History of medicine

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Honey from folklore to medical marvel?

I isn’t it funny how a bear likes honey? . . . I wonder why he does?, sings Winnie-the-Pooh as he merrily climbs a tall tree in the woods to get at the honey perched high up a tree. Winnie-the-Pooh, the Bear of Very Little Brain, is one of the most endearing and popular animal characters in children's books, known to and loved by millions of people around the world, both young and old. For a bear of very little brain, he thinks a lot. (Although bearing a feminine-sounding name, Winnie is a male bear.) “The only reason for being a bee”, he hums, “is making honey.” And he thinks the only reason for bees to make honey is so he can eat it.

Pooh-bear of course does not know that instinct drives him to eat honey - a lot of honey. All animals are equipped with self-preserving instincts to propagate their species and seek the food that their organism requires. So does man. There is evidence that man has long known that honey is a valuable food source. Early rock paintings on cave walls in Africa and eastern Spain show people gathering honey from trees or rock crevices while bees fly around them.[1][2]. A rock painting called the “Man of Bicorp”[Figure 1] was discovered in 1921 in the Cueva de la Arana (Spider Cave) in Valencia, Spain. The painting depicts a human figure near a cavity where there is a beehive. Hanging on three lianes, he is picking up honeycombs, while nearby are some stylized bees. The painting is believed to be over 15000 years old and dates back to the end of the Paleolithic Period.[3]. Rock art from other caves have been found which show figures surrounded by bees without being stung.

Pre-historic honey gatherers probably learned by accident that bees are driven away from the honeycomb by smoke as an offshoot of using fire for “warding-off” or driving other animals. Most likely primitive man observed the habits of bees and learned that wild bees made their home in the hollow limbs of trees, or in hollow places in the trunks of trees. Even now, bee trees often could be found by walking through the woods on bright sunny days and looking into the tops of the trees and watching for the bees coming and going.

The “Man of Bicorp” cave painting is clear proof that early humans actively sought honey as part of their diet. We do not know, however, whether pre-historic man used honey for medicinal purpose.

Honey hunting is an ancient tradition that is still practiced in isolated primitive cultures in Africa, the Indian subcontinent, Southeast Asia, Australia, and South America. Reports of such activities in the popular press describe the practice as heavily permeated with ritual. This is not surprising since the tradition was passed down for generations and has its origins from our dim, distant, and superstitious past.

Honey hunting is a dangerous pursuit since a bee sting could be fatal. Throughout history there have been and there are alternatives to honey as sweetener such as dates and figs. Yet, humans seem to prefer honey. There is the universal perception that "honey is good for you."
The widespread perception that honey is "good" has its genesis from folklore i.e. our collective memories of myths, legends, stories, proverbs and customs that have been passed down for generations - our heritage. Myth has played an important role in folklore. Oral and written records abound with the life-giving qualities of honey.

As early as the Stone Age period, there are cave drawings or paintings of people collecting honey indicating that pre-historic man considered honey an important food source.

Quantitative studies of hunter-gatherer diets are scarce. However, studies of primitive tribal diets indicate that honey is highly nutritious. For example, among the Guayaki Indians of Paraguay honey is the very basis of their diet and culture.

Unfortunately, research into the nutritional role of honey is scanty. However, studies of primitive tribal diets indicate that honey is highly nutritious. For example, among the Guayaki Indians of Paraguay honey is the very basis of their diet and culture.

Mythology offers rich insights into the perceived life-sustaining qualities of honey. In Greek mythology, Zeus, mightiest of the Greek gods, was hidden from his father who wanted to devour him and was raised on honey and milk by the bee-nymph, Melisseas. Honey made him so strong and tough that when he grew up he seized his father's throne.

Another myth is that ambrosia was the food of the gods and goddesses. Since their gods' food consisted only of ambrosia, the ancient Greeks attributed the immortality of their gods to ambrosia, which they believed consisted of honey, milk and nectar. Ambrosia was thought to be a nine-fold extract of honey - a sweet treat enjoyed by mortals throughout the ages. Honey was a divine symbol for the Greeks and honey mixed with blood was the sweetest oblation.

Ambrosia was more than just a delightful meal to the gods, however. There are several episodes in Greek myth in which ambrosia is used by the gods and goddesses as a sort of balm, to confer grace or even immortality to mortals. One myth narrates how ambrosia was used to beautify Aphrodite, the enchanting goddess of love. In the Homeric Hymn to Aphrodite, the goddess prepares herself for some serious seduction with the assistance of eau de ambrosia:

"There the Graces bathed her and anointed her with ambrosian oil such as is rubbed on deathless gods, divinely sweet, and made fragrant for her sake."

It is claimed that many of Cleopatra's cosmetics were honey-based. Many women in Arabia believe honey softens their skin and regularly apply it as facial mask.

Honey always played an important role in all religious festivals and especially in funeral ceremonies. Honey was used to embalm the dead. In one poignant and memorable scene from Homer's Iliad, the sea-nymph Thetis uses ambrosia and nectar to preserve the body of the dead warrior Patroclus, the dearest friend of her son Achilles:

"To save Patroclus from decay, she treated his body with ambrosia and red nectar, which she instilled through his nostrils."[6]

In Egyptian mythology, "when the God Re wept, his tears fell to the ground and were turned into bees. The bees began to build and were active on all flowers of every kind belonging to the plant kingdom. Thus wax came into being, thus was created honey from the tears of the God Re."

The ancient Egyptians offered their gods honeycombs overflowing with honey as a valuable gift to show devotion and worship. In the 12th century BC, Ramses III offered 15 tons of honey to Hapi, the god of the Nile. Jars of honey were buried with the dead as sustenance for the afterlife. Archaeologists have found clay pots filled with honey in a Pharaoh's tomb in the city of Thebes. Inscription on the clay pot read: Good Quality Honey. Large quantities of honey in jars were also found in the tomb of Tutankhamun[8]. Burying the dead (especially nobility) in or with honey was common practice in Egypt, Mesopotamia [Iraq], and other regions. It is rumored that Alexander the Great was buried in honey.

The Pharaohs also used honey in their wedding celebrations. This custom was passed on to Greco-Roman culture and handed down to Medieval Europe. Newly-weds drank honey-wine (mead) for a month after the wedding ceremony for good-luck and happiness. The ritual gave rise to the word honeymoon, a custom still practiced today.

Egyptian hieroglyphics dating back at least 3,000 years indicate that honey was used as a sweetener - mixing it with various fruits, nuts, herbs, and spices in breads, cakes and pastries.

The first written record of bee-keeping can be traced back to Egypt from about 2400 BC. The reliefs of hives depicted in ancient Egypt are very much similar to the woven wicker baskets covered with clay that are still used in Sudan today.

Temples kept bees in order to satisfy the demand for honey as offerings to the gods as well as for other domestic uses such as mummifying, boat and ship building, and as a binding agent for paints and in metal casting[7]. However, the Egyptians valued wild honey more than the homegrown variety. A passage from the Papyrus Harris reads:

"I appointed for thee archers and collectors of honey, bearing incense to deliver their yearly impost into thy august treasury[8]."

Honey is frequently mentioned in the Bible.

Moses led his people to the "land of milk and honey." Solomon in Proverbs 24:13 advised, "My son, eat honey; it is good. And just as honey from the comb is sweet on your tongue, you may be sure that wisdom is good for the soul. Get wisdom and have a bright future." The Jews believed honey made a person "mentally keen."

In early Christianity, honey had a deep mysterious meaning and it was given in christening ceremonies as a symbol of renovation and spiritual perfection. When St. John the Baptist was in the desert, he lived on honey and locusts. Bees were revered because of their ability to produce wax and therefore provide light, in many cases for religious practices. Before the advent of electricity, candles were important for lighting. In many religions, candles are still used for religious ceremonies. The Roman Catholic Church regarded the bee as an example of godliness and believed beeswax to be "pure" since virgins - i.e. non-mating worker bees - produce it. Monks kept bees to provide beeswax to make candles for the giving of bad news.
Honey as medicine in history

It is possible that pre-historic man's instinct and experiences with honey as a valuable food source became encoded in our legends and mythology. In time, the mythic belief that honey was the “food of the gods” passed into Holy Scriptures and ancient writings that honey was a “gift of God” and therefore, good. Since it was the food of the gods, it must contain the ingredient of immortality, and consequently fostering the universal perception that honey contains the secret to a long and healthy life.

Therefore, it is not surprising that the substance was prescribed as panacea for various ailments and diseases.

‘Healing for mankind’

Thy Lord taught the Bee
To build its cells in hills,
On trees and in man's habitations;
Then to eat of all
The produce of the earth . . .
From within their bodies comes a drink of varying colors,
Wherein is healing for mankind.

Qur'an, Surah XVI: 68 - 69

The prophet Muhammad advised his followers to "Use the two curatives: honey and Qur'an." Likewise, the Bible contains many references to honey. "But Jonathan [son of Saul] . . . reached out the end of the staff that was in his hand and dipped it into the honeycomb. He raised his hand to his mouth, and his eyes brightened." (1 Samuel 14:24).

The Hindu Scripture, Veda, which was composed about 1500 BC, and written down about 600 BC speak of "this herb, born of honey, dripping honey, sweet honey, honied, is the remedy for injuries; moreover it crushes insects". In the section on Hymn To All Magic And Medicinal Plants, honey is used as a universal remedy: “The plants . . . which removes disease, are full of blossoms, and rich in honey . . . do I call to exempt him from injury.

A Roman Catholic saint (St. Ambrose) stated, "The fruit of the bees is desired of all and is equally sweet to kings and beggars and is not only pleasing but profitable and healthful, it sweetens their mouths, cures their wounds, and conveys remedies to inward ulcers."

All the sacred books, including that of China, praise honey as food, beverage, and medicine.

Ancient writings

There are abundant references to honey as medicine in ancient scrolls, tablets and books. It was prescribed for a variety of illnesses. Excavated medical tablets from Mesopotamia indicate that honey was a common ingredient in many prescriptions. In ancient Egyptian medicine, honey was the most frequent ingredient in all the drug recipes for both internal and external use listed in the Ebers and Edwin Smith Papyri. Honey was used for treatment of stomach pain, urinary retention and as ointment for dry skin. It was used as ointment for wounds and burns, skin irritation, and eye diseases. The Ebers Papyrus contains a description on how to make ointment from honey and how to apply it, with a note: "Notice that this is a very good therapy".

The author of the Smith Papyrus directed that honey be applied topically, with few if any other possibly active ingredient, to wounds. An example appears below:

Instructions Concerning A Wound In His Head, Penetrating To The Bone:
"If thou examinest a man having a gaping wound in his head, penetrating to the bone, thou should'st lay thy hand upon it (and) thou should'st palpate his wound. If thou findest his skull uninjured , not having a perforation in it . . .

Thou shouldst bind fresh meat upon it the first day, thou should'st apply two strips of linen; and treat afterward with grease, honey, (and) lint every day until he recovers."

In ancient Egypt, honey was the only active ingredient in an ointment described in the Ebers Papyrus for application to the surgical wound of circumcision. Ebers also specifies that an ointment for the ear be made of one-third honey and two-thirds oil. The concentration of honey in seven oral remedies in the Chester Beatty VI Papyrus ranges from 10 to 50%, while its proportion in other remedies ranges from 20 to 84%. Honey could very well have provided some kind of protection from the kinds of bacteria most likely to infect wounds, at least enough protection to permit wounds to begin healing on their own.

The ancient Egyptians were not the only people who used honey as medicine. The Chinese, Indians, ancient Greeks, Romans, and Arabs used honey in combination with other herbs and on its own, to treat wounds and various other diseases.
In addition to excellent descriptions of nearly 600 plants and 1000 simple drugs, Dioscorides described the medicinal and dietetic value of animal derivatives such as milk and honey [13]. Dioscorides stated that honey could be used as treatment for stomach disease, wound that has pus, hemorrhoids, and treatment to stop coughing [6].

"Honey opens the blood vessels and attract moisture. If cooked and applied to fresh wounds it seals them. It is good for deep dirty wounds. Honey mixed with salt could be dropped inside a painful ear. It will reduce the pain and swelling of the ear. It will kill lice if infested children skin is painted with it. It may also improve vision. Gargle with honey to reduce tonsil swelling. For coughing drink warm honey and mix with rose oil" [14].

Dioscorides, De materia medica, (AD 77)

Galen recommended warming up the honey or cooking it, then using it to treat hemorrhoids and deep wounds[14]. The Roman, Pliny the Elder, said that mixing fish oil with honey was an excellent treatment for ulcers.

AlBasri (Ali Bin Hamzah AlBasri), a 10th century Arab philosopher mentioned uncooked honey for swollen intestine whereas cooked honey was good for inducing vomiting when poisonous drug was ingested. For that purpose, he recommended mixing one pound of sesame oil with 1/3 pound of cooked honey [14]. Al Razi (Rhazes, AD 864-932), a renowned Muslim physician famous for writing a treatise distinguishing measles from smallpox, claimed that honey ointment made of flour and honey vinegar was good for skin disease and sports nerve injuries and recommended the use of honey water for bladder wounds [6]. His book, Al Hawi (Encyclopedia of Medicine), a comprehensive medical textbook of medicine, which was translated from Arabic to Latin in the 13th century and became a standard textbook of medicine up to the 1700s stated [14]:

"Honey is the best treatment for the gums. To keep the teeth healthy mix honey with vinegar and use as mouth wash daily. If you rub the teeth with such a preparation it will whiten the teeth. Honey does not spoil and could also be used to preserve cadavers."

Al Razi, Encyclopedia of Medicine (Al Hawi)

Likewise, Ibn Sina (Avicenna), another famous Muslim physician whose great medical treatise, the Canon, was the standard textbook on medicine in the Arab world and Europe until the 17th century, wrote [6]:

"Honey is good for prolonging life, preserve activity in old age. If you want to keep your youth, take honey. If you are above the age of 45, eat honey regularly, especially mixed with chestnut powder. Honey and flour could be used as dressing for wounds. For lung disease, early stage of tuberculosis, use a combination of honey and shredded rose petals. Honey can be used for insomnia on occasions."

The Compendium of Medicine by Gilbertus Anglicus (Gilbert the Englishman), is one of the largest sources of pharmaceutical and medical information from Medieval Europe. Translated in the early 15th century from Latin to Middle English, the text consists of medicinal recipes with guides to diagnosis, medicinal preparation and prognosis. The text names over 400 ingredients. Treatments are presented roughly from "head to tail", so to speak, beginning with headache and ending with hemorrhoids. Honey was a frequent ingredient to many of the remedies and it was combined with other medicinal herbs commonly used at that time [15]. Excerpts appear below:

**Headache** . . . let him use oxymel . . . made of honey and vinegar; two parts of vinegar and the third part of honey, mixed together and simmered.

**Pimples** . . . anoint it with clean honey, or with the powder of burnt beans and honey, or with the powder of purslane and honey mixed together.

**Pennyroyal**. . . taken with honey, cleanse the lungs and clear the chest of all gross and thick humors.

It is clear that throughout the ages, honey was prescribed for a variety of uses, frequently mixed with herbs, grains and other botanicals. Obviously, remedies were passed down through the millennia simply because they seemed to be effective. No one knew why the remedies worked. The ancient remedies survive today, lumped together by modern medicine under the term "folk medicine" since their effectiveness has not been scientifically proven through clinical trials.

I had no idea how pervasive the belief in honey as remedy for ailments was until my husband, a cardiologist, had a bad case of prolonged sore throat. He laughingly told me that his mother had advised him to drink tea with honey and cinnamon, assuring him the drink would cure his sore throat. I called my sister to tell her the amusing story but as soon as I told her my husband had a sore throat, she immediately said, "I know a sure cure for that. Give him tea with two spoonfuls of honey and a pinch of cinnamon and make him drink it." And recently, while working on this article, my family and I traveled to Dubai to spend the Eid holiday (Eid is the festival marking the end of Ramadan, the Muslim Month of Fasting). In the hotel where we stayed, one of the cleaning staff was a young Asian man. Because he looked so young, I felt sorry that he was working so hard. He laughingly told me that his mother had advised him to drink tea with honey and cinnamon, assuring him the drink would cure his sore throat. He thought a moment, smiled, and replied: "She used to make me drink honey mixed with warm water." Apparently, honey for coughs and sore throats remains a popular remedy around the world, even today. Some antiseptic lozenges contain honey.

In underdeveloped countries where synthetic medicines are expensive, honey is one of the cornerstones in their pharmacopoeia. For example, lotus honey is used for eye diseases in India. It is used as topical eye ointment in measles to prevent corneal scarring [16]. Honey is used to treat infected leg ulcers in Ghana and earaches in Nigeria. Other uses include treatment of gastric ulcers and constipation [16]. Germans used honey and cod liver oil for ulcetations, burns, fistulas and boils in addition to a honey salve which was mixed with egg yolk and flour for boils and sores [17].

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**Honey in the 20th century before antibiotics**

In the early part of the 20th century, the medical literature contained reports on the antimicrobial and healing properties of honey. Russian soldiers during World War I used honey to prevent infections in wounds and to accelerate healing [18]. The effectiveness of honey to heal wounds spurred research into its antimicrobial activity, which was attributed to "inhibine." In 1963, inhibine was identified as hydrogen peroxide [19].
During the first half of the 20th century, there were many research papers documenting the wound healing properties of honey. The medical profession did acknowledge the value of honey in the treatment of wounds, leg ulcers and burns. The introduction of antibiotics shifted the focus to synthetic and mass-produced treatment. The medical uses of honey as effective treatment in wounds was "forgotten."

### Revival of honey in medicine

In 1976, an editorial in the Archives of Internal Medicine on medical folklore arrogantly dismissed honey as a "worthless but harmless substance" if the authors of the editorial had bothered to read a little bit of medical history, they probably would have given honey the benefit of the doubt.

Over the last two decades, reports from different parts of the world affirmed the effectiveness of honey in treating various wounds, burns and serious infections. These reports and the emergence of drug resistant infections stimulated a number of scientists to conduct studies on honey, bringing about a resurgence of interest in the medical uses of honey. Recent research on honey has shed light on the mechanisms underlying its antimicrobial effects.

In summary the antibacterial effects are due to:

- **Osmotic effect:** Honey is a supersaturated sugar solution of fructose and glucose, which comprise 84%. The interaction of the sugar molecules with water molecules leaves very little water available to support the growth of microorganisms.
- **Acidity:** Honey is acidic, with a pH ranging from 3.2 - 4.5 which is low enough to inhibit the growth of many pathogens.
- **Non-peroxide antibacterial factors:** There have been reports of isolation of various antibacterial chemical substances from honey that are not hydrogen peroxide but their concentration is reportedly too low to contribute much antibacterial activity.

Honey has been reported to have an inhibitory effect to around 60 species of bacteria including aerobes and anaerobes, gram-positives and gram-negatives. An antifungal action has also been observed for some yeasts and species of Aspergillus and Penicillium as well as all the common dermatophytes.

There are differences in the antibacterial activity of different honeys. Honey is produced from many different floral sources and its antibacterial activity varies with origin and processing. Long ago, both Aristotle and Dioscorides recommended that honey collected in specific regions and seasons and, presumably from different floral sources, be used for the treatment of particular ailments. Research has since shown that honey, like antibiotics, has certain organisms sensitive to it while others are resistant, and the sensitivity varies depending on the source of the honey. It is recommended that honey selected for clinical use should be evaluated on the basis of antibacterial activity levels determined by laboratory testing. Staphylococcus aureus is one of the species most sensitive to the antibacterial activity of honey.

Other beneficial effects of honey include:

- **Stimulation of the healing process:** especially leg ulcers and diabetic ulcers.
- **Speedy clearance of infection:** when used as dressing on infected wounds. Honey is reportedly extremely effective in the treatment of wounds infected with antibiotic resistant bacteria - MRSA as well as wounds infected with multi-resistant bacteria.
- **Cleansing action on wounds:** Honey has a debriding effect on wounds so that surgical debridement is unnecessary or only a minimum required.
- **Stimulation of tissue regeneration:** Honey promotes the formation of clean healthy granulation tissue and growth of epithelium over the wound, thus helping skin regenerate. It has also been reported that dressing wounds with honey gives little or no scarring.
- **Comfort honey dressings:** Honey is non-irritating and the pain or discomfort associated with changing dressings is minimized.

The current main medical use of honey is in the treatment of infected wounds, chronic leg and skin ulcers, bedsores, especially in settings of drug-resistant infections. The effectiveness of honey in wounds and ulcers has been known empirically for thousands of years and has recently been documented in clinical studies. In 1999, the Therapeutic Goods Administration of Australia, which is equivalent to the Food and Drug Administration in the USA, approved Medihoney, which is 100% honey derived from blossoms of the Leptospermum (Tea) Tree, as a primary wound dressing. Two new products were also introduced in the Netherlands in 2001. One is Medisoft, a plaster containing a neutral woven carrier of ethylvinylacetate (EVC) and pure honey. The other is a sterile mix of honey and other substances such as lanolin, sunflower oil and zinc oxide.

Honey is reportedly used by ophthalmologists for treating corneal ulcers in India and Russia where it has been used for chemical and thermal burns to the eye, conjunctivitis, and infections of the cornea.

Other traditional folklore medical indications of honey include peptic ulcers and gastroenteritis. There is currently no rational basis for its use in peptic ulcer. However, Helicobacter pylori has been implicated as a causative agent in peptic ulcers and honey's antibacterial property might be responsible for its therapeutic action in this setting. There is only one small study testing the sensitivity of H. pylori isolated from biopsies of gastric ulcers against Manuka honey from New Zealand. 5% honey was found to inhibit the growth of H. pylori. Honey has also been found to be effective in treating bacterial gastroenteritis in infants. At least two studies demonstrated that natural honey, but not commercial honey, was bactericidal against the bacterial isolates obtained and that different types of honey exhibited varying bactericidal concentrations.

### Safety considerations

Honey sometimes contains spores of Clostridium Botulinum so that there is a definite risk of introducing the spores into wounds if honey is used as dressing. Sterilization of honey for use as wound dressing would eliminate this risk. The antibacterial activity of honey is lost with sterilization.
standard sterilization procedures such as autoclaving but gamma-radiation does not affect its bactericidal activity.[38]

Conclusions

Much of the wisdom of folk medicine has its roots in ancient beliefs held by people who understood neither chemistry nor anatomy. Honey is just the latest of the ancient remedies to be “rediscovered.” There are abundant references in ancient writings indicating the beneficial effects of honey and other bee products.

The humble bee makes honey from countless varieties of plant blossoms and it is logical to assume that by-products from the bee-hive such as honey probably contain many substances of medicinal value that modern medicine has yet to discover. Who knows, honey may turn out to be another medical marvel.

References

6. Papyrus Harris, donation to the temple of Re at Heliopolis. James H. Breasted Ancient Records of Egypt Part Four, 326.

Figures

[Figure 1], [Figure 2], [Figure 3], [Figure 4]
No history of medicine would be complete without mentioning Andreas Vesalius, a Belgian doctor who more than anyone in European medical science established the truth of many myths that had been held true since Galen in the Roman era. Vesalius had been fascinated by Galen's findings and endeavored to create a complete map of the human body, but in so doing disproved many of Galen's most important hypotheses.

A brief history of medicine. By Tim Lambert. Medicine in the ancient world. Medicine among Primitive Peoples. The first evidence of surgery is skulls from the stone age. Some adults had holes cut in their skulls. All human societies have medical beliefs that provide explanations for birth, death, and disease. Throughout history, illness has been attributed to witchcraft, demons, adverse astral influence, or the will of the gods. These ideas still retain some power, with faith healing and shrines still used in some places, although the rise of scientific medicine over the past millennium has altered or replaced many of the old beliefs. Main article: Prehistoric medicine.