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Intimacy of integrin β8 with embryo implantation

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Abstract

Embryo Implantation is a well known complex process that requires intricate interaction between the adhesion competent blastocyst and a receptive endometrium. The acquisition of receptivity of endometrial luminal epithelial cells involves various structural and molecular changes in the plasma membrane and cytoskeleton. Integrins, the mediator of cell to cell and cell to matrix interactions are associated with the embryo implantation process, where they possibly control blastocyst and uterus interaction. During early pregnancy, integrin β8 has been shown to interact with transforming growth factor-β (TGF-β) at the feto-maternal interface. However, the precise role of integrin β8 in the uterus and its association with the embryo implantation is not yet elucidated. Therefore, we attempted to ascertain the role of integrin β8 during the window of an embryo implantation process by its protein expression inhibition analysis. Further, we explored the role of ovarian steroids on integrin β8 expression using delayed implantation and non-pregnant ovariectomized mice model. We found that integrin β8 is up-regulated during early peri-implantation stage of the window of embryo implantation and predominant to the sites of embryo implantation of peri-implantation stage. Bio-neutralization and mRNA silencing of the uterine integrin β8 at pre-implantation stage inhibited the embryo implantation and subsequent pregnancy, which suggests its crucial role during embryo implantation. Integrin β8 can regulate its downstream signaling molecules STAT-3, integrin β8, TGF-β1, Vav and Rac-1 activity in the uterus during embryo implantation. Integrin β8 can be regulated by the ovarian steroid, 17-β estradiol in progesterone primed receptive uterus. In this study, we have elucidated the indispensable regulatory role of integrin β8 during the window of embryo implantation.

Biography

Rajesh Kumar Jha has completed his Ph.D. from Devi Ahilya University, Indore, M.P., India and postdoctoral studies from Cleveland Clinic Foundation, Cleveland, Ohio, USA. He is a scientist in CSIR-Central Drug Research Institute, Lucknow, U.P., India. He has authored papers in sperm and embryo implantation biology area. He has received various grants such as Cleveland Clinic Research Program grant, CCF, Ohio USA, Department of Science and Technology, New Delhi, India and Indian Council of Medical Research. Currently, he is working on female reproductive biology using rodent model employing various proteomics tools.