

BAD BREATH IN THE TALMUD

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It is common knowledge that the Talmud and halachic commentaries discuss a wide variety of different topics that cover almost all areas of study. We often underestimate, however, the extent of the Rabbis' knowledge in seemingly secular areas, such as mathematics, philosophy, and science. In reference to science, the Rabbis exhibited an extensive understanding of the way the world, and specifically our body, works. This deep understanding often shaped the halachic conclusions in the Talmud and helped form the commentators' interpretations of various texts. By taking a deeper look into the specific physiology involved in various halachic and midrashic discussions, one can glean a greater understanding of the implications of the debated topics.

In *Ketubot* (72b, 77a), the Talmudists discussed halitosis, more commonly known as bad breath. According to the Talmud, bad breath is considered a serious disability, in regard to spouses and priests. It was considered to be a ground for divorce and it disqualified a priest from carrying out his holy duties.

In a Jewish marriage, the husband gives his wife a *ketuba*, or marriage contract, that dictates the financial obligations of the husband to the wife in the case of divorce. If, however, after the wedding, the husband finds a major disability in his wife for which he was unaware previously, he may annul the marriage and forfeit the *ketuba* obligations. Bad breath is considered to be one of these major disabilities that can allow the husband to cancel the *ketuba*. In general, there are lesser grounds for a woman to unilaterally divorce her husband. Bad breath, however, is considered such a major detriment in the husband (along with boils and engaging in foul smelling professions, such as leather curing, copper work, and collecting dog dung), that a woman is entitled to seek divorce (*Ketubot* 77a). The sages discussed whether nasal malodor should be given the same legal stature as oral malodor. Later, the great Jewish scholar, Maimonides (Rambam 1138-1204; Spain), decided that both types of malodor should be considered legally equivalent (*Hilchot Ishut* 25:12) [1].

Nowadays, most cases of halitosis originate from the mouth itself (about 90%), and only in more unlikely cases (about 5-10%) from the nasal passages. In most cases the odor is caused by bac-

terial decay in the oral cavity. In its initial phase, glycoproteins may be deglycosylated by Gram positive bacteria, exposing the naked protein to proteolysis by enzymes secreted by Gram negative bacteria. The amino acids are then be further broken down, yielding foul-smelling molecules, such as hydrogen sulfide (from breakdown of cysteine), methyl mercaptan (from methionine), cadaverine (from lysine), indole, and skatole (from tryptophan). Current scientific thought believes the tongue to be the major source for bad breath. Postnasal drip, food debris, and sloughed off epithelial cells collect on the posterior area of the tongue dorsum, where they are subsequently decomposed by the large microbial population. Serious cases of gingivitis and periodontal disease may contribute to oral malodor. Dryness of the mouth, which increases significantly during fasting or sleeping, also contributes greatly to oral malodor. Contrary to popular belief, the stomach does not contribute to bad breath, except in rare circumstances [1, 2].

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Another area in halachah that involves the mouth's physiology is the law to wait a given period of time between eating meat and milk. In the Talmud *Chulin* 105a, Mar Ukbah stated, "In this matter of waiting between meat and cheese, I am vinegar the son of wine, because if my father ate meat, he would not eat cheese for 24 hours. I, however, do not eat them at the same meal, but at the next meal, I will eat cheese." Our Rabbis used Mar Ukbah's statement to determine the time one must wait between eating meat and milk. Rabbeinu Tam (12th century, France) understood Mar Ukbah's statement to mean that one must only wait until the next meal, whenever that happens to be. According to Rabbeinu Tam, one who eats meat, must then recite the grace after meals, wash his hands and mouth, and can then eat cheese. Other Rabbis, however, like Rav Yoseph Kairo (16th century, Spain) quanti-

fied Mar Ukba's statement with a requirement to wait six hours-- the time it takes for the taste of meat to completely leave one's mouth. Rashi (eleventh century, France) explained the "taste of meat" as the coating of fat that remains in one's mouth and throat after eating meat. Rambam explained the "taste of meat" as the particles of meat that remain between one's teeth after eating [3].

The Rabbis' concern of the remainder of the "taste of meat" can be better understood when explored physiologically. Digestion of all foods begins in the oral cavity. The first step is a physical digestive step, called mastication, or chewing food into smaller pieces to increase the food's surface area and to allow for easier swallowing. Mastication is controlled by powerful muscles called the masseter and temporalis that move the mandible, or lower jaw, against the upper, in a motion which can crush even the toughest foods. Mastication causes exocrine glands under the tongue and in the back of the mouth to secrete a watery substance called saliva. The saliva moistens the crushed foods and allows the tongue to compact the food into a small, easily swallowed ball, called a bolus. The saliva contains digestive enzymes, like salivary amylase, that begins chemical digestion of foods in the mouth. The salivary amylase is able to break down carbohydrates to simple sugars at a relatively fast rate, as the food's surface area is repeatedly increased by mastication. Almost no proteins or fats are digested in the mouth, with the exception of a small amount of fats broken down by lingual lipase, an enzyme secreted by Ebner's gland on the dorsal side of the tongue [4].

Rashi's concern of a layer of fat remaining in the mouth after eating meat is very likely, because little fat breakdown is accomplished in the mouth. Any fat residue in the mouth would remain in its lipid form until is eventually broken down by lingual lipase enzyme, well after one has finished eating. Rambam's concern involves the process of mastication. Despite the sophistication of

our oral digestive systems, the small string like pieces that result when meat is chewed can often become stuck in one's teeth for many hours after a meal. Apparently during the waiting period the pieces of meat are decomposed, perhaps by bacteria in the oral cavity, to an extent where they are no longer considered meat according to the *halachah*.

Practically, we take into consideration both Rashi and Rambam's reasons for waiting between meat and milk. It is important to note, however, that the amount of time waited between meat and milk differs among Jews based on differences in traditions. Many other properties of the mouth are discussed throughout the Talmud and *Midrash*. The lubricating characteristic of saliva is mentioned in *Shemot Rabbah* (24:1), "If a man ate bread as it is, it would go down into his digestive tract and scratch him, but Hashem created a well in the throat which conducts the bread safely down." *Bamidbar Rabbah* (18:22) hinted to the oral digestion of carbohydrates, "the water of the mouth is sweet." This referred to the taste of the simple sugars that result from the breakdown of carbohydrates by enzymes (salivary amylase) in the saliva secreted by exocrine glands in the mouth. The Talmud (*Bava Batra* 126b; *Shabbat* 108b) noted the therapeutic treatment of applying spit to an eye infection. The medicinal properties of saliva may be related to lysozyme, an agent that prevents cell wall synthesis of bacteria, which leads to the osmotic lysis of bacterial cells. Another approach attributed the remedial properties of saliva to potassium sulfocyanide, present in highest concentrations in the saliva of a fasting person [5, 6].

Allusions to the physiological workings of the mouth permeate the Talmud and commentaries. Gaining insight into the intricacies of our physiological makeup helps us acquire a deeper understanding of *halacha* and Torah in general and enhances our appreciation of the miracle that our bodies are. ■

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