a polysaccharide content much lower than that of human meconium. The purified polysaccharide, on the other hand, resembled the human polysaccharides closely, but was devoid of human blood group A or B activity.

The observations reported are as yet of a preliminary nature and require elaboration in several directions. From the present data, it would appear that meconium in the first instance represents the residue of the mucous secretions of the entire alimentary tract, including saliva and gastric and intestinal juices. It is known that in secretors the secretions of many glands normally contain mucoproteins and exhibit blood group activity. The absence of protein from normal meconium may be attributed to the activity of proteolytic enzymes, foremost tryptase, which would digest the protein while leaving the polysaccharides intact. The different composition of the meconium from the infant with meconium ileus might then be due to the lack of proteolytic activity, which would lead to the persistence of protein. The much greater than normal viscosity of meconium of infants with ileus would find its explanation in the circumstance that mucoproteins are more viscous than mucopolysaccharides. The observations on calf meconium would indicate that the occurrence of polysaccharides in meconium is not restricted to man.

The availability of a potent and easily accessible source of human blood group substances in the form of meconium appears of great theoretical and practical interest. It opens the possibility of study of hitherto practically inaccessible blood group substances and of a close comparison between human and animal products. Blood group substances from meconium offer great promise in blood transfusion practice as neutralizing agents of agglutinins of pooled plasma or blood, and have the advantages over currently used products of high potency, simple purification, and certain absence of antigenic properties.

### References


1. BRAY, H. G. and STACEY, H. *Advances in carbohydrate chemistry.* New York: Academic Press, 1949. Vol. IV, p. 37.
2. DISCHE, Z., and SHETTLES, L. B. *J. biol. Chem.,* 1948, **175,** 595.
3. ELSON, L. A. and MORGAN, W. T. J. *Biochem. J.,* 1933, **27,** 1824.
4. HITCHINGS, G. H. *J. biol. Chem.,* 1941, **139,** 843.
5. KABAT, E. A. and MAYER, M. M. *Experimental immunochemistry.* Springfield, Illinois: Thomas, 1948.
6. MORGAN, W. T. J. and KING, H. K. *Biochem. J.,* 1943, **37,** 640.
7. NELSON, N. *J. biol. Chem.,* 1944, **153,** 375.
8. NELSON, W. N. (Ed.) *Mitchell-Nelson textbook of pediatrics.* Philadelphia and London: Saunders, 1945.
9. OKAJIMA, S. *Jap. J. med. Sci. VII, Soc. Med. and Hyg.,* 1940, **3,** 154.
10. SEKIMOTO, H. *Jap. J. med. Sci. VII, Soc. Med. and Hyg.,* 1940, **3,** 122.
11. SEVAG, M. G. *Biochem. Z.,* 1934, **273,** 419.
12. SMITH, C. A. *The physiology of the newborn.* Springfield, Illinois. Thomas, 1945.
13. UBEYAMA, R. *Jap. J. med. Sci. VII, Soc. Med. and Hyg.,* 1940, **3,** 139.
14. WITEBSKY, E. and SATOH, T. *Klin. Wschr.,* 1933, **12,** 948.
15. YOSIDA, K. I. *Z. ges. exp. Med.,* 1928, **63,** 331.


# Taste Reactions to Antithyroid Substances


**William C. Boyd**

***U. S. Naval Medical Research Unit No. 3, Cairo, Egypt***


Fox discovered a number of years ago (*4*) that some persons taste phenylthiourea (phenylthiocarbamide, or PTC) as distinctly bitter, whereas others find it nearly or quite tasteless. Family studies have shown (*2, 6*) that this taste ability is hereditary, the nontasting characteristic being in all probability a recessive gene. About 25% of most populations are nontasters for PTC, although there are racial and sexual variations. The discovery by Fisher, Ford, and Huxley (*3*) that chimpanzees can likewise be divided into tasters and nontasters for PTC makes it seem probable that this gene pair has existed in man for a very long time.

Thus, a gene appears to exist which enables its possessor to taste a synthetic compound not known to occur in nature. It is not too easy to understand how such a gene can exist, nor to guess what its function can be.

A possible explanation for this gene's existence appears to have been demonstrated in this laboratory. The substance *l*-5-vinyl-2-thio-oxazolidone, recently isolated and structurally defined (*1*), occurs widely in nature, particularly in turnips and cabbage. A sample was kindly sent by Dr. M. G. Ettlinger, and tests were made on 21 individuals, of whom 7 could not taste PTC, 13 tasted it as bitter, and 1 tasted it as bitter after some delay. Ability to taste *l*-5-vinyl-2-thio-oxazolidone was found to parallel exactly that for PTC. There can be little doubt that the same gene controls ability to taste this naturally occurring substance.

In regard to the "purpose" of the tasting gene, it is known that thiourea, thiouracil (*5*), *l*-5-vinyl-2-thio-oxazolidone, and other substances of similar constitution act as antithyroid drugs. This seems to point to some connection between the tasting gene and thyroid function. It is planned to test hypothyroid and hyperthyroid patients for ability to taste substances of this group and thus investigate further the possible relation between the "tasting" gene and glandular function.

It is realized, of course, that the relationship may be less direct than seems obvious at first. In fact, Fisher, Ford, and Huxley (*3*) suggest that the reason for the long survival in man of both the tasting genes might be that the heterozygote had some (unspecified) advantage over both the homozygotes. Examples of this have been observed in *Drosophila.*

### References


1. ASTWOOD, E. B., GREER, M. A., and ETTLINGER, M. G. *J. biol. Chem.,* 1949, **181,** 121.
2. BLAKESLEE, A. F. *Proc. Nat. Acad. Sci.,* 1932, **18,** 120.
3. FISHER, R. A., FORD, E. B., and HUXLEY, J. S. *Nature,* Lond., 1939, **144,** 750.
4. FOX, A. L. *Proc. Nat. Acad. Sci.,* 1932, **18,** 115.
5. RIDDELL, W. J. B., and WYBAR, K. C. *Nature,* Lond., 1944, **154,** 669.
6. SNYDER, L. H. *Ohio J. Sci.,* 1932, **32,** 436.