Caribbean Trace Genetics and Archaeobiology

RADIOCARBON ANALYSIS REPORT

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Dear Mr. Thierry Jamin

Please find below the results of ^{14}C Radiocarbon analyses & Stable Isotope Ratio $\delta^{13}C$ analyses for the submitted samples. Received for Carbon Dating July 13, 2017.

Sample ID	Material	$\delta_{13}C_c$,‰	^{14}C age years, BP	±	pMC	±
29824	Brain	-14.76	1010	20	88.19	0.25
29825	Bone	-13.09	1080	25	87.43	0.26
29826	Skin	-25.44	7270	40	40.44	0.20

Methods:

Sample received was aseptically handled in CTGA laboratory UV treated surfaces and packaging before entrance to facility. Material was treated under UV for 20 min for surface decontamination before aseptically sampling and crushing to fine powder using a nitrogen Mill. The resulting powdered material was aliquoted for carbon dating and genetic assays.

The bone powder was reacted under vacuum with 1N HCl to dissolve the bone mineral and release carbon dioxide from bioapatite. The residue was filtered, rinsed with deionized water and under slightly acid condition (pH=3) heated at 80ºC for 12 hours to dissolve collagen and leave humic substances in the precipitate. The collagen solution was then filtered to isolate pure collagen and freeze dried out. The skin and brain samples were cleaned with the solvents and freeze dried. The dried samples were 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). 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 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.

Brief Analysis:

Both Bone and Skin samples were removed from same finger material that were separated during the initial sampling stage. The difference in the ^{14}C age for the two materials from the same finger sample is therefore highly suspect. Specifically with regards to the skin sample with a ^{14}C date 6190 year older than the same sample bone. The Stable isotope and the low pMC support this observation.

A possible explanation for the anomaly is that the skin of the individual was treated with a substance(s) (such as embalming fluid) that has a carbon content of a far older origin than the fossilized material itself, possibly a hydrocarbon. A chemical analysis of the skin material can be performed to characterize the anomaly.

The results for the Brain (sample from cranial cavity) and Bone material (from finger) are consistent; the slight difference may be related to the source material itself, or in the case of bone, maybe a crossover effect (penetration) of the putative skin treatment. A directed chemical analysis of the bone, in addition to the skin, could further elucidate this affect.

Yours Sincerely

Dr Ashley Matchett PhD

17/05/2018