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Dementia in Ayurveda

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ABSTRACT

The ancient Indian medical system, Ayurveda, included geriatrics as 1 of 8 medical divisions. Well-documented evidence exists for treating aging and age-related disorders including dementia. Geriatrics was termed *Rasayanatantra*. Cognitive function was well recognized and Sanskrit terms existed such as *Buddhi* for intelligence and *Cittanasa* (*Citta* means mind, *nasa* means loss of) for dementia. A normal human life span was considered to be 100 years. It could be prolonged to 116–120 years through the use of preventive treatments, if they were started during late youth or middle age. Treatments included herbal preparations, diet, exercise, and attention to general mode of life and social behavior. Several herbal formulations are described, including details of their composition and preparation. The mode of action of antiaging drugs was believed to occur at 3 levels. Detailed descriptions of the mode of action of several herbs are provided, and recent research confirms some of this activity.

INTRODUCTION

The ancient Indian system of healthcare, Ayurveda, is considered to be the oldest system of medicine in the world based on scientific principles (Kurup, 1977). The word Ayurveda (Sanskrit) is derived from *Ayus(r)*, meaning life (combined state of body, senses, mind and soul), and *Veda*, meaning knowledge or science. Thus, Ayurveda literally means "science of life." Health in Ayurveda is defined as a combination of well-balanced metabolism, plus a happy state of mind and soul. Disease is considered 4-fold, emerging from body, mind, external factors, and natural intrinsic causes. Ayurvedic treatment of diseases consists of the salubrious use of drugs, appropriate diet, and healthful practices (Sarma, 1979). The basic concepts of Ayurveda have continually been refined since their evolution in the Vedic Period (about 3000 to 1500 BC) (Saraswathi, 1988). Two distinct schools emerged, the school of medicine and the school of surgery. The major treatise of the school of medicine is *Caraka Samhita*, originally written by physician/sage Atreya at Texila, in northern India, where the world's first university was founded (approximately 1000 BC). *Caraka Samhita* was later revised and enlarged by 2 of Atreya's students—Caraka (after whom the text is named) and Drdhrabala. The text continues to be called *Caraka Samhita*. The major treatise of the school of surgery is called *Susruta Smhita* and was written by Susruta between 1000 and 500 BC at Banaras, another learning center in ancient India. Ayurveda is divided into 8 divisions: *Kayachikitsa* (internal medicine), *Salyatantra* (surgery), *Salakya tantra* (head and neck diseases), *Balantantra* (pediatrics), *Agadatantra* (toxicology), *Bhutavidaya* (literal translation—demonic disease, deals with mental illness), *Rasayanatantra* (geriatrics including improving

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memory, preserving vigor and restoring youth), and *Vajikaranatantra* (the science of increasing virility by toning the weakened organs of reproduction) (Jee, 1927).

In Ayurveda, geriatrics falls into the category *Rasayanatantra*. This division takes care of the health of the aged and encompasses a comprehensive discipline aimed at promoting longevity, imparting immunity against disease, and furthering mental competence. This includes improvement of memory, skin luster, voice, sexual vigor, and promotes a healthy state of all organs. Rasayana is not only a drug therapy but also a regimen covering the general mode of life, social conduct, behavior, diet, and use of specific restorative remedies. Rasayana is a process by which all of the body tissues regenerate and various organs are toned for a healthful long life. The word *Rasa* is equivalent to normalcy of health. The practice of Rasayana therapy is advocated to improve a number of specific conditions such as individual constitution (*Prakrati*), aging, tissue restoration (*Satmya*), micro-circulation (*Spotasa*), digestion and metabolism (*Agni*), and vitality (*Ojas*). It is said that this process should begin in late adult or midlife, but will not be effective when started too late because many of the approaches are preventive rather than "curative." Rasayana is the process by which all body tissue is regenerated and various organs are toned to delay the aging process. During the Rigvedic Period (about 3000 BC) (Saraswathi, 1988), human life expectancy was considered to be about 100 years (Ramachandran, 1985). There are methods described in Ayurveda that, presuming that maximum human life potential is about 100 years, if practiced, may extend life to 116 years, and in occasional cases, to 120 years.

Caraka Samhita redefined Rasayana as a promotive treatment to attain longevity, intelligence, freedom from age-related disorders, youthful appearance, optimum strength of physique and sense organs, maintain language ability (absence of aphasia), and improve memory. *Vajikarana* includes restoring sexual potency and improving resistance to disease (immunity). Therapeutics in Rasayana are derived from a wide variety of plants, minerals and dairy products. The mode of action of Rasayana drugs occurs at 3 different levels:

1. Acting at the level of *Rasa*, meaning nutrition, enhancing nutritional value. A nutritious diet called *Satavari* is one such example.
2. Acting at the level of digestion and metabolism, referred to in Ayurveda as *Agni*. Digestion, absorption, and metabolism of ingested nutrients or drugs are emphasized to create energy and rebuild tissue.
3. Acting at the level of microcirculation—referred to in Ayurveda as *Spotansi*. Nutrient or drug absorption is improved to promote tissue profusion and nourishment. Thereby improving the overall function of various organs. An example would be *Commiphora mukul* (*Guggulu*) from which the gugulipid is extracted. This alkaloid is known to have a lipid-lowering effect and thus reduces the incidence of arteriosclerosis (Dev, 1988).

Ayurveda describes several gerontological terms. *Jivaniya* means promoting longevity. *Ayusya* carries a similar meaning. *Balya* means promoting strength. The term *vayahsthapana* means antiaging. *Medhya* means promoter of intelligence/memory, while *buddhiprada* means promoter of intellect. *Cetaki* means promoter of alertness, a state that can be considered equivalent to the pharmacological effect produced by caffeine or amphetamines. *Sramkara* refers to an antifatigue effect.

Cognitive function is well recognized in Ayurveda. The mind *(manus)* is thought to be the inner instrument for perception. Mind, ego, and intellect together form an "internal organ" the chief function of which is to receive impulses from the external environment and respond suitably. The system includes sensory and motor organs as accessories. The whole apparatus, consisting of the internal organ and its several accessories, corresponds to the brain and the nervous mechanisms associated with its function, similar to concepts in modern psychology (Hariyanna, 1960). Bhela, a contemporary of Caraka and a disciple of Atreya, and one of the major contributors to *Caraka Samhita*, regarded the brain as the center of the mind (Das Gupta, 1952). Bhela referred to the *Manas* as being connected with cognition and situated in the brain. He uses the term *Citta* to describe one's feelings, which he considered were lo-

cated within the heart. Intelligence is referred to as *Buddhi*. Dementia is termed *Cittinasa* (loss of mind). The *Caraka Samhita* outlines 7 factors that help the emergence of memory: perception of cause; perception of form; similarity; contrast; predominance of practice; constant thinking, and repeated hearing. Thus, memory is defined as the recollection of what is seen, heard, and experienced (Sharma, 1983).

Rasayana is a method of systemic rejuvenation. It is a broad-based approach to analyzing the aging process and the drugs that may help treat dementia disorders, as described in *Medhya*. The *Materia Medica* of Ayurveda contains several herbal drugs (botanicals) that have been used for treating dementia for several centuries and are considered to be both safe and effective (Table 1). However, to be acceptable in the contemporary medicine, it needs to be reevaluated applying modern techniques.

Certain prerequisites are considered necessary for administration of various Rasayana drugs. For example, many of the treatments are to be initiated before the signs of aging develop, ie, before an individual reaches middle age. Many of these medications are to be taken on an empty stomach ("after the previous meal has been digested," to quote the exact Ayurvedic expression) (Sharma, 1983). The dosage of the drug is adjusted to body weight; for example, a heavy person will require a higher dose than a leaner person. Sages who underwent Rasayana drug treatment experienced increased life span, and freedom from drowsiness, exhaustion, and dyspnea. They were also endowed with full mental concentration, intelligence, and strength. There was improvement in the sense organs (hearing, vision, and ability to smell) and greater immunity from diseases. Ayurveda does not propagate immortality. Rasayana predicted a "stabilized life span to 100 years without senility until death."

The Ayurvedic approach to mental function resulted in improved memory, intelligence, and concentration. Better language ability, meaning lack of aphasia, was also recognized. A decrease in overall vocal volume was apparent, although some of the drugs mentioned enhanced clarity of speech (Sharma, 1983).

Table 1. Plants with Rasayana Effect Mentioned in Ayurveda

Sanskrit name	*Latin name*
Aindri	*Bacopa monnieri*
Ashwagandha	*Withania somnifera*
Bakuchi	*Psoralea corylifolia*
Bhallataka	*Semecarpus anacardium*
Brahmi	*Bacopa monnieri*
Chatra (syn. Danti)	*Baliospermum montanum*
Dadim	*Punica granatum*
Guduchi	*Tinospora cordifolia*
Guggulu	*Commiphora mukul*
Haritaki	*Terminalia chebula*
Jatamansi	*Nardostachys jatamansi*
Jivanti	*Coelogyne evalis*
Jyotismati	*Celastrus paniculata*
Kushmand	*Benincasa hispida*
Mandukparni	*Centele asiatica*
Matsyakhyaka	*Alternanthera sessilis*
Meda (syn. Mahameda)	*Polygonatum verticillatum*
Mundi	*Sphaeranthus indicus*
Nagabala	*Sida spinosa*
Punarnava	*Boerhaavia diffusa*
Shankhpushpi	*Convolvulus pluricaulis*
Sthira (syn. Salaparni)	*Desmodium gangeticum*
Vaca	*Acorus calamus*
Vadari	*Pueraria tuberosa*
Vidanga	*Embelia ribes*
Yashtimadhu	*Glycyrrhiza glabra*

RASAYANA IN RIGVEDA

Rigveda is the oldest of the 4 Vedas. The other 3 are Yajurveda, Samaveda, and Atharvaveda. The Vedas are the oldest books in the library of mankind (Siddhantalankar, 1969). In many hymns of Rigveda, several plants are mentioned as having rasayanic properties. In particular, the soma plant, *Clitoria ternatea*, *Butea frondosa*, and *Ficus religiosa* are emphasized (Karnick, 1970).

Rigveda describes a story about the sage Cyavana who was rejuvenated by a formulation created by Ashvini Kumars, the twin gods of medicine, which contains 37 different herbs (Table 2). The story goes like this: Cyavana fell in love with a young woman named Vandana. He wanted to marry her and have a child, but he was very old, feeble, and had no physical stamina, so he prayed to Ashvini Kumars. Responding to the prayers, Ashvini Kumars gave him a medicinal formulation and asked him to consume it daily for 40 days. Cyavana prepared the formulation, and consumed it as pre-

TABLE 2. PLANTS OR PLANT PRODUCTS INCLUDED IN CYAVANAPRASH ACCORDING TO *CHARAKA SAMITA*

Sanskrit name	*Latin name*
Agnimantha	*Premna integrifolia*
Aguru	*Aquilaria agallocha*
Amalaki	*Emblica officinalis*
Bala	*Sida cordifolia*
Bilwa	*Aegle marmelos*
Brhati	*Solanum indicum*
Candana	*Santalum album*
Draksa	*Vitis vinifera*
Ela	*Eletteria cardamomum*
Goksura	*Tribulus terrestris*
Guduci	*Tinospora cordifolia*
Haritaki	*Terminalia chebula*
Jivaka	*Tamarix gallica*
Jivanti	*Coelogyne evalis*
Kakanasa	*Pentatropis spiralis*
Kakoli	*Roscoea procera*
Kanta-Kari	*Solanum xanthocarpum*
Karkatasrngi	*Pistacia integerrima*
Kasmarya	*Gmelina arborea*
Masaparni	*Teramnus labialis* (*syn. Glycine debilis*)
Meda	*Polygonatum verticillata*
Mudgaparni	*Phaseolus trilobus*
Mustaka	*Cyperus rotundus*
Patala	*Stereospermum suaveolens* (*syn. Bignonia suaveolens*)
Pippali	*Piper longum*
Prsniparni	*Uraria lagopodioides*
Punarnava	*Boerhaavia diffusa*
Puskaramula	Not available; *Saussuria auriculata* is substituted.
Rddhi	*Habenaria* species
Rsabhaka	*Microstylis muscifera*
Salaparni	*Desmodium gangeticum*
Sati	*Curcuma zerumbet*
Syomaka	*Panicum frumentaceum*
Tamalaki	*Habenaria* species
Utpala (syn: Nilotpala)	*Nymphaea stellata*
Vaca (roots)	*Acorus calamus*
Vidari	*Ipomoea digitata*

scribed. Subsequently, he not only married Vandana, but also enjoyed a life of many years, and even fathered a son! This formulation, *Cyavanaprash* is popular even today (Ramachandran, 1985).

FORMULATIONS FOR RETARDING DEMENTIA AND AGING

The fruit Amalaki (*Emblica officinalis*) is thought to have Rasayana properties. The Himalayas are the main habitat for this tree, which also grows throughout India and can be grown in other tropical countries. The fruits should be mature and obtained at the proper season (the exact season is not mentioned) (Sharma, 1983). Brahmarasayana is a formulation prepared from the fruits of *Embilica officinalis* and other herbs that is thought to prolong life expectancy, retard the aging process, fatigue, and drowsiness, and improve the ability to concentrate. The full description of this preparation is included in *Caraka Samita* (Sharma, 1983). The fruits of Amalaki are steamed to remove seeds, dried in the shade, and powdered. The powder is mixed with the juice of fresh Amalaki, and 22 other ingredients (Haritaki [*Terminalia chebula*], Vaca [*Acorus calamus*], Vandanga [*Embelia ribes*], Nagbala [*Sida spinosa*], Bhallataka [*Semecarpus anacardium*], Andri [*Bacopa monnieri*], Matsyakhyaka [*Alternanthera sessilis*], Brahma-Savarcata [identity unknown, probably because the plant's Sanskrit description is not yet verified to suggest botanical name], Ksirapuspi [identity unknown], Sravani [identity unknown], Mahasravam [identity unknown], Jivanti [*Coelogyne evalis*], Punarnova [*Boerhaavia diffusa*], Sthira [*syn.* Salaparni, *Desmodium gangeticum*], Chatra [*syn.* Danti, *Baliospermum montanum*], Atichatra [identity unknown], Meda [*syn.* Mahameda, *Polygonatum verticillatum*], Brahmasuvancata [identity unknown]. This preparation is then mixed with the juice of another plant, Nagabala (*Sida spinosa*) and dried in the shade. It is then mixed with ghee (butterfat) and honey, shaped into small boluses and stored in a vessel underground surrounded by hemp ashes for a fortnight. It is subsequently removed, and bhasma (oxide) of gold, silver, copper, iron, and coral are added before administration. Brahmarasayana is thought to create a disease-free, youthful state and significant vigor and no dementia (Sharma, 1983).

For a life span of 100 years, *Caraka Samita* (Sharma, 1983) recommends taking a formulation to preserve youth, full vigor, and cognitive function, prepared as follows: 1000 fruits of Amalaki (*Emblica officinalis*) with 1000 fruits of black pappali (*Piper longum*) are dipped in alkaline water prepared from the young Palasa (*Butea monosperma*) tree. Seeds are removed and made into a powder. The powder is mixed with

4 times its weight in honey and ghee (butterfat) and one-fourth the quantity of sugar and stored underground for 6 months. The preparation should be started sometime in later youth or middle age, and taken for life from new moon to full moon with a break from full moon to new moon, with the dose based on the person's digestive ability. The diet should be adjusted accordingly for proper digestion (Sharma, 1983).

The second formulation consists of powder of Amalaki fruit of 2.56 kg (weight converted from ancient Indian weight system to metric system, 1 kg = 66.67 tola or 1 tola = 15 g) immersed in the juice of the same fruit stored for 21 days and nights. This is subsequently blended with 2.5 kg of honey and 2.5 kg of butterfat and 120 gm of black pepper. Fine sugar is added in a quantity that totals one-eighth the total weight of the mixture. The preparation is kept in a vessel and stored in the early rainy season under hemp ash. When the rainy season is over, it is taken out and consumed in small quantities along with a wholesome diet (Sharma, 1983).

Similar formulations utilizing other fruits such as Bhallataka (*Semecarpus anacardium*) and Nagabala roots (*Sida spinosa*) are also recommended in *Caraka Sumita* (Sharma, 1983). Roots of the forest-grown Nagabala are collected in late winter. The area where they are found should be covered by *Kusa* grass and the soil should be black or golden in color with no known contaminants around including poisonous plants, injurious animals, anthills, previous fires, standing water, or a cremation ground. For maximum potency, the roots should be undamaged and neither too old or immature. The plant selected should have shed its old leaves and the new leaves should not have yet appeared. Once the roots are removed they should be washed well, dried, and powdered. Forty grams of this powder are taken every day on an empty stomach with milk or honey and ghee (butterfat). This should be followed by a diet of sali rice, milk, and butterfat. If taken regularly for 1 year, it is said to promote longevity and eliminate signs of aging.

Another preparation called Aindrarasayana, is also recommended. It consists of Aindri and Brahmi (both *Bacopa monnieri*), Matsyakhyaka (*Alternanthera sessilis*), Vaca (*Acorus calamus*), Brahmasuvarcala (identity unknown), Pippali (*Piper longum*), lavana (salt), and Shankhapuspi (*Convolvulus pluricaulis*). This preparation is considered to alleviate dementia from whatever etiology. Three parts *Aindrarasayana* and 2 parts gold oxide are mixed with Visa (*syn.* Vatsanabha, *Aconitum chasmanthum*) in an amount equal to the size of 1 sesame seed, and 40 g ghee (butterfat). This mixture is consumed on an empty stomach. When this preparation is digested, meaning several hours later, honey and a generous amount of butterfat should be consumed (Sharma, 1983).

A preparation consisting of the juice of Mandukapurni (*Centella asiatica*), powder of Yastimadhu (*Glycyrrhiza glabra*) mixed with milk, juice of Guduci (*Tinospora cordifolia*) stem along with a paste made from the root and flowers of Sankhapuspi (*Convolvulus pluricaulis*) retards age, prevents dementia, and improves digestion and complexion (Sharma, 1983).

INDIVIDUAL PLANTS

Soma plant

Rigvada contains nearly 114 hymns in praise of the Soma plant. Sushruta Samhita describes 24 varieties of Soma with 15 leaves that wax and wane with the phase of moon. One leaf grows every day in the lighted fortnight, obtaining the greatest number of leaves the night of full moon, then, the leaves begin to decrease in number, dropping one by one until the bare stem of the creeper is left on the night of the new moon. Sushruta Samhita indicates that the Soma is lord of all medicinal herbs that bring about the rejuvenation of the system of its user and enables him/her to witness the thousand summers on earth in the full enjoyment of a youthful body. The Soma is said to have the smell of butterfat (ghee), a bulb similar to those of the lily family, leaves like the garlic plant, and has an aquatic habitat.

The Soma plant's identity, however, remains a mystery. Several plants have been mistakenly thought to be the Soma. Muller (1883) records

a short botanical description and states that it is a creeper, dark in color, sour in taste, has no leaves, and a milky, fleshy surface. Watt (1890) states that he obtained a sample of the "Soma" plant from Bombay and identified it as *Periploca aphylla*, which is an erect, leafless perennial shrub with twigs as thick as goose quills. The plant had milky sap. Another opinion was that the Soma could be *Ephedra pachyclada* (Aidchison, 1984). *Ephredra* species are considered not to possess intoxicating, narcotic, or hallucinogenic activity. However, ephedrine needs to be considered as a component of this plant (Mahdihassan, 1981). Karnick (1970) made a comparison of probable species from Vedic descriptions of Soma's botanical identity and came up with 6 plants. Combined efforts of specialists in several fields such as archeology, ethnobotany, linguistics, and prehistoric plant ecology established that Soma could be a potent hallucinogenic mushroom (*Amanita muscaria*) (Wasoon, 1968).

It was thought that the Soma possessed intoxicating properties and could sharpen the intellect. Soma juice is thought to promote health and impart immortality. Rigvada described Soma as (Wilson, 1993):

> "Thou Soma, fond of praise, the lord of plants, art of life to us,
> Be unto us, Soma the bestrewer of wealth, the remover of disease,
> Exulting Soma! Increase with all twining plants."

Drinking Soma every day, the aged exile felt exhaustion-free and happy as though rejuvenated. Furthermore, the Soma plant is said to bring complete rejuvenation in body and mind insuring a fresh feeling of youth (Majumdar). Because the exact identity of the Soma plant is unknown, caution should be exercised as many of the plants named above have serious toxic effects and should not be used without further study. Ayurveda has specific detoxifying methods. For example, roots of *Aconitum ferax* has known antipyretic activity, but is toxic. The crude extract of *Aconitum ferax* roots showed four times stronger acute toxicity (LD_{50}) in mice compared to processed extracts as prescribed in the Ayurvedic texts. In the detoxified product the toxic component was removed with out loss of beneficial effect (Mahajani, 1990).

Bacopa monnieri

Bacopa monnieri plant has been used in Ayurveda under the name Brahmi. The plant is also known by many other names in India, including Brahmi, Sarasvati, Soma, Satyahva, Brahma carini, Manduka parni, Manduki, Tvasti, Divya, Mahausadhi, Kapota vanka, Munika lavanya, and Soma vallari (Dash and Kashyap, 1980). Its description is found in Veda (Mukherjee and Dey, 1966). Although *Bacopa* is the preferred genus it is also referred to as *Herpestis*. *Bacopa monnieri* belongs to the family Scrophulariaeae, and is a succulent creeping herb with stems 10 to 30 cm long, rooting at the nodes with numerous ascending branches. Leaves are obovate to oblong in shape, fleshy, and dotted with black specks. The plant grows throughout India, Sri Lanka, and other places with wet, warm climates. The plant is described under the name Brahmi in Caraka Samhita. The *Bhavprakasa Varg-Prakarana* (drug classification of Bhavprakasa) from the 16th century describes the therapeutic usefulness of Brahmi, indicating that it acts as a brain tonic and promotes longevity and increases memory. This plant is considered to prevent aging, and promote intelligence, longevity, and memory (Dash and Kashyap, 1980), So far, the plant has not been studied in the form or dose by Ayurvedic practitioners, although it is stressed that traditional medicines should be investigated in the form prescribed. Two saponins-bacosides A and B, bututic acid, D-mannitol, and stigmasterol β-sitosterol derived from the whole plant have been isolated (Chatterjee et al., 1963, 1965; Basu et al., 1967). Mukherjee and Dey (1966) found that a defatted alcoholic extract of *Bacopa monnieri* improved the learning process. When a decoction of this plant was fed to albino rats, maximum improvement in maze learning was noted (Dey et al., 1976).

Centella asiatica

Centella asiatica, known as Gotu kola in United States is a slender herbaceous creeping plant. The hairy leaves are the size of a small coin and have delicately scalloped margins; the

flowers are so small as to be barely visible to the naked eye. This plant belongs to the family Umbelliferae, which includes carrots and celery. *Centella asciatica* grows throughout India, Sri Lanka, China, Madagascar, the Philippines, and South Africa. It has few natural enemies except grazing animals and a few insects. *Centella asciatica* is called *Mandukaparni* in Sanskrit. Its medicinal value is thought to be similar to that of Brahmi *(Bacopa monnieri)* by the Ayurvedic *Materia Medica*. The drug has a variety of uses as remedy. It is found effective in memory disorders, impaired intelligence, as a rejuvenator, "blood purifier" and in various skin diseases (Nadkarni, 1954, Dutt, 1980; Meulenbeld and Wujastyk, 1987). In some parts of India, powdered dry leaves are given with milk to improve memory (Kirtikar and Basu, 1993).

Centella asiatica has been shown to cause significant improvements in both general ability and behavioral patterns in mentally retarded children (Appa Rao et al., 1973), and the plant is claimed effective in overcoming the negative effects of fatigue and stress (Mowery, 1975). An aqueous extract of the fresh leaves fed to albino rats resulted in significant improvement in the memory retention abilities of the drug-treated group compared to the saline-treated group when tested with passive avoidance tasks. Subsequent neurochemical analyses of the brains of these animals revealed that the drug significantly affected dopamine, serotonin, and norepinephrine systems in the learning and memory process (Nalini et al., 1992). There is also a suggestion based on the results of a battery of pharmacological tests that the action of the drug may be mediated through the D_2 receptor and cholinomimetic action (Sakina and Dandiya, 1990).

Convolvulus pluricaulis

Convolvulus pluricaulis plant has been called *Sankhapuspi* in Sanskrit. In Ayurveda the plant is recommended as a 'strong brain tonic' to promote memory and intellect, eliminate nervous debility, and treat hypertension (Mahatama, 1971; Sen et al., 1980; Dash and Kashyap, 1980). The winter crop is considered desirable for medicinal use. However, experimental evidence suggests that the spring crop possessed maximum pharmacological activity (Mudgal, 1975).

Terminalia chebula

Terminalia chebula is a large deciduous tree that attains a height of up to 100 feet. It grows throughout India, Myanmar (Burma), and Sri Lanka. In Sanskrit it is called Haritaki. The ripe fruit is considered to possess an ability to promote memory *(Medhya)*, intellect *(Buddhi Prada)*, and to prolong life *(Jivanti)* (Dash, 1980). Thus, it is thought to possess a rejuvenating effect. It is also thought to promote improved eyesight *(Caksusya)* and may also have anti-inflammatory, antineoplastic and anti-infectious abilities (Kirtikar and Basu, 1993). The fruit has the ability to retard the aging process, and improve the cognitive process in a short period of time (Sharma, 1983). The plant has been referred to as a "life giver" *(Pranada)* (Dutt, 1980). *Terminalia chebula* is contraindicated in those who are emaciated, fasting, pregnant, or extremely exhausted (Dash, 1980). It is suggested that only ripe fruit be used, because unripe fruit produces a different effect (Kirtikar and Basu, 1993). It is suggested that 1 fruit be eaten every morning.

In conclusion, Ayurveda as an observational science was well suited to study the aging process in humans. Geriatrics as a medical specialty existed in Ayurveda and was practiced in ancient India. Emphasis was placed on delaying onset of age-related symptoms, including dementia. Preventive treatment was started in late youth or middle age and focused on combination of herbal preparations, diet, exercise, and social behavior. Emphasis was also placed on developing immunity to diseases. If treatment was started after onset of symptoms, it was felt to be less effective. Some of the plants mentioned in Ayurveda such as the Soma plant cannot be found today, or could not be identified despite scholarly efforts; perhaps they may have become extinct. With increasing life expectancy, dementia and other age-related disorders such as arthritis, retinal degeneration, Parkinson's disease, etc., is becoming a global problem. Ayurveda may offer answers to some of these issues especially dementia. However, further scholarly and scientific research based

on contemporary techniques is needed. This could be undertaken in a cost-effective manner.

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