



The University of Georgia

Center for Applied Isotope Studies

RADIOCARBON ANALYSIS REPORT

October 27, 2010

Hugo Miller
1215 Bryson Rd.
Columbus, OH 43224-2009

Dear Mr. Miller

Enclosed please find the results of carbon content analyses for the sample received by our laboratory on December 22, 2009.

UGAMS #	Sample ID	Material	¹⁴ C age, years BP	δ ¹³ C, ‰
7509a	P-Ac-1	bioapatite	29690±90	-9.9
7509b	P-Ac-1	bulk organic matter	30640±90	-19.0

Bulk carbon content in the original bone sample-**2.53%**, N – **0.013%**

The bone was cleaned and washed, using ultrasonic bath. After cleaning, the dried bone was gently crushed to small fragments. The crushed bone was treated with diluted 1N acetic acid to remove surface absorbed and secondary carbonates. Periodic evacuation insured that evolved carbon dioxide was removed from the interior of the sample fragments, and that fresh acid was allowed to reach even the interior micro-surfaces. The chemically cleaned sample was then reacted under vacuum with 1N HCl to dissolve the bone mineral and release carbon dioxide from bioapatite.

The bone sample was treated with 5% HCl at the temperature 80°C for 1 hour, then it was washed and with deionized water on the fiberglass filter and rinsed with diluted NaOH to remove possible contamination by humic acids. After that the sample was treated with diluted HCL again, washed with deionized water and dried at 60°C.

For accelerator mass spectrometry analysis the cleaned charcoal was combusted at 900°C in evacuated / sealed ampoules in the presence of CuO.

The resulting carbon dioxide was cryogenically purified from the other reaction products and catalytically converted to graphite using the method of Vogel *et al.* (1984) Nuclear Instruments and Methods in Physics Research B5, 289-293. Graphite ¹⁴C/¹³C ratios were measured using the CAIS 0.5 MeV accelerator mass spectrometer. The sample ratios were compared to the ratio measured from the Oxalic Acid I (NBS SRM 4990). The sample ¹³C/¹²C ratios were measured separately using a stable isotope ratio mass spectrometer and expressed as δ¹³C with respect to PDB, with an error of less than 0.1‰. The quoted uncalibrated dates have been given in radiocarbon years before 1950 (years BP), using the ¹⁴C half-life of 5568 years. The error is quoted as one standard deviation and reflects both statistical and experimental errors. The date has been corrected for isotope fractionation.

Sincerely,

Dr.Alexander Cherkinsky

Center for Applied Isotope Studies University of Georgia

Tel: (706) 542-1395
FAX: (706) 542-6106

E-mail:
acherkin@uga.edu

INVOICE

October 27, 2010

Results To:

Hugo Miller
1215 Bryson Rd.
Columbus, OH 43224-2009

Invoice To:

Invoice Nos.: 10455

Description of Work:	1 carbon content analyses	@ \$20.00
	1 radiocarbon (AMS) analysis of burnt bone	@ \$525.00
	1 radiocarbon (AMS) analysis of bioapatite	@ \$575.00

Total Samples: 1
UGAMS 07509a and 7509b.

Please Pay This Total AmountUS\$1120.00

Make Check Payable ToUniversity of Georgia/CAIS

Remit Payment to Center for Applied Isotope Studies
C.A.I.S. Building
120 Riverbend Rd.
Athens, GA 30602-4702

Invoice Submitted byAlexander Cherkinsky

Center for Applied Isotope Studies