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The Role of MED31 in the Regulation of Mesenchymal Stem Cell State

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Presenter Information

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The role of MED31 in the regulation of mesenchymal stem cell state

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Mediator, a large protein complex exclusive to eukaryotes, is a master regulator of cell-type specific gene expression. Mediator functions as a molecular adaptor that, with the help of DNA looping, connects activators bound at enhancers to the transcription pre-initiation complex (PIC) located at the promoter where it recruits RNA Polymerase II. Our research focuses on how Mediator influences the state of differentiating bone marrow-derived mesenchymal stem cells (MSCs). Bone marrow-derived MSCs are harvested from adult donors and, in addition to their ability to self-renew, can differentiate down chondrogenic, osteogenic, and adipogenic lineages. Published research demonstrates that Mediator complexes with major coactivators in the adipogenesis pathway. We performed siRNA-mediated knockdowns of MED31 prior to inducing adipogenic differentiation assays to determine the role of MED31 in directing proper differentiation. The MSCs remained viable post-transfection under standard culture conditions but displayed reduced adipogenic differentiation as demonstrated by images of cell morphology, adipose vesicle staining, and patterns of gene expression. These results suggest MED31 is important for appropriate Mediator function in regulating human MSC adipogenic differentiation. Such information elucidates the biomolecular requirements for proper regulation of MSC differentiation, and this broader understanding of Mediator's function in MSCs will help foster their continued use in clinical applications such as regenerative medicine.