

Exosomes Are the “*Novel Anesthetics*”

If you break the heart of every particle; You will see a sun in its heart

Hatef Isfahani

18th Century Poet in Isfahan

One of the characteristics of the human body is that whenever it is injured, it heals automatically. Although this feature does not happen in many cases, it is the most important treatment for the problems of humans and other living beings (1, 2). This extraordinary feature, i.e. the partial or complete restoration of the damaged part of the body following an injury, from a living cell to repair of part or all of an organ after injury, is considered a potential and desirable method and hope in medicine. In 1957, the first steps were taken to treat with the help of this feature; the extraordinary aspiration of the medicine that we know today as regenerative medicine (2, 3).

However, the speed of progress in this field has not been as high as the hopes and dreams of physicians (4). In recent years, there have been two main approaches in regenerative medicine: the use of stem cells versus the use of exosomes (2). Meanwhile, regenerative medicine has a lot to say in the field of anesthesia, especially in the area related to exosomes. The interesting point is that both anesthetic drugs act on exosomes and exosomes can have multiple roles in the properties of anesthetic drugs and also in the beneficial or potentially harmful effects of anesthetic drugs (5). Among these effects, the following are just samples of larger individual studies that have opened great windows regarding the role of exosomes in anesthesiology and perioperative care

- the molecular protection of cardiac cells (6)
- the cardioprotective role of plasma exosomes in heart failure (7)
- Perioperative organ protection against injury (7, 8)
- The potential effects of exosomes in abolishing the toxicity effects of local anesthetics (9)
- The role of exosomes in regional anesthesia (10)

- The role of exosomes in pain management (11)
- The role of exosomes in treatment of COVID-19 (12)
- In this issue of the JCMA, Ebrahim Soltani and colleagues have demonstrated the role of exosomes in suppressing the tissue inflammatory response and improving the healing process (13)

Meanwhile, there are some unwanted side effects from the anesthetic drugs on the production of exosomes with controversial results in animal studies (14, 15); anesthetics possibly affect both “the composition and the function of extracellular vesicles” (16); describing a plausible theory for the role of anesthetic agents in patients undergoing surgery for cancers (17) or the interesting explanations for the role of anesthetics in ischemic cardiac cells’ protection (6).

Some may believe that anesthesiologists have a long path to reach to the point that they can apply regenerative in the daily clinical practice in the operating rooms; however, when reviewing the related studies and the new information, our attitude towards the mutual interaction of regenerative medicine and anesthesia will be completely transformed. We will again whisper the poem by Hatef Esfahani: “*If you break the heart of every particle; You will see a sun in its heart*”.

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