8541 P

X-Ray Absorption Coefficients of Coronal and Root Dentin.*

FRANKLIN HOLLANDER AND EDMUND VESELY

From the Laboratory of Physical Chemistry, Department of Oral Histology, Columbia University Dental School, New York.

By means of the precision micro-method recently reported[1], linear X-ray absorption coefficients were measured in various parts of the dentin of 4 non-carious human teeth (3 third molars, 1 premolar) from different individuals of ages from 17 to 68 years. The ground sections were approximately 300 micra thick and the disc-shaped areas of observation were 1 mm. in diameter. A photomicrographic record of each section made it possible to correlate values of the coefficient with the structural characteristics of each disc. The number of independent measurements per tooth varied from 10 to 20, depending on the size of specimen; each measurement was done in duplicate.

The coefficients for each specimen showed considerable variation (as great as 20%) among themselves. Their mean values were 95.4 ± 0.9 units,† 96.3 ± 0.7, 94.1 ± 1.2 and 95.2 ± 0.6 respectively; even the greatest difference between these means is so small that its significance is statistically uncertain. It is worthy of note that the mean values for the 2 halves of any one section, taken with respect to its longitudinal axis, are unquestionably identical; the differences between such means were 0.2, 0.8, 0.8, and 0.1 units, or less than 1% of the means themselves. The maximum values for the several specimens (101.5, 100.7, 99.6, and 99.6) were so close together that any difference between them is likewise of questionable significance. Thus, for the several specimens studied, both the mean and the maximum values differ by no more than 2%, an amount so small as to make the values practically identical. On the other hand, their minimum values varied significantly (89.3, 86.8, 79.3, and 81.7), due in part to structural variations. As yet it is impossible to establish any quantitative correlation with type of structure, possibly because the number of sections is too few to permit of generalization in this regard.

*Aided by a grant from the Commonwealth Fund of New York.

[1]Hollander, F., PROC. SOC. EXP. BIOL. AND MED., 1935, **33**, 388.

† These units are expressed as micra of aluminum equivalent to 100 micra of tooth substance, in respect to absorption capacity. The precision measure is the probable error of the mean.

The distribution of the values of the coefficient in any one specimen was not random, but tends to decrease as the position of measurement passes from the crown toward the apex of the root. In order to establish this difference between coronal and root dentin conclusively, the values in these 2 regions were grouped and averaged for each specimen. The differences between the corresponding means for crown and root were 7.4 ± 1.0, 6.4 ± 1.3, 4.2 ± 1.0, and 2.2 ± 1.2 respectively. Consistent with the occurrence of this gradient, the coronal values were scattered far less than were the root values—using the probable error as a criterion of scatter.

It appears, therefore, that the coefficient approaches an upper limit in the coronal dentin of non-carious teeth—which is in fairly close agreement for all 4 specimens—and that the deviation from this maximum value tends to increase with the distance between the position of measurement and the dentino-enamel junction. Dentin formation is known to start at this junction and to proceed toward the root apices. Thus, the gradient in the X-ray absorption coefficient of the dentin appears to parallel the progress of its formation. Whether the gradient results from the pre- or post-eruptive suspension of the calcification process cannot yet be inferred from these observations.

8542 C

Volume Concentration of Rat Muscle Measured by the Phosphate Partition Method.

CHARLES A. WINTER AND ERIC PONDER.

From the Department of Physiology, University of Buffalo, and The Biological Laboratory, Cold Spring Harbor.

A simple method, based on the assumed impermeability of muscle cells to phosphate, has recently been described for finding the volume concentration (relative volumes of interspaces and cells) in frog muscle.[1] This investigation was undertaken with the idea that the method might be applicable to rat muscle.

The method used was essentially that of M. G. Eggleton. Adult rats were decapitated, and paired leg muscles (extensor digitorum longus or tibialis anticus) were quickly dissected out and weighed.

[1] Eggleton, M. G., *J. Physiol.*, 1933, **79**, 31.