Cord Blood Stem Cells: From Farm to Point of Care

Dr. Dean Betts, Guelph University

This is another project seeking to overcome the problem of stem cells being unsuccessful so far as antidote to cartilage lesions. Research in human medicine indicates that umbilical cord cells are more effective than stem cells from fat or bone marrow. The researchers have already isolated umbilical cord blood stem cells in horses and have "demonstrated their potential to form bone, cartilage, and fat in petri dishes."

This project will continue the learning curve, not only in use of cord stem cells in the horse from which they were harvested, but also allogenic stem cell therapies (use in horses other than the donor).

As stated by Dr. Betts,

"This knowledge has the potential to greatly enhance clinicians' ability to make rational decisions regarding the choice of stem cell to use in specific situations."

Differentiation of Stem Cells for Cartilage Repair

Dr. Alan Nixon, Cornell University

Cartilage damage affects both yearlings and horses in training and commonly triggers the development of arthritis. The resultant stress of the joint also can lead to fractures of the pastern or cannon bone.

Dr. Nixon points out that "despite popular perception, cultured stem cells or marrow-derived mixtures so far seem incapable of forming durable cartilage."

Past attempts have created only transitory effects on cartilage. His current approach is to utilize and test robust gene-based methods to turn stem cells from the animal's own marrow into dedicated cartilage cells:

"These equine specific genes have been recombined into non-viral vectors that insert them into the chromosomal DNA of target cells."