



The University of Georgia

Center for Applied Isotope Studies

## RADIOCARBON ANALYSIS REPORT

May 31, 2011

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 May 2, 2011.

UGAMS #	Sample ID	Material	<sup>14</sup> C age, years BP	δ <sup>13</sup> C, ‰
8824a	P-P-1	bioapatite	22020±50	-5.4
8824carb	P-P-1	carbonates	4070±25	-7.2

**Bulk carbon content in the original bone sample-1.51%, N – 0.30%**

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. Carbon dioxide from the secondary carbonates was collected and purified for analysis. The chemically cleaned sample was then reacted under vacuum with 1N HCl to dissolve the bone mineral and release carbon dioxide from bioapatite.

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 <sup>14</sup>C/<sup>13</sup>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 <sup>13</sup>C/<sup>12</sup>C ratios were measured separately using a stable isotope ratio mass spectrometer and expressed as δ<sup>13</sup>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 <sup>14</sup>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.

Sincerely,

Dr. Alexander Cherkinsky

# Center for Applied Isotope Studies University of Georgia

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## INVOICE

May 31, 2011

**Results To:**

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

**Invoice To:**

**Invoice Nos.: 11028**

<b>Description of Work:</b>	1 carbon content analyses	@ \$20.00
	1 radiocarbon (AMS) analysis of bioapatite	@ \$575.00
	Credit	@ \$15.00
	Total Samples: 1	
	UGAMS 08824a.	

**Please Pay This Total Amount** .....US\$580.00

**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

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