

# A TOOTHLESS TYPE OF MAN<sup>1</sup>

## The "Bhudas" of India—A Case of Sex-linked Inheritance

K. I. THADANI, B. Ag.

*Agricultural Department, Bombay, India*

*(Graduate Student in the A. & M. College of Texas, College Station, Texas)*

THERE occurs in the Hindu Amil community of Hyderabad Sind, a town in India, a type of men who have no teeth. These men are further characterized by a bald head and an extreme sensitiveness to heat. They are known as "Bhudas," which literally means "toothless." The following facts are known about them:

(1) When such a man (a Bhuda) marries a normal girl having both parents free from these defects, all the children, both males and females, are apparently normal—that is to say, apparently free from the defect.

(2) When the  $F_1$  males marry normal females having both parents normal, their children, both males and females, are apparently normal.

(3) When the  $F_1$  females marry normal males, their female children are apparently normal, while the male children are "Bhudas."

(4) No case is known in which a toothless man has married the daughter of a "Bhuda."

(5) No females have been found showing the anodont condition.

### BIOLOGICAL EXPLANATION OF THE PHENOMENON

This is, apparently, a case of sex-linked inheritance in man. The inheritance of this toothless condition, as well as the associated defects of sensitivity and hairlessness, is a case in point, and the causative character seems to be carried by the sex chromosomes. The factors involved are: B for the normal condition, and its recessive allelomorph "b" for the toothless condition.

(a) When a female of the genetic constitution (BX) (BX) is mated to a male (bX) Y, we get:

<i>Genotypes</i>	<i>Phenotypes</i>
$F_1$ (BX) (bX)	Normal females.
(BX) Y	Normal males.

That is to say all the children are normal in appearance. This explains fact No. 1, stated above.

(b) Fact No. 2 is self-explanatory when we consider the genetic constitution of the  $F_1$  male.

(c) Fact No. 3 carries us to the  $F_2$  generation. When an  $F_1$  female (BX) (bX) marries a normal male (BX) Y, who has the same genetic constitution as her  $F_1$  brother, then we shall get:

<i>Genotypes</i>	<i>Phenotypes</i>
$F_2$ (BX) (BX)	Normal female.
(BX) (bX)	Normal female.
(BX) Y	Normal male.
(bX) Y	Toothless male.

The following points are worth noting:

(1) We expect all females to appear normal; this is what actually happens in practice. So the theoretical expectations coincide with the practical results.

(2) Of the males we expect some toothless, some normal, strictly speaking one to one. Now let us see what actually occurs in practice. The general belief is that all males are toothless, but this is a matter for further investigation. At the same time, the absence of normal males in the  $F_2$  generation in actual practice can be explained by taking into consideration the fact that only one individual is produced at a time, therefore the chances of one of the phenotypes not appearing at all, or another appearing repeatedly, are as great as the chances of all the phenotypes (comprising 4 genotypes in the present case) being represented in a single generation. In order that all of the phenotypes may appear, we must have a sufficient number of individuals under observa-

<sup>1</sup> A preliminary report.

tion, a condition not under control. But the fact remains that there is a possibility of any of the phenotypes not already observed appearing sooner or later. So that whenever such appear, they are easily accounted for. Further, we must note that in the practical observations that are known to us, there is nothing that can not be accounted for; there is nothing that conflicts with our theoretical expectations.

(3) The Mendelian ratio of 3:1 in the  $F_2$  generation is apparent, but we have no data as to how far it is attained in actual practice. However, we must remember that this ratio should be looked for only in those organisms in which a reasonably large number of individuals are born in a generation.

(d) Facts Nos. 4 and 5 are inter-related, one being the cause, and the other its effect. A toothless female (bX) (bX) can only result when a heterozygous female (BX) (bX) is mated to a toothless male (bX) Y, a condition not yet attained in practice.

#### CONCLUSION

(1) The toothless man seems to be an example of regressive mutation.

(2) The phenomenon of heredity in the toothless man is strictly a case of sex-linked inheritance, as all the existing facts are in conformity with our theoretical expectations based on Mendelian laws of Segregation and Dominance.

#### PRACTICAL SIGNIFICANCE

Since heredity in the toothless man obeys the laws of Segregation and Dominance, we can predict some of the important facts summarized below.

(1) A normal male, even if he is a son of a toothless man, has no contamination of this defect in his germplasm; no fear need be entertained about his carrying the defect in his germ without he himself showing it.

(2) The daughter of a toothless man, altho she does not show the defect in her body, carries the contamination hidden in her germplasm and will produce, on union with a normal male, some toothless children, and these will be males, with the complete exclusion of the toothless female children. But if she marries a toothless male there is a possibility of her producing both toothless and normal females, and also both toothless and normal males.

(3) Should, at any time, a toothless female appear, and should she marry a toothless man, then all their children, whether males or females, will be toothless without exception.

#### INFORMATION WANTED

The writer of this article would be glad to hear from anyone who can report if, at any time, any of the toothless men ever had (or has) a brother (from the same mother) who was normal, that is to say, was *not* a "Bhuda"; if any of his sisters (from the same mother) had all toothless sons while another had some normal sons.

#### The Diseases of Infancy

LEITFADEN DER KINDERHEILKUNDE für Studierende und Aertze; erster Teil, SÄUGLINGSKRANKHEITEN; 4te, verbesserte Auflage. Von Dr. Walter Birk, professor d. Kinderheilkunde a.d. Universität Tübingen. Pp. 269, broschiert M. 12.50, gebunden M.15.50. A. Marcus and E. Webers' Verlag, Bonn, 1920.

Dr. Birk lays out his subject method-

ically and sticks to it in a practical way that gives little opportunity for excursions into the field of genetics; although much might be written on the part that heredity plays in the diseases of the first year of life. His brief remarks on the frequency with which twins show marked difference as regards constitutional disease, make one desire further elaboration on this point.—P. P.