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From Aphrodisiac to Health Food:

A Cultural History of Chocolate

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Chocolate is more than a confection, more than a dessert, more than a delightful pleasure. When drunk as cocoa or eaten as a solid bar of chocolate, consumers share a common connection through a vast spectrum of time. *Theobroma cacao*, the tree that bears the pods and beans that are ultimately made into chocolate, was probably domesticated initially in the western regions of the Amazon basin about 4000 years ago. Another suggestion is that domestication and human use of cacao first took place within a geographical area that today encompasses the modern states of Tabasco, Oaxaca, and Chiapas in southern Mexico, northern Guatemala, and Belize.

The story of cacao and chocolate begins with the early Olmecs who lived in Mesoamerica more than 3000 years ago. The story extends through the 16th-century Spanish conquest and colonization of Central America, when frothy cacao beverages prepared at the court of King Montezuma were served to Cortés and his troops. Chocolate facts and myths are linked with the spread of this beverage into Europe and North America during the late 16th and early 17th centuries. Today, in the 21st century, consumers welcome chocolate in a variety of ways, whether as a primary meal item or as a dessert, but always as a delightful pleasure.

Linguistic specialists, among them Martha Macri and her students at the University of California, Davis, have suggested that chocolate-related terms probably originated with the early Olmec civilization, passed to the Mayans, and then to the Mexica/Aztecs. Beans from cacao trees were dif-

ferentiated by the ancients into two primary types: the term *quauhcahuatl* represented the best-quality beans that were used as a form of currency, while the word *tlacacahuatl* applied to lower-quality beans used to prepare beverages. The English word cacao is derived linguistically from the Nahuatl (Aztec language) words *cacahuatl* or *xoxocatl*, generally translated as “a beverage prepared from cacao and water.”

How cacao came to humans

In ancient Mayan texts cacao has a divine origin – it is truly a gift from the gods. Xmucane, one of the creation gods, invented nine beverages, and from these, humans were formed who were able to feed themselves. Of these nine beverages, three were made with cacao and corn. Then came a time when historical events shifted geographically from the Mayan lowlands and southern regions of

modern Mexico as new immigrants arrived from the north and poured into the central valley of Mexico. These immigrants, the Toltecs, built the astonishing pyramids located at Teotihuacan. According to Toltec religious texts, the god Quetzalcóatl planted the first earthly cacao tree in a field at the site of Tula to honor good, hard-working humans who lived and toiled there.

The Toltecs, themselves, experienced cultural upheaval in the 14th century as their world was disrupted by the arrival of people known as the Mexica (Aztecs). Mexica warriors subdued the indigenous tribes that

had flourished in the valley and constructed their capital, Tenochtitlan, on two islands in Lake Texcoco. By the 16th century, the Aztecs had installed a strong economic, military, and political presence within the valley. Tenochtitlan at this time was an extraordinary architectural achievement, with a population variously estimated by scholars as between 250–350,000, making the capital one of the largest cities in the world.

The Mexica/Aztecs loved chocolate. More correctly, the Mexica nobility and male soldiers loved chocolate. Cacao/chocolate was not available to all the Mexica and others living in the central valley. It was served as a beverage only to adult males, specifically priests, government officials, military officers, distinguished warriors, and



Fig. 1. Cortés being greeted by Mexica on his way to Tenochtitlan, the Aztec capital [Spanish manuscript, Musée de l'homme, Paris].

sometimes to the bravest enemy captives before sacrifice. The Mexica held that cacao/chocolate beverages were intoxicating and stimulating and, therefore, not suitable for women and children.

Arrival of the Spanish

Just as the Mexica had replaced the Toltecs, a new invading force changed the culture of the New World. Spanish expeditionary forces arrived on the eastern shore of what is now modern Mexico in 1519, an event that initiated revolutionary regional changes and new chapters in the complex history of chocolate. Hernando Cortés landed near modern Vera Cruz. After burning his ships he led his troops inland toward the Mexica capital where his army was received by King Montezuma (fig. 1). Cortés, himself, and several of his literate officers wrote accounts of their march and documented events of the Mexica conquest. Several passages reflect direct observation of cacao-sellers in Tenochtitlan, while others describe behavior at dinners hosted by Montezuma where chocolate was served:

*From time to time the men of Montezuma's guard brought him, in cups of pure gold, a drink made from the cocoa-plant, which they said he took before visiting his wives. . . I saw them bring in fifty large jugs of chocolate, all frothed up, of which he would drink a little (Bernal Díaz del Castillo: 1560).**

This passage by Bernal Díaz is the first documentation in a European language to associate chocolate drinking with sexual activity (but would not be the last). Missing from the earliest Spanish documentation, however, is any suggestion that chocolate was consumed both as a food and as a medicine – two roles that ultimately dominated later European descriptions of this interesting food.

Medical uses of chocolate in Mexica texts

While the earliest Spanish accounts do not report medicinal uses for chocolate, the written record is not silent. Indigenous Mexica medical views of cacao/chocolate are recorded in several documents, among them the *Codex Barberini*, Latin 241, commonly known as the *Badianus Manuscript* (1552) and the *Florentine Codex* (1590). While both manuscripts postdate Spanish colonial contact, they were compiled by Spanish priests who obtained the information from Mexica respondents, so the views probably reflect earlier, pre-European-contact behavior.

The *Badianus Manuscript*, written in both Nahuatl/Aztec and Latin, is a Mexica herbal that identifies more than 100 medical conditions common to the central valley, and their treatments. The manuscript contains a striking color painting of a cacao tree among the healing plants identified in the text (fig. 2). There is also a passage describing how cacao flowers were strewn in perfumed baths to reduce the fatigue experi-

enced by Mexica government administrators.

The *Florentine Codex* was compiled by the priest Bernardino de Sahagún who arrived in New Spain in 1529. While many priests associated with the early decades of Spanish colonial rule in Mexico (or New Spain) viewed local inhabitants as savages, and their customs, traditions, and literary documents as “ungodly,” Sahagún did not. He was curious about Mexica medical knowledge and sought to learn as much as he could about their social traditions and history. Sahagún's Mexica informants reported a vast array of knowledge that he dutifully recorded and preserved for posterity. Without his labor and efforts to preserve this information, 21st-century scholars would have relatively few documents to work with and interpret when attempting to understand and reconstruct the precolonial era.

The information within the *Florentine Codex* is critical to understanding the early medical-related history of chocolate. The document reports that Mexica respondents warned against excessive drinking of cacao prepared from unroasted beans, but praised it if used in moderation. They reported that drinking large quantities of green cacao made consumers confused and deranged, but if used reasonably, the beverage both invigorated and refreshed. Another passage from the *Florentine Codex* reveals that cacao was mixed with various medicinal products and used to offset or mask the flavor of ill-tasting drugs. Sahagún's informants also reported that a local product known as *quinametli* (identified as “bones of ancient people called giants”) was blended with chocolate and used to treat bloody dysentery.

Chocolate arrives in Europe

While many recent texts and websites provide readers with a precise year

and a specific event whereby chocolate was first introduced to Europe, food historians always debate “firsts” and the so-called “first” arrival of chocolate in Europe is a subject of conjecture to say nothing of myth (fig. 3). Chocolate may have been introduced to Europe via the Spanish court in 1544, when Dominican friars are said to have brought Mayan nobles to meet Prince Philip. I suspect, though, that this oft-cited statement is probably more allegorical than precise. It is correct to say, however, that within a century of the arrival of the Spanish in Mexico, both culinary and medicinal uses of chocolate had spread from Mexico to Spain, France, England, and elsewhere within Western Europe (entering through Spain and Portugal) and probably North America as well (entering through the Spanish settlement at St. Augustine, Florida). Throughout Europe, chocolate was considered an “exotic” beverage – in competition with coffee and tea – and consumers readily developed their passion and desire for this dark, strangely “exciting” drink. In England chocolate houses emerged as the “rage of the day,” where wealthy, powerful Englishmen debated politics and global affairs over steaming cups of hot chocolate (fig. 4a). Indeed, the so-called “Queen's Lane Coffee House on High Street,” Oxford, began serving both coffee and chocolate in 1650 and still serves both beverages today in the 21st century (fig. 4b).

Chocolate as food – chocolate as medicine

From the 16th through early 19th century, numerous European travel accounts and medical texts documented the presumed merits and medicinal value of chocolate. Using library holdings of the Library of Congress, Washington, DC, the British Museum, and the University of California, as well as translations of original hand-written documents located at various archives in Mexico,



Fig. 3. An allegorical picture of the transfer of chocolate from the New to the Old World: a Native American presenting “chocolate” to Neptune [A. Colmenero de Ledesma (1631): *Curioso Tratado de la Naturaleza y Calidad del Chocolate*; with permission, University of California, Davis].

Spain, and elsewhere, my research team has identified more than 100 medical uses for chocolate prescribed by physicians during the past 475 years [1].

Presented here is a brief “taste” of these rich chocolate-related passages from selected historical monographs. On inspection, these samples reveal that chocolate products were used to treat a myriad of human disorders:

Francisco Hernández (1577) wrote that pure cacao paste prepared as a beverage treated fever and liver disease. He also mentioned that toasted, ground cacao beans mixed with resin were effective against dysentery and that chocolate beverages were commonly prescribed to thin patients in order for them to gain “flesh.”

Agustin Farfan (1592) recorded that chili peppers, rhubarb, and va-

nilla were used by the Mexica as purgatives and that chocolate beverages served hot doubled as powerful laxatives.

José de Acosta (1604) wrote that chili was sometimes added to chocolate beverages and that eating chocolate paste was good for stomach disorders.

Santiago de Valverde Turices (1624) concluded that chocolate drunk in great quantities was beneficial for treatment of chest ailments, but if drunk in small quantities was a satisfactory medicine for stomach disorders.

Colmenero de Ledesma (1631) reported that cacao preserved consumers' health, made them corpulent, improved their complexions, and made their dispositions more agreeable. He wrote that drinking chocolate incited love-making, led to conception in women, and facilitated delivery. He also claimed that chocolate aided digestion and cured tuberculosis.

Thomas Gage (1648) described a medicinal chocolate prepared with black pepper used to treat “cold liver.” Gage wrote that chocolate mixed with cinnamon increased urine flow and was an effective way to treat kidney disorders.

Henry Stubbe (1662) wrote that consumers should drink chocolate beverages once or twice each day to relieve tiredness caused by strenuous business activities. He reported that ingesting cacao oil was an effective treatment for the Fire of St. Anthony (i.e., ergot poisoning). Stubbe also described chocolate-based concoctions mixed with Jamaica pepper used to treat menstrual disorders, and other chocolate preparations blended with vanilla to strengthen the heart and to promote digestion.

William Hughes (1672) reported that cough could be treated by drinking chocolate blended with cinnamon or nutmeg. He wrote that chocolate nourished the body, induced sleep, and cured the “pustules, tumors, and swellings commonly experienced by hardy



Fig. 2. On the left, the cacao tree, *Theobroma cacao*, from the 16th-century *Badianus Manuscript*, a Latin Aztec herbal [CONACULTA-INAHMEX. Reproduced with permission of the National Institute of Anthropology and History, Mexico City]. Compare with the real tree illustrated above.

* For readers who would like full reference citations please visit the Karger Gazette website at www.karger.com/gazette

sea-men who had long been kept from a diet of fresh foods," symptoms akin to scurvy.

Sylvestre Dufour (1685) wrote that medicinal chocolate commonly contained anise-seed as an ingredient, and that such mixtures were used to treat bladder and kidney disorders. He described a type of medical chocolate blended with achiote (*Bixa orellana*) that produced a product of a blood-red color, used to reduce the "fever of love."

Nicolas de Blégné (1687) reported that chocolate mixed with vanilla syrup soothed lung inflammations and lessened the "ferocity of cough." He identified medicinal chocolates that contained as ingredients "syrup of coins," "drops of gold tincture," and "oil of amber" that treated indigestion and heart palpitations.

De Quélus (1718) wrote that drinking chocolate was nourishing and essential to good health. He said that drinking chocolate "repaired exhausted spirits," preserved health, and prolonged the lives of old men. Further, he claimed that an ounce of chocolate contained as much nourishment as a pound of beef.

Antonio Lavedan (1796) claimed that chocolate was beneficial but only if drunk in the morning, and he strongly cautioned against afternoon use of this beverage. He wrote that chocolate alone – with no other food – could keep consumers robust and healthy for many years, and remarked that drinking chocolate prolonged life.

Brillat-Savarin (1825) wrote that chocolate was a "wholesome, agreeable food, nourishing, easily digested, and an antidote to the inconveniences ascribed to coffee." He claimed that chocolate was best suited to those who exercised their brains, especially clergymen, lawyers, and travelers, and he recommended a concoction of cacao mixed with amber dust as a treatment for the ill-effects of hangover.

Auguste Saint-Arroman (1846) reported that chocolate – while suited to both the aged and weak – was dangerous if drunk by the young. He identified a recipe for medical chocolate that included iron filings, used to treat chlorosis in women.

Saint-Arroman's monograph on chocolate is intriguing for other reasons. He provided a recipe whereby chocolate was prepared from roasted cacao, sugar, and aromatic substances, such as ginger, pimento, and cloves, and sometimes vanilla and cinnamon. He also wrote that a common form of Spanish chocolate included the bulb of the root of *arachis* or "earth pistachio," better known in English as the peanut (*Arachis hypogaea*). Peanuts, domesticated initially in the Americas (perhaps Brazil), were taken to Europe and initiated there as a field crop. The Saint-Arroman account represents one of the earliest reports to document the blending of chocolate and peanuts, whether as medicine or as food, a blend that today in the 21st century represents a favorite combination for millions of consumers globally.

While chocolate has been prescribed in past centuries to patients suffering from "alpha to omega"



a

(from anemia, angina, and asthma to wasting, weakness, and worms), its long history in medical treatment has been a controversial one. While 21st-century physicians would not claim that chocolate cured cancer, gout, jaundice, rheumatism, scurvy, snake bite, or syphilis (as claimed in the past), examination of the historical medical accounts reveals five consistent, reasonable, medical-related uses:

1. For emaciated patients in order to restore weight – certainly an important treatment for patients with wasting diseases such as tuberculosis.
2. To stimulate the nervous systems of feeble patients, especially those suffering from apathy, exhaustion, or lassitude – an action which we might now attribute to the theobromine and caffeine in chocolate.
3. To calm, soothe, and tranquilize patients identified as "over-stimulated," especially those suffering from strenuous labor or "serious mental activity" – here, it is the pleasurable taste and flavor sensations, coupled with a relaxing effect, which would produce the mellow mood.
4. To improve digestion and elimination. Chocolate was said to strengthen, calm, or soothe "stagnant stomachs," stimulate the kidneys and hasten urine flow, improve bowel function, soften stools, and even cure or reduce hemorrhoids.
5. To bind medicinal ingredients and to mask the flavors of ill-tasting drugs, uses which are reflected in the modern view that "a little bit of chocolate makes the medicine go down."

Although not consistent through time, there are also intriguing historical accounts that suggest eating or drinking chocolate could/would have had a positive effect on patients beyond merely the placebo effect and pleasure of consuming this food. Hughes wrote in 1672 that drinking chocolate alleviated asthma spasms; Stubbe wrote in 1662 that drinking chocolate increased breast milk production; and Colmenero de Ledesma suggested in 1631 that drinking chocolate could expel kidney stones. Modern science has identified the vasodilatation and diuretic effects that

follow chocolate consumption, and with chocolate's high energy value, the concept that chocolate could be a galactagogue (milk producer) can at least be considered.

But chocolate, of course, is not a panacea for all of life's ills. Countering the well-documented positive and potentially positive medical effects of chocolate consumption identified in historical documents, these same texts offer other claims that may be discounted: effective against ergot poisoning (claimed by Stubbe in 1662); effective in delaying the growth of white hair in men (claimed by Lavedan in 1796); effective in reducing tumors/pustules (claimed by Hughes in 1672).

Recent chocolate-related fieldwork

Throughout the centuries chocolate has been used as both a food and medicine in many regions of the world. Since 2000, our team has conducted fieldwork in selected countries of Central America and the Caribbean where we have sought information on culinary, health, and medical uses as reported by traditional populations.

Mexico. In the geographical region of the Mixtec Alta in the Central Valley of Oaxaca, Mexico, *curanderos* (traditional healers) informed us that chocolate beverages were prescribed to cure bronchitis. In this region *curanderos* use cacao beans to treat the medical condition known as *espanto* or *susto*, an illness thought to result when persons have been startled or frightened. The treatment for *espanto/susto* reflects the high importance played by cacao in Mixtec society and the value placed upon cacao beans. Both patient and healer return to the exact location where the fright occurred: the *curandero* brings quantities of tobacco, bowls of fermented beverages, herbs, and cacao beans. The healer feeds the earth by planting cacao beans as a form of payment to the forces that caused the disease. The explanation given us was that by restoring wealth to the earth (in pre-Spanish times, cacao beans served as a type of money), the evil that caused the fright would become



b

Fig. 4. a. Henry Rowlandson watercolor of an 18th-century chocolate house [Museum of London]. b. The Queen's Lane Coffee House, Oxford, UK [photo: L. Grivetti].

distracted, whereupon the person suffering from *espanto/susto* could be treated and returned to health. Elsewhere in the El Istmo region of eastern Oaxaca, residents told us that chocolate beverages were commonly served to children at the morning meal as a type of talisman that protected children against the stings of scorpions, bees, or wasps.

The most intriguing uses of chocolate in Mexico are ancient cultural rituals blended with a veneer of Christianity. The celebration called *Día de la Muertos* (Day of the Dead) lasts from October 31 through November 2. At this time chocolate plays a central role in the cultural/social life of Mexican families. During *Día de la Muertos*, the living must fulfill their obligations to the deceased, a responsibility known as *guelagueta* (reciprocity). Chocolate is prepared locally as balls, tablets, and as hot beverages that are exchanged among friends and relatives. Foods, beverages, and especially chocolate prod-

ucts are placed on *ofrendas* (offering tables/altars) erected at homes and local cemeteries (fig. 5). Chocolate in either solid or liquid form is offered to the memory of dead children on the night of October 31, the day specifically known as *Día de los Angelitos* (Day of the Little Angels). Deceased adults are honored with chocolate offerings on November 1 or *Todos Santos* (All Saints' Day). Families visit the cemeteries at night where they gather in a family atmosphere to think about and remember the deceased. During the evening "watch," family members drink hot chocolate.

The Christian faithful at Oaxaca use chocolate in other religious celebrations as well. December 25 initiates the Twelve Days of Christmas, a period that extends through the New Year and ends on January 6 (Epiphany: the traditional date for the arrival of the Magi at Bethlehem). During the day and evening of January 5, homes of relatives and friends are visited and guests are served a festi-



Fig. 5. Day of the Dead offering table, Mexico [photo: S. Escarcega].



Fig. 6. Chocolate for sale on an Oaxacan market [photo: S. Escarcega].

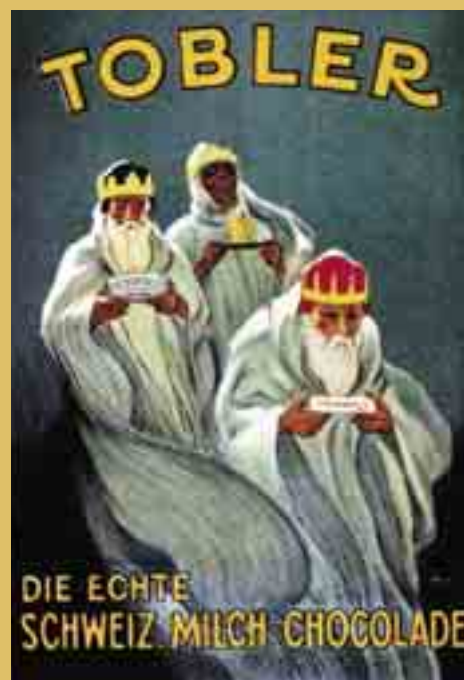


Fig. 7. Early 20th-century posters for chocolate.

val food called *La Rosca de Reyes* (The Three Kings Bread). This bread is eaten with hot chocolate, prepared using water or milk. A tiny figure of the infant Jesus is baked inside the bread. Whoever receives the doll in their slice is obligated to organize the next chocolate-related festival – February 2 or *Día de la Calendaria* (Candlemas) – when *tamales* and hot chocolate are prepared as festive dishes.

Dominican Republic. Chocolate beverages continue to be widely used in the Dominican Republic as traditional medicine, whether to improve kidney function, reduce anemia, or to halt diarrhea. Chocolate is prescribed by healers to treat sore throat, to ease “over-exerted brains” (among persons engaged in heavy thinking), and to soothe stomach ache. Other respondents stated that chocolate beverages blended with coconut milk and onion reduced symptoms of the common cold. Still others said that chocolate beverages strengthened the lungs and energized consumers.

California, USA. Our team members have also worked among the Mixtec Indian community located at Madera, a small town in the San Joaquin Valley of California, with cultural roots in the state of Oaxaca in southern Mexico. We were interested in the maintenance or abandonment of chocolate-related customs and traditions after immigration to the United States. Mixtec residents we interviewed reported that chocolate was consumed in three ways in Madera: (1) as *Champurado*, a mixture of chocolate, maize flour, and boiling water, (2) as a basic beverage prepared with water or milk, or (3) as *Mole*, a chocolate sauce commonly served with festive turkey dishes.

Favorite Oaxaca recipes that normally blended cacao, sugar, cinnamon, and almonds were widely desired and missed – so much so that individuals returning to Oaxaca for

short-term visits were given “wish lists” to fulfill and bring back to Madera, items that included Oaxaca-style chocolate (fig. 6). American-style chocolates, widely available throughout the community, were eaten but not considered as “real” chocolate, or types widely desired by respondents.

The Mixtec we studied in California were a community in transition and individuals were undergoing various levels of acculturation. Still, interviews we conducted related a strong, sustained use of chocolate in a medicinal context. Respondents reported that regular drinking of chocolate was healthy; that chocolate blended with fresh beaten eggs combated fatigue; that chocolate mixed with a *manzanilla*-based herbal tea alleviated pain; and chocolate mixed with cinnamon and *ruda* (rue) eased stomach ache.

The Mixtec living at Madera reported that eating and drinking chocolate also had two additional effects. We were told that some individuals drank chocolate to lower their high blood pressure. Alternatively, “lethargic” individuals who drank chocolate would experience elevated blood pressure and no longer feel tired. Many in the community reported that drinking chocolate eased symptoms of the common cold.

The globalization of chocolate

We have written elsewhere that – chocolate is more than a beverage, more than a confection, that chocolate is more than the sum of its interesting phytochemicals [1]. To taste chocolate is to share a common connection through history – from the early Olmecs more than three thousand years past, to the period of frothy cacao beverages prepared at the court of King Montezuma, into the 20th- and 21st-century era of the contemporary chocolate bar.

A number of books have been published recently on chocolate-related botany, economics, history, lore, and medical/nutritional properties [2–5]. These books are good places to begin. Further, those interested in chocolate history and lore should be encouraged to go online: a search with the key words “chocolate” and “cacao,” and various spelling variants, will reveal thousands of book titles and nearly 23 million websites (as of July 1, 2005). Hundreds of these sites claim to host “real” chocolate “facts” and “correct chocolate-related timelines.” Some of these are generally correct, others, however, fit more within the realm of fiction, while the majority merely copy chocolate-related dates and events from one site onto another without critical scrutiny regarding the information source and whether or not the information is correct.

It is more interesting, instead, to search the web for specific chocolate-related or sociocultural aspects of chocolate: search for chocolate-related advertisements from magazines, newspapers, and signs; chocolate-related collectibles, whether boxes and tins, candy molds, posters (fig. 7), chocolate pots/cups/saucers, even chocolate-related toys. What one encounters during such searches is exposure to how chocolate fits into many aspects of cultures throughout the world, how it links peoples and cultures through time and geographical space – from Austria to Zambia, from precolonial Central and South America to the 21st century of the Common Era: chocolate has become part of the “social gloss” of millions throughout the world today.

Our chocolate-related research has revealed a consistent, global fascination with this wonderful food. Eating chocolate may alter the mind and be pleasing to consumers because of its theobromine content. But chocolate is more. Chocolate alters

the mind through a myriad of pleasurable sensations as the flavor and taste sensations flood the mouth, stimulating memories of the consumer’s childhood, youth, and adult years. It is not the same with other foods: memories of broccoli, liver, and turnips hold no such places in the pantheon of great food-related experiences, but memories of chocolate allow consumers to recall wonderful days and pleasurable events.

If there is a “true history of chocolate,” it will remain forever elusive, the threads too long, too tangled to ever fully unravel. The traces extend through most of the fields in the humanities (art, literature, music, poetry, theater), the social sciences (anthropology, economics, geography, history, psychology, sociology), as well as the agricultural and biological, medical, even physical sciences (too many to identify). But maybe that very mystery – tempting our research – together with the endless human inventiveness in its use, will ensure that chocolate remains one of the most intriguing foods on this planet.

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About the author

Professor **Louis E. Grivetti** received his Ph.D. in geography in 1976 from the University of California, Davis. He served on the Editorial Board of the *Cambridge World History of Food Project* and currently serves on the editorial boards of *Ecology of Food and Nutrition*, *Journal of Ethnopharmacology*, *International Journal of Food Sciences and Nutrition*, and *Nutrition Today*. Dr. Grivetti’s nutrition research focuses on human food patterns and the nutritional consequences of food-related behavior, from both historical and contemporary perspectives. His work blends nutritional science with history and culture. He currently coordinates a research team dedicated to the study of chocolate.



Chocolate: good for the heart?

The last three years have seen a spate of studies and articles – and much accompanying discussion – on the possible cardiovascular benefits of eating chocolate, specifically dark chocolate. In various controlled studies, consumers of dark chocolate have shown such benefits as lowered blood pressure, reduced oxidation of low-density lipoproteins and reduced platelet aggregation.

These findings are being attributed to the presence in cocoa of a certain group of flavonoids, the flavan-3-ols. These chemicals, including (–)-epicatechin, (+)-catechin, and procyanidins, have pronounced in vivo antioxidative properties to which the beneficial effects are being ascribed. The stimulation of nitric oxide production is another possible route for their effects, and they have also been suggested to modulate certain cell-signaling pathways and gene expression, and to influence cell membrane properties and receptor function.

The positive effects seem to be limited to dark chocolate, the milk in milk chocolate apparently interfering with flavanol absorption in the gut. The flavanol content of different products can also vary greatly depending on how the chocolate is processed: roasting and other manufacturing procedures can reduce the flavanoid content by as much as 90%. Some manufacturers are now probing their production lines to see if and where the flavanols are being destroyed and taking steps to stop this. If the evidence from new studies continues to indicate the beneficial properties, we may well start to see flavanoid contents printed on the wrappers of chocolate bars.

The other big issue, of course, is that chocolate is high in calories – a 100-g bar contains about 500 calories. So it’s all very well incorporating dark chocolate into the daily diet as a dessert or dessert replacement, quite another thing to add it on as a “healthy” extra, particularly given its high fat content.

There is also a dearth of information on how flavanols interact with other dietary components, and on their possible acute or chronic effects. Doubtless we will soon see the results of studies and clinical trials exploring these and other outstanding questions, particularly on the precise mechanisms of flavanol action. Meanwhile, chocolate lovers can nibble on dark pralines while imagining, at least, their blood cells racing through wide, unsticky vessels. (ab)

For further reading please refer to the literature list at

www.karger.com/gazette/68

Eating Your Way to Happiness:

Chocolate, Brain Metabolism, and Mood

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In the spring of 2004, a woman walked into Woolworths with a yearning for chocolate and walked out with 10,000 Mars bars. In April of the same year, a man in the throes of a late-night craving shot a sales clerk who would not exchange his expired bag of chocolates. One month later, a small town's police department started handing out chocolate bars to late-night bar-goers as a new "weapon for deterring drunks" from violent outbreaks. Throughout the USA, Chocolate Lovers' Weekend packages – replete with chocolate spa treatments and tastings – entice consumers. The Hotel Hershey has even opened a special spa where men and women can have their dreams fulfilled – to be covered from head to toe in melted chocolate with treatments such as whipped cocoa baths, chocolate hydrotherapy, chocolate bean polishes, and chocolate fondue wraps.

Surprising? Yes, and no. According to the US Department of Commerce, the average American eats 4.9 kg of chocolate per year. (While per capita sales figures for Switzerland, the highest in the world, are 11.6 kg a year. However, since some of this represents purchases by tourists, the average Swiss citizen isn't quite consuming two 100-g bars of chocolate a week.) American surveys have shown that chocolate cravings represent close to 50% of all food cravings. That makes it the most commonly craved food in North America, especially among women. The taste and aroma of chocolate can tempt even the most disciplined among us. But, why do we feel such a passion for chocolate? What makes chocolate so seductive? The simple answer is that it tastes great and makes us feel good. But, what is it in chocolate that makes us feel so good, that drives us to crave and in some cases become addicted?

Chocolate has always been considered unique among foods. From its historical use as a sacred sub-

stance up to its prominence today as the food of romance, celebration, and indulgence, it has always held a special place in society. We do not classify chocolate as part of any of the four basic plant groups of food (whole grains, vegetables, fruit, and legumes). Nor do we call it a drug. But curiously, chocolate has properties of both. A food is defined as "any substance taken into and assimilated by a plant or animal to keep it alive and enable it to grow and repair tissue; nourishment; nutriment," while a drug is "a substance used as a medicine or as a narcotic," or "a chemical substance, such as a narcotic or hallucinogen, that affects the central nervous system, causing changes in behavior and often addiction." Chocolate is defined as "a paste, powder, syrup, or bar made from cacao seeds that have been roasted and ground." It contains nutrients, provides nourishment, and fits the definition of a food. Ask chocolate lovers to define chocolate, however, and they will describe it as "the love drug," "the eighth wonder,"

"the food of the gods," "a wicked pleasure," "better than sex," and "the secret drug of happiness."

It is becoming increasingly clear that chocolate contains several biologically active compounds, some of which have potential mind-altering properties that may explain the feelings that people have toward chocolate [1]. These compounds include: cannabinoid-like fatty acids that are structurally similar to the active molecule in marijuana (tetrahydrocannabinol); methylxanthines, including one of the most widely consumed drugs with documented addictive properties (caffeine); alkaloids including the same compounds that are found in alcohol and that are thought to be partially responsible for alcoholism (tetrahydro-beta-carbolines); and biogenic amines, including phenyl-ethylamine, otherwise known as the "love drug" because it induces physiological and psychological effects similar to those caused by being in love. While each of these pharmacological agents is present only in small amounts, the combined effects of these compounds, together with the unique sensory

properties of chocolate, might be sufficient to induce a chocolate high that triggers and reinforces chocolate cravings.

The combined psychological and pharmacological effects of chocolate have been a topic of increasing interest among nutritional scientists who are now localizing in the body and brain the sites where chocolate acts, and identifying the precise compounds involved.

The endorphin effect: the sensory properties of chocolate

The most widely accepted explanation for chocolate cravings focuses on its sensory properties, its unique combination of sweetness, taste, and texture. Chocolate contains large amounts of sugar and fat (cocoa butter). Cocoa butter melts at body temperature, and it is this feature that is largely responsible for the overall pleasurable, mouth-watering experience of chocolate consumption. Chocolate also contains more than 400 distinct flavor compounds (more than twice as many as any other food). One would have difficulty arguing against the statement that at least part of chocolate's allure is driven by its unique, highly enjoyable sensory appeal.

Chocolate contains approximately 50% fat and close to 50% carbohydrate; this combination of nutrients results in a powerful effect whereby all brain chemicals (specifically serotonin, dopamine, and opiate peptides) are positioned at optimal levels for positive mood and euphoric feelings. Palatable foods

such as chocolate, cakes, and ice cream stimulate the release of brain opiates known as endorphins, which make you feel good and may even increase appetite. As endorphins are chemically similar to morphine, the brain responds to them in the same way as it responds to morphine. These brain opiates are largely responsible for the body's response to pleasure, stress, and pain, and are known to be involved in drug addictions. It is now believed that cravings for sweet and high-fat foods such as chocolate may be partly mediated by these brain opiates.

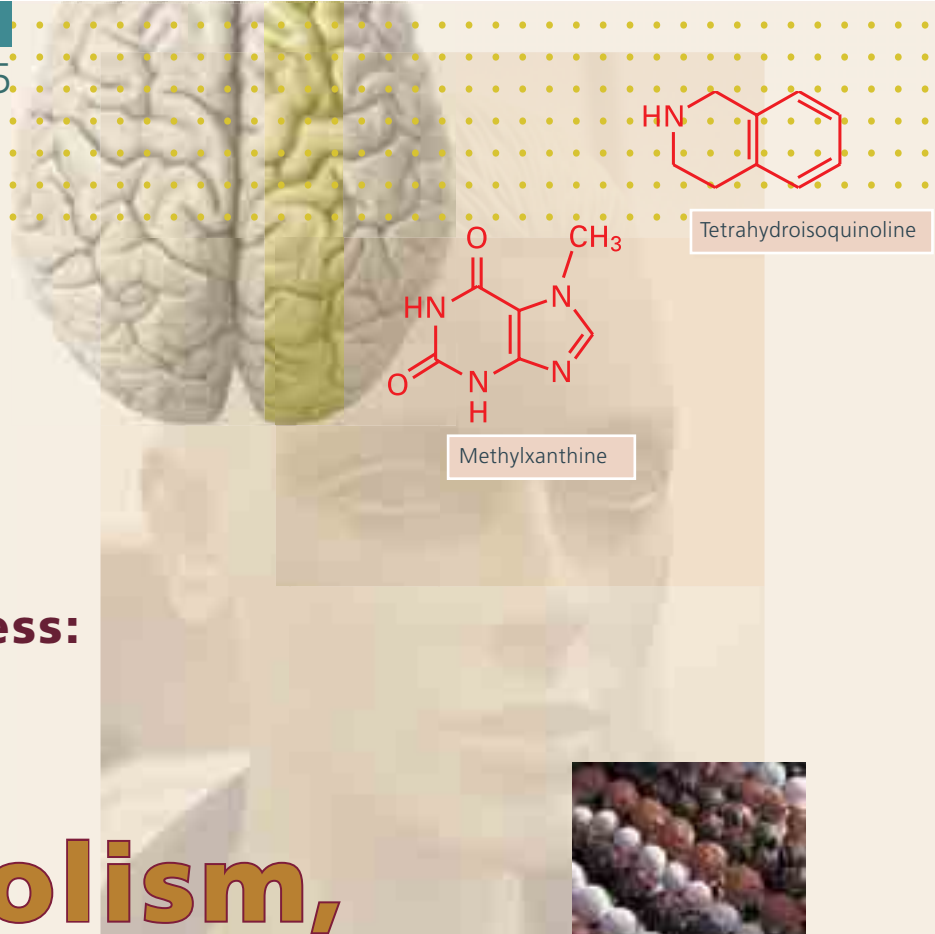
If sensory experience, mediated by opiates, rather than chocolate's drug-like constituents, is the ultimate object of chocolate craving, then only chocolate should satisfy the craving. Investigations involving "white chocolate" have been useful in delineating the extent to which the sensory qualities of chocolate contribute to cravings. "White chocolate" has the texture and sweetness of chocolate as it also contains cocoa butter and sugar. However, because it contains no chocolate liquor, "white chocolate" does not emit chocolate's distinctive aroma, nor does it contain chocolate's many pharmacological constituents. In an experiment whose aim was to isolate the sensory effects of chocolate from the potential pharmacological effects, the researchers found that "white chocolate" produced only an intermediate effect in reducing craving, significantly less than milk chocolate, which largely alleviated craving [2]. These findings lend credence to either a notable sensory effect of chocolate's aroma and/or a pharmacological effect of its biologically active compounds.

Drug-like chemicals in chocolate

Evidence is accumulating to suggest that chocolate contains several pharmacologically active compounds that may have drug-like effects on the body and mind.

Anandamides (cannabinoid-like fatty acids)

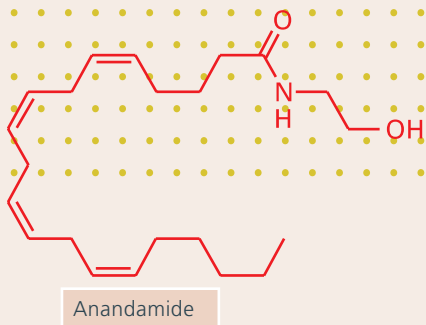
One of the most interesting new findings on chocolate's pharmacological properties is that it may contain a



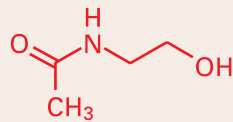
Methylxanthine

Tetrahydroisoquinoline





Anandamide



Acylethanolamine

molecule that mimics the actions of cannabinoids. Cannabinoids, including marijuana, have been used medicinally for over 4000 years to treat migraine, muscle spasms, seizures, glaucoma, pain, and nausea. They have also been used recreationally for their mind-altering, relaxing, and mood-elevating effects.

Recently, a study undertaken at the Neurosciences Institute in San Diego, California, identified a group of biologically active constituents in chocolate, most notably anandamide, that appear to target the endogenous cannabinoid system of the brain [3]. Anandamide, which literally means “internal bliss,” is a lipid that binds to and activates cannabinoid receptors within the brain, mimicking the psychoactive effects of cannabinoid drugs, such as heightened sensitivity and euphoria.

been detected in “white chocolate” or in brewed espresso coffee. The two chocolate NAEs also appear to interfere with the ability of the brain to break anandamide down and remove it from the brain and hence may extend the consequent sense of well-being following chocolate consumption.

Critics contend, however, that you would need to eat an enormous amount of chocolate to experience the characteristic high induced by cannabinoids such as marijuana. Some have estimated that it would take around 11 kg of chocolate eaten in one sitting to produce a response similar to that experienced following marijuana use.

Methylxanthines

Chocolate also contains significant amounts of methylxanthines, most

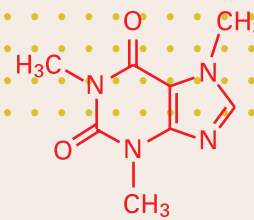
medicine codeine. Consequently, chocolate is now being marketed as the new, effective cough suppressant.

While the quantities of methylxanthines in chocolate are variable even within a brand, a typical 1.65-oz Hershey milk chocolate bar contains only 10 mg of caffeine (22 mg/200 g) and 92 mg of theobromine (197 mg/100 g). For comparison, a cup of coffee usually contains 80–100 mg caffeine, and no theobromine. While the relative concentrations of methylxanthines in chocolate are low, the caffeine and theobromine are nevertheless likely to play a large role in the pharmacological effects of chocolate. Although the dosage typically found in chocolate appears to exert only modest, caffeine-like symptoms, the combined effects of theobromine and caffeine in cocoa products may differ from those of either compound alone. Moreover, a recent study demonstrated that when comparing cocoa powder with just the isolated methylxanthines, the two groups exhibited similar pharmacological effects. The researchers concluded that since the cocoa powder (which contains all of the active compounds in chocolate) had similar activity to the isolated methylxanthines, the pharmacological effects of chocolate are most likely largely due to the methylxanthines.

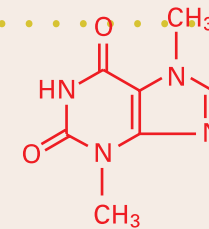
Biogenic amines

Another group of compounds found in chocolate are the biogenic amines, most notably tyramine and phenylethylamine (PEA). Biogenic amines are naturally occurring, biologically active compounds that act primarily as neurotransmitters and are capable of affecting mental functioning and regulating several bodily processes such as blood pressure and body temperature. Tyramine is an amino acid that acts to contract blood vessels and is often implicated as a major contributor to migraine headaches in susceptible individuals. PEA occurs naturally as a neurotransmitter in the brain and is thought to stimulate the nervous system and produce feelings such as those experienced when a person is “in love.” For that reason, PEA has been touted as the “love drug” and has been credited for chocolate’s aphrodisiac properties.

On a normal basis, PEA is evenly distributed throughout the central nervous system and at physiological doses may act to stimulate the release and transmission of dopamine, a neurotransmitter that inhibits appetite and improves mood, alertness, ability to cope with stress, and mental functioning. PEA is structurally and pharmacologically similar to catecholamines and amphetamine, substances that when released into the blood increase heart rate, blood pressure, breathing rate, muscle strength, and mental alertness. They also reduce the amount of blood going to the skin and increase blood flow to the major organs (such as the brain, heart, and kidneys). In fact, PEA has even earned the nickname “chocolate amphetamine” due to its amphetamine-like structure and its ability to promote feelings of attraction, excitement, giddiness, and apprehension.



Caffeine



Theobromine



Phenylethylamine

PEA is known to reach peak levels during orgasm.

While PEA is produced naturally by brain tissue, studies have also demonstrated that it is pharmacologically active and stimulatory when administered. PEA initiates the activity of dopamine production and transmission in the brain, thereby stimulating the brain’s pleasure centers.

In fact, several studies have suggested that PEA is an important modulator of mood and that a deficit may contribute to depression. PEA is reduced in the biological tissues and fluids of depressed subjects, and replacement with PEA and/or its amino acid precursor, L-phenylalanine, appears to improve some types of depression. PEA is found in substantial concentrations in chocolate (0.4–6.6 µg/g) and some experts have contended that craving for chocolate may be an attempt to self-regulate brain PEA and mood.

Alkaloids

A recent study conducted in Spain found that the same alkaloid compounds found in alcohol are also present in chocolate (the darker the chocolate, the more alkaloids). Specifically, the researchers demonstrated that ordinary cocoa and chocolate bars contain two groups of alkaloids known as tetrahydro-beta-carbolines (THBCs) and tetrahydroisoquinolines (TIQs) [4]. The concentration of two THBCs in chocolate and cocoa has been found to be comparable to that of alcoholic beverages such as wine, beer, and liquor, which contain a relatively high amount of those compounds.

These same chemicals in alcohol have been found to exhibit neuroactive properties and have been linked to alcoholism. Many recovering alcoholics use chocolate to curb their craving for alcohol, especially early in sobriety. In fact, the book *Alcoholics Anonymous* actually recommends using chocolate to satisfy alcohol cravings [5]. Interestingly, no connection between compulsive drinking and chocolate craving has been established.

These neuroactive alkaloids in chocolate are currently being investigated for possible influences on mood and behavior. Preliminary evidence suggests that they may influence the production of endogenous opioids (endorphins), the feel-good chemicals produced by the brain. Other studies suggest that THBCs might play a role as neuromodulators via effects on monoamine oxidase (MAO), the enzyme that is largely involved in the production and breakdown of neurotransmitters (i.e., serotonin and dopamine) that are critical to functions such as appetite, motivation, cravings, mood, and sleep. Spe-

cifically, THBCs appear to inhibit MAO, thereby potentiating the effects of biogenic amines in chocolate (i.e., PEA, tryptamine, and others), reducing the breakdown of neurotransmitters and extending their duration of action.

The TIQs found in chocolate include salsolinol (SAL) and salsoline. SAL is a dopaminergic active compound, which binds largely to dopamine receptors. These receptors are specifically responsible for reinforcement and reward, and have been associated with neuropsychiatric disorders such as drug addiction. Preliminary evidence suggests that SAL may influence the production of endogenous opioids (endorphins) and the amount of SAL ingested in 100 g of chocolate is sufficient to interact with the dopamine receptors [6]. Although the concentration of SAL in chocolate products is small, the brain effects may be significant, especially in combination with the other biologically active components of chocolate, and SAL has been deemed one of the main psychoactive compounds present in cocoa and chocolate.

Chocolate and the brain

So, what is really going on in the brain of a “chocoholic”? How are chocolate’s unique sensory properties and pharmacologically active compounds interpreted by the brain during and after chocolate consumption? Many chocolate lovers exhibit a heightened sense of well-being during consumption and others report that just thinking about chocolate can evoke a pleasurable response.

It has been suggested that all drugs of abuse act on the brain’s reward system and cause the brain to interpret drug signals as biologically rewarding or potentially important stimuli comparable to food or sex. This may also be true for chocolate. The mere sight and smell of pleasurable foods can cause brain dopamine levels to rise in brain regions associated with food motivation (such as the dorsal striatum). This means that the dopamine reward system can be triggered by food even when there is no pleasure associated with it. The spike in dopamine observed following exposure to palatable foods, like chocolate, is similar to that seen in drug addicts when they are craving drugs.

So what types of chocolate-related cues or signals might the brain interpret as biologically rewarding or significant? Cues such as images, scents, and emotions associated with chocolate activate similar brain regions and circuitries as those activated following exposure to drug-associated cues. A study involving brain scans of normal, hungry chocolate lovers showed that their brains lit up when they saw and smelled chocolate



In addition to anandamide itself, chocolate and cocoa both appear to contain two other unsaturated fatty acids, which are chemically and pharmacologically related to anandamide. These fatty acids are known as N-acyl-ethanolamines (NAEs; N-oleoylethanolamine, N-linoleoylethanolamine) and could mimic endocannabinoid ligands such as anandamide either directly (by activating cannabinoid receptors) or indirectly (by slowing the breakdown of anandamide, thereby increasing anandamide levels and prolonging the action in the brain). Elevated brain anandamide levels have been suggested to magnify the sensory properties of chocolate, which are fundamental to craving, and could also interact with other biologically active constituents of chocolate (i.e., caffeine, theobromine) to induce a noticeable sense of well-being. No unsaturated NAEs have

notably caffeine and theobromine (a caffeine-like substance found almost exclusively in chocolate). Both are stimulants, and caffeine can cause noticeable behavioral effects. Although the methylxanthines are bases, they have a very low pKa (0.5) and, hence, are highly fat soluble and are absorbed from the stomach and through the walls of the intestines, easily crossing both the blood-brain and placental barriers. In animals, theobromine appears to have effects congruent to those of caffeine, although theobromine causes less stimulation and takes longer to induce a peak pharmacological effect. Moreover, recent clinical studies have suggested that theobromine suppresses vagus nerve activity, which is responsible for coughing. In fact, theobromine has been shown to be nearly 30% more effective in stopping persistent coughs than the leading



in the same way that the brain of a cocaine addict responds when the addict thinks about his or her next high. Likewise, in a study designed to investigate why cravings for both drugs and chocolate can be triggered by environmental cues that have come to be associated with the craved substance, the researchers found that exposure to chocolate-associated stimuli induces a pattern of gene expression in the prefrontal cortex that shows many similarities to the pattern elicited by drug cues (the prefrontal cortex is a brain region responsible for several aspects of drug addiction) [7]. The researchers concluded that both chocolate and drugs of abuse induce long-term physiolog-

ical changes in brain regions that are responsible for certain aspects of addiction. So, the brain areas responsible for drug addiction respond to chocolate-related cues in the same way as they respond to drugs of abuse.

The brain of a "chocoholic" also responds to eating chocolate in the same way the brain of a drug addict responds to appeasing a drug craving. In one study, participants melted chocolate slowly in their mouths while their brain activity was measured as they became satisfied and then beyond, to a point where they ate despite feeling satiated. The researchers found that different brain regions were activated selectively de-

pending on whether the subjects were eating chocolate when they were hungry or whether they were continuing to eat chocolate despite being full [8]. For the hungry "chocoholics," presentation of chocolate significantly increased the metabolism in regions of the brain that are largely associated with addiction (the superior temporal, anterior insula, and orbitofrontal cortex). In contrast, the pattern of brain activity was different for participants when they were full, and eating chocolate was considered aversive. Interestingly, the brain regions that were activated in the hungry "chocoholics" are the same regions that are activated in cocaine users when they have thoughts about the drug. Together, these findings support the idea that the brain may interpret chocolate as a drug and that the activation of this dopamine reward system likely plays an integral role in the explanation of chocolate's appeal.

Women's special relationship with chocolate

Why do more women than men experience chocolate cravings? Why is chocolate often an uncontrollable addiction for women, one that can sabotage a healthy diet, weight control and/or disease prevention?

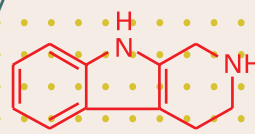
Many scientists believe that the cycle of fat and sugar cravings in women coincides with reproductive needs. Women consistently report heightened fat and sugar cravings during puberty and following ovulation (premenstrually), which allows for building up energy stores in preparation for pregnancy. Men, on the other hand, report preferences for high-protein foods, consistent with their species-survival need for greater muscle mass.

Other scientists explain gender differences and the cyclic nature of food cravings strictly by differences in hormonal production, as women's cravings for sweet high-fat foods increase dramatically prior to menstruation. Studies have shown that of the 40% of women who experience regular chocolate cravings, almost half experience heightened chocolate cravings before and during menses.

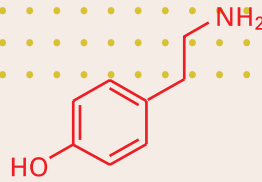
Finally, some researchers suggest that chocolate cravings in women may also have a cultural explanation. Considering the immense amount of chocolate advertising that targets women, and its association with romance, perhaps it is not surprising that women, more than men, have come to associate chocolate with sex, love, and comfort.

Summary

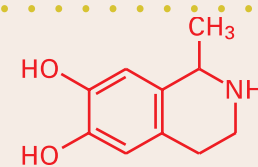
Chocolate's unique characteristics, including its sensory properties, pharmacologically active compounds, and



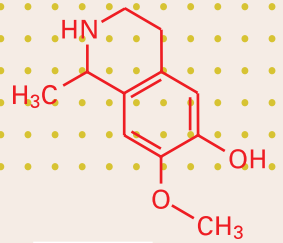
Tetrahydro-beta-carboline



Tyramine



Salsolinol



Salsoline

drug-like effects on the brain and behavior have been studied extensively. However, the exact reason for the unique magnetism of chocolate, particularly among women, has not yet been established. The sensory reward of chocolate, shaped by its pharmacological properties and cognitive effects, is an exceptionally potent force and appears to be the predominant factor contributing to chocolate's noble status. It is becoming clear, however, that chocolate is not just a delicious food that represents romance, love, and celebration. Rather, chocolate is a cocktail of pharmacological agents hidden within a sweet, velvety, and, to many if not all, irresistible dessert that has the potential to induce drug-like effects on the body and the mind.

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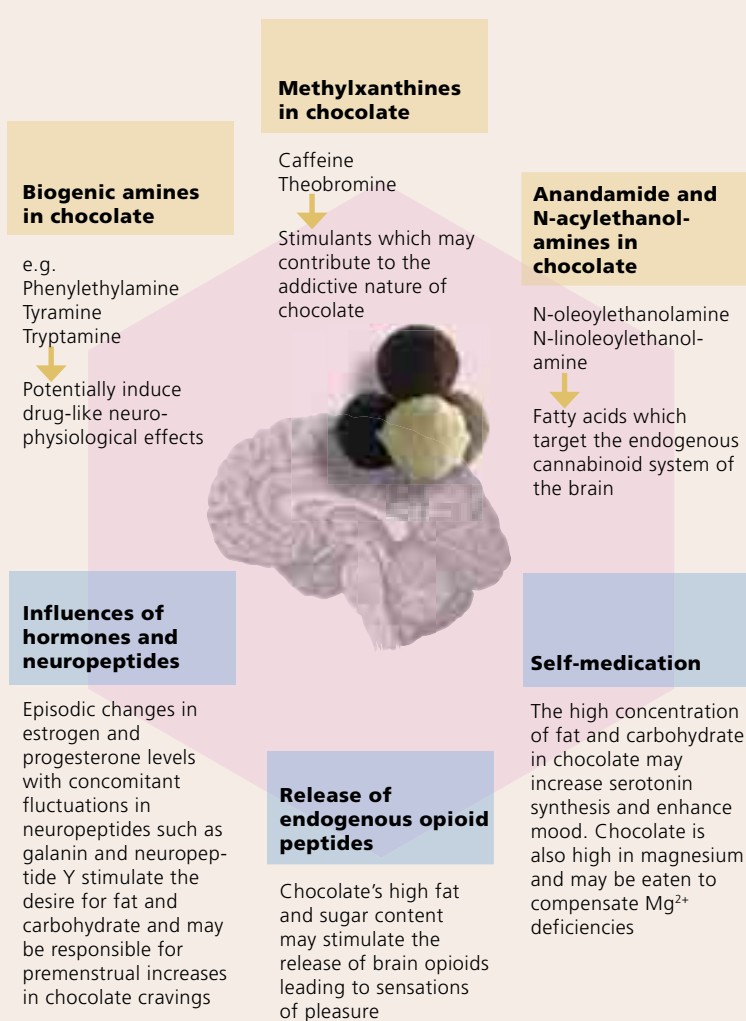
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Douglas Taren received his doctoral degree in nutritional sciences from Cornell University in 1986. After serving on the faculty at the University of South Florida College of Public Health from 1987 to 1992, he joined the University of Arizona College of Medicine in 1996. His work has focused on women's health and the prevention of preterm infants, the development of educational programs, the improvement of dietary assessment methods, and child nutrition. He has undertaken projects in Central and Latin America, Africa, China and Nepal. Author of two textbooks, numerous book chapters, and more than 60 published papers, Dr. Taren is currently an Associate Professor of Public Health in the Mel and Enid Zuckerman Arizona College of Public Health where he chairs the Master of Public Health Program.

How chocolate could influence brain and behavior



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Illustration on title page: Aztec woman preparing a chocolate drink, which was made frothy by pouring it back and forth.
(From: Codice Tudela, 16th century)

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Camille Bloch – A Story Made in Switzerland



Ask anyone who likes chocolate to name two Swiss chocolate firms, and they are likely to reply: Suchard and Lindt. Ask them to name a specific Swiss chocolate product, and the answer might now depend on where they live. Outside Switzerland, Toblerone – the triangular, Alp-mimicking, chocolate and almond bar – is likely to be the most familiar product. Within Switzerland, though, two other bars, to be found in every newspaper kiosk, by the checkout till in every supermarket, are just as familiar – Ragusa and Torino. And these chocolate bars are not manufactured by a large multinational firm, but by a small, 75-year-old, Jewish family-owned business, based in Courtelary, a rural town in the French-speaking part of Switzerland: Camille Bloch. The unusual story of Camille Bloch combines imagination and business acumen, resilience and customer loyalty.

From Bern to Courtelary: on the winding road to success

Camille Bloch, the firm's founder, moved his small enterprise into an empty paper factory in Courtelary in 1935. He had become a chocolate manufacturer in 1929 when, after selling chocolate for Tobler, he bought up machinery from A.W. Lindt in Bern, who were closing down. But rents in Bern were high, and so, with his son Rolf – the future director – in the back seat, he drove up into the countryside looking for new premises. His choice also fell on Courtelary because the Swiss watch industry, which is largely based in the canton Jura, had been strongly hit by the Depression, and many of the region's inhabitants were out of work. A chocolate factory was a welcome, if not quite usual, source of employment.

In 1935, the firm had a turnover of about CHF 0.5 million. Seventy-five years later, the annual turnover is CHF 50 million (USD 40 million). The company today employs 150 people and annually produces 2700 tonnes of chocolate.

Making chocolate: an ancient craft

Chocolate begins with the cocoa bean. And, in contrast to all other Swiss chocolate firms of equivalent size, Camille Bloch still purchases and roasts the beans itself, rather than buying the partially prepared chocolate paste from an outside source. The beans usually come from Ghana and Ecuador and are stored, refrigerated, on site before they are processed. After quality control checks and cleaning, the beans are roasted: for dark chocolate for longer periods and at higher temperatures. They are then crushed and the husk is blown away by air. The beans are then ground finely to form the cocoa mass, and other products are added:

additional cocoa butter, sugar, and, for milk chocolate, milk powder. This mixture is refined to a flaky powder in a roller mill. Next comes the process of conching, which transforms the powdery aggregate into a fluid, shearing the chocolate mass with rotary blades to aerate and homogenize it. This takes time, but brings out the full flavor of the cocoa, and is where the mouth-melting properties of chocolate are created: the longer the conching, the smoother the chocolate – so it's said. Conching once took as long as 72 hours! Today, many firms have cut this down to 12 hours. But at Camille Bloch conching still lasts 24 hours – to reduce it further, the company believes, would impair the quality of the chocolate.

After conching, the chocolate is ready to enter the various production lines for different products – e.g. solid bars, bars filled with liqueurs and, at Camille Bloch – Torino and Ragusa.

Ragusa – an invention born of necessity

As World War II wore on, Camille Bloch, like all other European manufacturers of chocolate was faced with a shortage in his basic raw material – cocoa beans. Chocolate firms tried all sorts of ways to make the chocolate go further, like adding fruits and nuts to their bars. Camille Bloch, however, came up with an idea that

wasn't merely novel but laid the foundations for the firm's survival and prosperity in a very changed postwar consumer landscape.

He replaced part of the chocolate mass with a hazelnut mass, i.e. a smooth praline paste made from the nuts, whose supply had not been interrupted by the war. Not only that, he changed the form of the chocolate, from a flat bar to a "branche," a 50-g bar with a squarish cross-section, the soft filling containing – the third innovation – whole hazelnuts, surrounded by a darker-chocolate coating. Wrapped in foil and then placed in a cardboard tube.

Sales of Ragusa during the war were modest, but its unusual taste and texture clearly found a following. After the war, the market for chocolate slowly recovered, but a new player had entered the field – the American snack bar, like Mars and Hershey. In Ragusa (and Torino, a 46-g praline bar created shortly after the war), Camille Bloch not only had a competitor but could build on the preexisting affection Swiss consumers had already developed for the products. With strategic and dynamic publicity and marketing, Ragusa and Torino became, and remain, unreplaceable household brands. Each today represents 30% of the total production of Camille Bloch chocolate products.

Recipes for survival – quality and niche products

How has a small, family-owned firm managed to survive, persist, and grow in a highly competitive market now dominated by a few, large corporations? Irreplaceable products are part of the story, but there is more to it than that. As the current CEO, Camille Bloch's grandson, Daniel Bloch, told us, such a company must acknowledge what it cannot do, identify its strengths, and cultivate them. Here, the two key words are quality and specialization.

By buying the raw cocoa beans on the market, and testing samples before purchase, Camille Bloch can exert a high degree of control over the quality of the raw materials that go



Camille Bloch



Rolf Bloch



Daniel Bloch

into the chocolate. And such quality control accompanies all the stages of the manufacturing process. Camille Bloch makes its chocolate in batches, and Daniel Bloch emphasized that this again means that the company can guarantee the quality and consistency of its products.

Specialization is the second pillar of success. Camille Bloch could not possibly hope to compete successfully with larger firms if it produced the same kind of "faceless" products – flat bars of milk or plain chocolate for example. Although, it does indeed produce a small quantity of chocolate for the tourist market, wrapped, predictably, in Swiss Alpine scenery, or famous landmarks like the wooden bridge in Luzern. A focus on special niche products is the only phenotype for survival. In addition to Ragusa and Torino, Camille Bloch is perhaps best known for its bars of kirsch-filled chocolate.

And, at about the same time that this issue of the Karger Gazette is released, Camille Bloch will be launching a new line of "mousse" chocolates: more dark seductions for its devoted and, the company obviously hopes, new consumers.

Kosher chocolate

Twice a year, Camille Bloch produces Kosher chocolate, which comprises 5% of its sales, half to the USA, the rest going to Israel and Europe. What makes chocolate Kosher is not the manufacturing process, per se, but

that all the stages of production, from the source of the raw ingredients right through to the end product have met the rabbinical standards of food hygiene – for example, the absence of contact with pork (e.g. at the farms producing the milk), and, for Passover consumption, no cereals in the end-product.

The future: continuity and expansion

A challenge for manufacturers of any product is to attract, and hold, each new generation of consumers: it cannot rely on parents passing on their tastes to their children. This requires a judicious balance between modern marketing strategies for existing products and the introduction of new brands for a different consumer awareness. It is noticeable, for example, in this era of health- and weight-consciousness that dark and bitter chocolate are gaining on milk chocolate, and chocolate products are increasingly available in smaller portions, so we can indulge our sweet sins with a little less guilt!

Market expansion is another way forward. The burgeoning markets in East Asia are not an option for Camille Bloch at the moment – other, larger corporations must, perhaps, first melt the barrier of different eating habits and tastes among, say, the Chinese. New markets nearer home are more attractive. Eighty percent of the company's production is currently sold within Switzerland – countries of the European Union, like France, Italy, and Germany, with similar patterns of chocolate consumption and good purchasing power, are appealing new markets to try to enter.

Following in his father's footsteps, it was Rolf Bloch who steered the firm from the 1950s onwards, through all the lows and highs of employee shortages and consumer booms. In 1998, his sons Daniel and Stéphane (as Marketing Director) took over the driving seat and will steer the company into the 21st century. Whether they in turn will be followed by their children remains to be seen. As Daniel Bloch pointed out, for them, Camille Bloch is a company name, not a blood-and-flesh personality as he was for their fathers. But they like chocolate – and that's a start. (ab)

We would like to thank the firm of Camille Bloch for its time and hospitality, in particular Sandra Biedermann-Bigai who organized our visit and provided documentation and photographs, CEO Daniel Bloch for granting us an interview, and Liliane Scheidegger who gave us a fascinating guided tour of the plant and production process.

