RADIOCARBON DATING OF BONE OSTEOCALCIN: REFINEMENTS IN PROCEDURES FOR ISOLATING A PURE FORM OF NON-COLLAGEN PROTEIN

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Widely accepted methods used to chemically pretreat bone samples can, in some cases, yield unreliable ^{14}C age determinations when applied to fossil bones, characterized by low to trace amounts of organic residues that do not exhibit a collagen-like amino acid pattern. The lack of effective pretreatment procedures for seriously biochemically degraded bone limits the critical application of ^{14}C dating for this sample type – effectively eliminating the possibility of obtaining reliable ^{14}C measurements on bone samples from most tropical environments older than a few thousand years. These environments include regions from which some of the most interesting late Pleistocene hominid fossils derive.

^{14}C determinations have been obtained on osteocalcin, a non-collagen protein in bone. It has been proposed that osteocalcin retains isotopic integrity even in samples where collagen has been denatured by natural hydrolysis and other diagenetic processes, and where collagen and collagen-derived products are retained in only low and trace amounts. The basis of the suggested isotopic integrity of osteocalcin is that it binds to hydroxyapatite, the major mineral component of bone, and, in this bound form, it is biogeochemically stable. In addition, it appears that the distribution of osteocalcin in nature is limited to vertebrates, and has not been detected in arthropod exoskeletons or in microorganisms.

Concerns have been expressed about the purity of the osteocalcin fraction isolated using published procedures and the degree to which organics other than osteocalcin might bind to hydroxyapatite. We will report on ^{14}C data obtained on osteocalcin bone fractions by electrophoresis, immunological testing, amino acid residues and C/N ratios.

RADIOCARBON DATING OF PALEOSEISMICITY ALONG AN EARTHQUAKE FAULT IN SOUTHERN ITALY

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On November 23, 1980, a major earthquake (M_S = 6.9) struck a large area of the southern Apennines (Campania and Lucania regions, southern Italy). Such a seismic event, the largest in Italy over the last 80 years, almost completely destroyed 15 villages and caused extensive damage to other villages and towns including Naples. The quake produced the first well-documented example in Italy of surface dislocation, represented by a fault scarp 38 km long. To assess the seismological hazard for the area, a study, including radiocarbon dating of organic materials from layers displaced by paleoseismic events, has been undertaken. Peat and charred wood samples were collected on the walls of two trenches excavated across the 1980 fault with a mechanical

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