



Stem-cell-activated organ following ultrasound exposure: better transplant option for organ transplantation.

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Although doctors try their best to protect transplants during surgery, there remain great challenges for the higher survival rate and less rejection of transplants after organ transplantation. Growing evidence indicates that the stem cells could function after injury rather than aging, implying that suitable injury may activate the stem cells of damaged organs. Furthermore, it has been revealed that stem cells can be used to induce tolerance in transplantation and the ultrasound has great biological effects on organs. Basing on these facts, we hypothesize that the stem cells within the transplants can be activated by ultrasound with high-frequency and medium-intensity. Therefore, the stem-cell-activated organs (SCAO) can be derived, and the SCAO will be better transplant option for organ transplantation. We postulate the ultrasound can change the molecular activity and/or quantity of the stem cells, the membrane permeability, the cell-cell junctions, and their surrounding microenvironments. As a result, the stem cells are activated, and the SCAO will acquire more regenerative capacity and less rejection. In the paper, we also discuss the process, methods and models for verifying the theory, and the consequences. We believe the theory may provide a practical method for the clinical application of the ultrasound and stem cells in organ transplantation.

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