesicles released from the cells by their size, density, lipid composition of the bilayer and specific protein markers, such as Alix and TSG101 (Willms et al., 2016). Exosomes are released from almost every type of cell in the body, which includes lymphocytes, cardiac, epithelial, muscle and neural cells, and are released into the extracellular fluid. Exosomes are detected in different body fluids like CSF, serum, saliva and urine (Braicu et al., 2015). The biochemical composition of exosomes includes proteins, lipids and nucleic acids. Exosomal cargos represent the cell of its origin and can act as a liquid biopsy, especially in cancer detection (Zhang et al., 2017). Hence, exosomes and their cargo can act as potential biomarkers for physiological and pathological conditions (Lin et al., 2015).

Different methods of isolation have been described to isolate exosomes from various biological samples such as serum, cerebrospinal fluid, urine and growth media (Greening et al., 2015). Commonly, ultracentrifugation and ultrafiltration are the methods used. Although exosomes can be visualized under the Transmission Electron Microscope (TEM), Nanoparticle Tracking Analysis (NTA), where the Brownian motion of the particles are tracked by laser illumination, has been used to assess the size distribution and concentration of the exosomes in the given sample (van der Pol et al., 2014).

Recently, the therapeutic aspects of exosomes have been actively researched. Since the exosomes are specific for the tissue of origin, able to cross the blood brain barrier and non-immunogenic in nature, these factors have made it an attractive drug delivery vehicle in various disorders especially cancer (Lässer, 2015). This has led to the design of exosome-based or exosome-mimicking drug carriers. For example, exosomes were used as doxorubicin delivery platform for targeted tumor therapy in an animal model (Tian et al., 2014).

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