Equine Bone Marrow-Derived Stem Cells: Comparing the Ilium and the Sternum

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Both the sternum and ilium offer a rich supply of stem cells that have similar growth rates. The highest concentration of stem cells is in the first 5 ml bone marrow aspirate. Authors’ addresses: Clinical Sciences (Adams, Rao, and Olea-Popelka) and Equine Orthopaedic Research Center (Goodrich, Phillips, Kisiday, and McIlwraith), 300 West Drake Road, Colorado State University College of Veterinary Medicine and Biomedical Sciences, Fort Collins, CO 80521; e-mail: lauriegoodrich@colostate.edu. *Corresponding author. © 2011 AAEP.

1. Introduction
The two sites of equine bone marrow derived mesenchymal stem cells (BMDMSC) harvest are the sternum and ilium, and site selection is based primarily on practitioner preference. The goal of this study was to determine the effects of harvest site and harvest fraction on stem cell quantity and rate of growth. We hypothesized that cell concentration would be higher in the sternum than the ilium and higher in the first fraction of marrow compared with subsequent fractions. Furthermore, we hypothesized that cell growth rates would not differ between sites.

2. Materials and Methods
Two sequential 5-ml marrow samples were taken from the sternum and ilium of seven horses before euthanasia. Nucleated cell counts (NCCs) were obtained for all samples pre- and post-marrow processing. Cells were expanded in culture for three passages, and NCCs were obtained at each passage.

3. Results
There was no significant difference (p > 0.05) between the NCCs of the first sternum aspirate and the first ilium aspirate. However, the NCCs of the first 5-ml aspirate were significantly higher than the second 5-ml aspirate for both sites (p < 0.05). There was no significant difference between growth rates for any of the groups (p > 0.05).

4. Discussion
These data should give practitioners confidence that both the sternum and ilium offer a rich supply of stem cells that have similar growth rate characteristics.

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