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# MSCs and HSCs: Are they Stem cells or Progenitors?

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Pluripotent very small embryonic-like stem cells (VSELs) exist in various body tissues. A pluripotency network comprising VSELs with nuclear Oct-4 and slightly bigger progenitor cells with cytoplasmic Oct-4 was demonstrated *in situ* in adult human testis and ovary by our group. Nuclear Oct-4 in VSELs acts as a transcription factor and once the cell starts differentiating-Oct-4 is no longer required, gets shifted to the cytoplasm and is eventually lost. Being small in size, VSELs are easily lost during cell processing. They were detected along with the RBCs in the 'discarded fraction' during bone marrow (BM) mononuclear stem cells separation and similarly they are unknowingly discarded while banking cord blood (CB). Oct-4 immunolocalization on various fractions collected after Ficoll-Hypaque centrifugation of CB and BM and on umbilical cord tissue sections shows the presence of VSELs with distinct nuclear Oct-4 and slightly larger cells possibly the HSCs and MSCs with cytoplasmic Oct-4. Thus HSCs and MSCs are progenitors rather than true stem cells, have already entered differentiation path and have limited differentiation potential. This explains the minimal efficacy of autologus stem cell therapies since the progenitors (HSCs and MSCs) neither dedifferentiate nor undergo transdifferentiation. Being pluripotent, VSELs have maximum regenerative potential and should be exploited for regenerative medicine. Since VSELs exist in adult body tissues, the need to reprogram adult somatic cells to embryonic state by iPS technology needs further justification. VSELs will hopefully unite adult and embryonic stem cell biologists since they are pluripotent stem cells in an adult body!

## Biography

Deepa Bhartiya completed her Ph.D from Central Drug Research Institute, Lucknow and postdoctoral studies from NIH. She is the Head of Stem Cell Biology Department at NIRRH, a premiere research institute belonging to Indian Council of Medical Research, Government of India. She has published more than 25 papers in reputed journals and has extensive funding from ICMR, DBT etc for her research on embryonic stem cells.