RHINOCEROS BONE CELLS IN CULTURE

J.A. Gallagher, J.P. Dillon, and C.E. Sheard
Deparment of Anatomy and Embrology, University College, London, UK.

Tissue culture has been used extensively in the investigation of bone cell function. Cells have been cultured from bone of a variety of species, but most frequently from tissue of rodent or avian origin. Cells are usually isolated by enzymic digestion, mechanical disruption, or explant culture, the last technique being the least harsh on the cells and yielding cell populations that exhibit osteoblastic characteristics. We obtained, courtesy of the zoological Society of London, trabecular bone from the mandible of a 67 kg full-term fetal rhinoceros. One piece of bone was disrupted mechanically by a technique that has been used to isolate osteoclasts from neonatal bones of other species. However, in this case no multinuclear cells or functionally resorbing cells were obtained, possibly because of the length of time the animal had been dead (>12h) prior to obtaining the sample or because of a paucity of resorbing cells at the chosen site. Another piece of bone was broken into fragments, which were cultured as explants. Cells migrated from the explant and within 3 weeks had formed a confluent layer. Cells grew well at first passage; they produced considerable quantities of extracellular matrix that eventually caused the cell layer to float free of the surface of the tissue culture wells. The cells expressed levels of alkaline phosphatase similar to those observed for cultures of human osteoblast-like cells, and in response to $1,25(OH)_2D_3$ (10^{-11}–10^{-2} M) there was a dose-dependent increase in enzyme activity. These results demonstrate the value of explant culture in isolating cells from bone, even after clinical death and also indicate that, in terms of effects of $1,25(OH)_2D_3$ on osteoblastic markers, rhinoceros is more like man than chick, mouse, or rat. The possibility of culturing bone cells from other large mammals should be investigated.

BONE FORMATION IN ORGAN CULTURE OF MARROW PIECES

E.A. Luria, M. Owen, A.J. Friedenstein, J. Morris, S.A. Kuznetsow, and C. Joyner
MRC Bone Research Laboratory, Nuffield Orthopaedic Centre, Oxford; Department of Anatomy, University of Oxford, Oxford; and the Gamaleya Institute for Epidemiology, Moscow.

A method for organ culture of intact mouse marrow fragments is described. Observations with both light and electron microscopes demonstrate the formation of a well-organized trabecular tissue which is morphologically similar to bone. The tissue mineralized consistently in the presence of 10 mM sodium β-glycerophosphate. Osteogenic differentiation of human marrow is being investigated using this system.