Dental Reduction and the Probable Mutation Effect

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ABSTRACT A recent test of the probable mutation effect can be interpreted to suggest the operation of mutations under conditions of reduced selection in the late Pleistocene reduction of the human dentition.

Suarez ('74) presents a test of whether the probable mutation effect is the likely cause of Neandertal tooth size reduction. He uses the degree of bilateral asymmetry as a population independent measure of variability, and compares the asymmetry in what might be thought of as a European archaic *Homo sapiens* sample with the asymmetry in living people. The method appears useful, but I believe it is necessary to question the *interpretation* of the results.

The model tested has been clearly stated by both Brace ('67) and Brose and Wolpoff ('71). This model suggests that the archaic sapiens sample maintains large incisors and canines because it is selectively advantageous; that is, they are useful. As it turns out, this sample has the largest incisors of any fossil or living hominid sample. The canines are also quite large, but they are smaller than in *Homo erectus*, and thus are already in the process of reduction. The posterior teeth are much smaller than *Homo erectus* and are much further along in the *process of reducing*. The model of reduction due to mutation accumulation allowed by relaxed selection therefore predicts that the variability of the incisors should be low, since these are being maintained at a large size by stabilizing selection. The variability in the posterior teeth, on the other hand, should be quite high since these are in the process of reduction and have been for some time. The canines should be intermediate in variability, although because the size reduction from *Homo erectus* is not great one might expect the increase in variation to be smaller than in the posterior teeth.

In the modern human sample used by Suarez ('74), the reduction has already occurred in both the anterior and the posterior teeth. Reduction is no longer occurring, and stabilizing selection maintains dentitions at their present size. This is a point clearly raised by Bailit and Friedlaender ('66). Consequently, since the dentition is under stabilizing selection the expectation is that the variability will be low.

I differ from Suarez ('74), then, in what I believe the model of reduction in the dentition predicts in the comparison of archaic with modern sapiens. My prediction is that the incisors of both groups, under selection, will have the same variability, while the posterior teeth will be more variable in the archaic sapiens sample because they are in the process of reduction.

Suarez presents the relevant data in his table 2. Buccolingual or labiolingual diameters give more genetic information than mesiodistal length because they are not subject to environmental modification from intersitital wear.

The table compares variation in the archaic and modern sapiens samples by comparing the difference in asymmetry. It shows no significant difference in the incisors, a small level of significance for the difference in the canines, and a very high level of significance for the difference in the posterior teeth. In the canines and the posterior teeth the archaic sapiens sample is in all cases the more variable.

Frankly, I could not conceive of data better verifying the hypothesis that Pleisto-

cene dental reduction in the hominids is likely due to the accumulation of mutations allowed by relaxed selection.

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