The University of Georgia

Center for Applied Isotope Studies

RADIOCARBON ANALYSIS REPORT

August 27, 2008

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

Dear Mr. Miller

Enclosed please find the results of ^{14}C Radiocarbon analyses and Stable Isotope Ratio $\delta^{13}C$ and analyses for the samples received by our laboratory on June 27, 2008.

UGAMS#	Sample I.D.	Material	$\delta^{13}C$ (‰)	Radiocarbon ^{13}C Corrected Age (YBP±1s)
03228a	P-T-2a	bioapatite	-4.7	39230±140
03228c	P-T-2a	collagen	-23.8	30110±80
03229	P-T-2b	bulk material	carbon content- 1.30%	

Carbon content is given for the bulk sample and reflects both carbonate and organic carbon concentration.
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 crushed bone was treated with 1N HCl at 4ºC for 24 hours. The residue was filtered, rinsed with deionized water and under slightly acid condition (pH=3) heated at 80ºC for 6 hours to dissolve collagen and leave humic substances in the precipitate. The collagen solution is then filtered to isolate pure collages and dried out. The dried collagen was combusted at 575ºC in evacuated/sealed Pyrex ampoule in the present 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 $^{14}C/^{13}C$ 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 $^{13}C/^{12}C$ ratios were measured separately using a stable isotope ratio mass spectrometer and expressed as $\delta^{13}C$ 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 ^{14}C 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. Use of the corrected date assumes the material originally had a $\delta^{13}C$ composition of -25‰.

If the dates are to be published, please quote the UGAMS numbers, as it identifies our laboratory as having produced the dates.

If we can be of further assistance, or you wish to discuss these results, please do not hesitate to contact me.

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

August 27, 2008

Results To:

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

Invoice To:

Invoice Nos.: 8682

Description of Work:

2 Radiocarbon AMS (^{14}C) analysis of bone @ $450.00
1 Collagen extraction @$50.00
1 bioapatite preparation @$50.00
1 Stable Isotope Ratio ($\delta^{13}C$) analyses (included)
1 carbon analysis @20.00
Total Samples: 2
UGAMS 03228 and 03229.

Please Pay This Total Amount ……..US$1020.00
Make Check Payable To …….University 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 by……Alexander Cherkinsky

Center for Applied Isotope Studies