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VIRUSES AFFECTING HUMAN NERVOUS SYSTEM

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Abstract
The past four decades have witnessed increased research and understandability on various aspects related to the field of neuro-virology. However, newer types of viruses with their own set of infection to nervous system as well as other body symptoms will continually appear. Therefore, there is pressing need for further research in this direction. The three-pronged T approach applies fully well to this field of medicine for its continued advancement- training, technology and therapy.

Viruses-'the undead'

Viruses are submicroscopic, obligate, intracellular parasites. That is, they must reproduce inside of a living host cell. Viruses are called the "undead" because they are little more than genetic material (a blue-print) and a surface protein that gets them into the host cell[1]. Viruses reproduce by using the genomic and protein replicating machinery of the host cell. When they are ready to get out of the cell, some of their proteins show up on the surface of the host cells. Viruses can either bud out of the cell and not kill it, or burst out, killing the cell at that time. Some viruses can go dormant (latent) for long periods of time only to break out periodically to infect the host[1].

Neurovirology

It focuses to study viruses capable of infecting nervous system. It is an interdisciplinary field incorporating the melding of virology, clinical neuroscience, neurology, immunology and molecular biology. The field studies the use of viruses as tracers of neuroanatomical pathways, for delivering gene therapy, or selectively eliminating targeted neural cells[2].

Neurotropic viruses

Hundreds of viruses exhibit tropism for the central and/or peripheral nervous system. In some, nervous system involvement is predominant feature, whereas in others, is a rare complication of more generalized illness. A neurotropic virus[3] is capable of infecting nerve cells or does so preferentially**.** A disease agent is said to be neuroinvasive if it is capable of entering or infecting the central nervous system, and neurovirulent if it is capable of causing disease within the nervous system. Rabies virus has high neuroinvasiveness and high neurovirulence, herpes simplex virus has low neuroinvasiveness and high neurovirulence whereas, poliovirus can spread neurally, but primarily spreads via hematogenous dissemination.

Neurotropic virus like Japanese Encephalitis, Venezuelan Equine Encephalitis, California encephalitis, polio, coxsackie, echo, mumps, measles, influenza, rabies, members of the family Herpesviridae (herpes simplex, varicella-zoster, cytomegalo, HHV-6, and Epstein-Barr can cause acute or chronic aseptic meningitis, encephalitis, myelitis, ganglionitis, polyradiculitis or polyneuritis (Guillian Barre syndrome) and acute flaccid paralysis. They may also incite para or post infectious inflammatory or autoimmune syndromes. Viruses like herpes simplex and varicella-zoster invade and establish latent infection in nervous tissue. Viruses like measles, rubella, JC, and retroviruses like human T-lymphotropic virus 1(HTLV-1) and human immunodeficiency virus (HIV) produce slow, chronic or progressive nervous system diseases[4].

Neurotropic viruses are increasingly being exploited as research tools, and for their potential use in treatment. In particular they are being used to improve the understanding of the nervous systems circuits.

Classification

The most useful and most widely used classification system distinguishes viruses according to the type of nucleic acid they use as genetic material and the viral replication method they employ to coax host cells into producing more viruses.

DNA viruses:	double-stranded DNA viruses	ds DNA
	single-stranded DNA viruses	ss DNA
RNA viruses:	Positive-sense single-stranded RNA viruses	(+) ss RNA
	Negative-sense single-stranded RNA viruses	(-) ss RNA
	Much less common double-stranded RNA viruses	ds RNA
Reverse transcribing viruses:	Double-stranded reverse-transcribing DNA viruses	dsDNA-RT
	Single-stranded reverse-transcribing RNA viruses	ssDNA-RT
		including retroviruses.

Pathogenesis

Viral infections of the nervous system are a challenging group of diseases for clinicians and for researchers. The pathogenetic mechanisms involved in this group of diseases are very diverse. Infections of the brain are less common than that of other organs, and depend on rare events that allow the virus to penetrate the blood brain barrier. Although some, like enteroviral meningitis, are common, however, many are rare and have limited and unpredictable distributions, both geographically and in time (e.g., Nipah virus infection).

Most systemic viruses do not enter the brain. Those that do may take advantage of rare events that include break down of the blood brain barrier, or infection of Trojan horse-like immune cells that are competent to cross the blood brain barrier, but in doing so, subsequently release viruses within the brain. The route and site of entry may play a large role in the ultimate symptoms generated. Viruses can cause neurological problems due to a number of mechanisms including lytic effects on brain cells (cytomegalovirus), induced apoptosis (vesicular stomatitis virus, VSV), or secondary damage due to release of glutamate, DNA, and other inducers of further brain damage. Other viruses such as rabies do not kill neurons, but instead commandeer cellular transcriptional pathways to express viral rather than neuronal genes; these results in neurons that no longer function as neurons, but look normal upon routine pathological examination[5].

Serology: It is useful in diagnosing viral infections of the CNS when PCR analysis returns negative results.

Mechanism of Viral entry into nervous system

Viruses have evolved mechanisms enabling them to easily infiltrate the nervous system. Two main methods of viral entry have been identified, the transneuronal spread and hematogenous spread. In transneuronal spread; the mechanism is not entirely known yet, but it involves the virus escaping the immune system by traveling up the axons of the nerves[6]. There are two main ways that a virus is thought to enter the brain via hematogenous spread. The first is by infecting an immune cell, which then carries the virus to the nervous tissue. Viral examples of this include the JC virus which infects B cells and HIV which infects CD4 T cells and macrophages to infiltrate the brain. The second is by crossing the blood capillaries as a free virus or in leukocytes[7].

But it is difficult to identify any virus that infects the CNS to cause brain dysfunction that behaves in a manner fully consistent with Koch's postulates; the gold standard in establishing the cause of infectious disease. The virus that comes the closest is rabies, an enveloped RNA virus. But even with rabies, if the virus does not enter the CNS of an infected individual, then no serious symptoms will occur.

Another well-known neurotropic virus for which a neurological symptom cannot be predicted is polio virus, a small positive-strand RNA virus. Fewer than one in a hundred non-immunized people that have a productive infection from polio virus show neurological symptoms. Still scientists do not understand how and why the polio virus selectively infects the motor system of these unlucky few that show neurological symptoms associated with poliomyelitis. Similarly, the unrelated West Nile virus, another RNA virus, also causes serious neurological dysfunction in fewer than one in a hundred people that become infected with the virus from a mosquito infusion. That only a small number of infected individuals ever show neurological consequences with these two well-studied viruses underlines the difficult task of assigning cause for infections of the brain by the many other less-studied viruses that sporadically infect the CNS.

Advantages of infecting the nervous system

Neurons lack molecules necessary to present viral peptides on the surface to killer cells, which means they provide a safe house for viruses to replicate. Once viruses get in neurons they can persist for the host's lifetime and can influence the factors that disturb the function of neurons and the homeostasis of the nervous system, leading to nervous system diseases[7].

Clinical presentation

The basic clinical features of most types of viral meningitis and encephalitis is similar but specific physical examination helps narrow possible viral etiology[8]. Unlike other organs such as liver where íhe specific location within the liver infected by the virus does not substantively alter the symptoms, the precise region in the brain that is infected plays a key role in the type of resulting dysfunction. Limbic infections will manifest a completely different syndrome than infections of motor or sensory systems. Viruses such as cytomegalovirus, rubella, and lymphocytic choriomeningitis virus cause serious abnormalities if the developing brain is infected, and depending on the site and age of fetal infection, can generate overlapping but distinct symptoms such as deafness, blindness, epilepsy, hydrocephalus, and/or reduced IQ in a manner directly related to what part of the brain was infected. The age of the infected individual also plays a large role in some infections; different viruses cause neurologic dysfunction at different stages of life. Some viruses, for instance West Nile Virus, are more likely to cause neurological problems in the elderly. Conversely, the DNA virus, cytomegalovirus, is considered the most common infectious agent causing permanent neurologic dysfunction in the developing human brain, but presents little danger to the mature brain. Other viruses including wild type VSV show an age-dependent shift in the type of neurons infected. These factors all contribute to the difficulty in trying to demonstrate that the cause of an existing neurological syndrome may be viral in origin. The most common neurotropic viruses causing encephalomyelitic diseases of nervous system is listed in Table 1.

Investigations

There are several diagnostic tools which have become invaluable to diagnosing viral infections of the nervous system. In the past, more invasive methods of obtaining samples for diagnosis were needed such as the use of brain biopsy. Now, with the advancement of technology, less invasive means are used more frequently, such as Neuroimaging and the analysis of Cerebrospinal fluid (CSF)

Neuroimaging: CT scans and MRI scans are useful in visualizing inflammation and lesions caused by viral infection of the CNS. MRI is used to visualize deep white matter and temporal lobe lesions, which are not well defined by a CT scan[6].

Unlike bacterial and fungal meningitis in which imaging abnormalities are not specific for a particular agent, many virus infections of the CNS produce MRI abnormalities not seen by any other infectious agent. The changes caused by the specific virus can also be produced by noninfectious disorders. Imaging changes must always be evaluated in conjunction with the clinical symptoms, signs, and laboratory abnormalities, particularly the presence of a CSF pleocytosis. The purpose of this montage is to ensure that the clinician includes the specific virus in the differential diagnosis[9] (Figure 1).

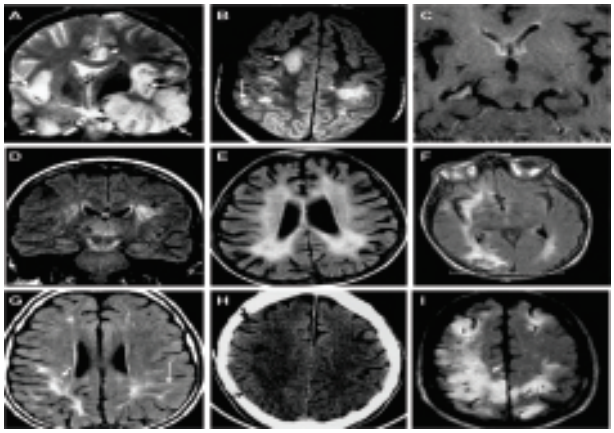

Fig. 1

(A) **Herpes simplex virus encephalitis**. Abnormal signal and edema in the left temporal lobe (short bottom arrow), insula (long arrow) and cingulate gyrus (arrowhead), sparing deep nuclear structures with mass effect compressing the left lateral ventricle and uncal herniation; also note increased signal in the right inferomedial temporal lobe (short bottom arrow) and insular cortex (long arrow). Differential diagnosis includes glioma and Rasmussen encephalitis (both usually restricted to one hemisphere), abscess, granuloma, limbic encephalitis, and paraneoplastic disease; the latter two disorders would not produce the mass effect seen here.
(B) **Varicella zoster virus vasculopathy**. Ischemia/infarction more common in white matter (top arrow), particularly at gray-white matter junctions (short arrow), less frequently in gray matter (long arrow) and may enhance. Differential diagnosis includes metastatic carcinoma, embolism/endocarditis and CNS vasculitis, although vasculitic lesions are usually smaller and do not have a predilection for gray-white matter junctions.
(C) **Cytomegalovirus encephalitis**. Characteristic enhancement in ependyma around lateral ventricles. *Differential diagnosis* includes varicella zoster virus ependymitis, abscess rupture, meningitis, shunts, chemotherapy, and subependymal spread of various brain tumors (glioma, pinealoma, lymphoma).
(D) **Togavirus encephalitis**. Deep-seated structures characteristically involved: subcortical white matter (top arrow), thalami (middle arrow), and substantia nigra (bottom arrow). In this case, the lesions were caused by West Nile virus; the same areas are disproportionately infected by other togaviruses (St. Louis encephalitis virus, Japanese encephalitis virus, and Eastern and Western equine encephalitis viruses) and occasionally in Creutzfeldt–Jakob disease.
(E) **HIV infection of the CNS**. Characteristic abnormalities are brain atrophy and diffuse white matter attenuation. *Differential diagnosis* includes long-standing hypertension, chemotherapy, or X-irradiation; in the latter three conditions, the extent of the white matter abnormalities usually exceeds the degree of brain atrophy.
(F) **JC virus infection of the CNS** causes progressive multifocal leukoencephalopathy. Typical multifocal and confluent subcortical nonenhancing white matter hyperintensities extending to the cortical gray matter. *Differential diagnosis* includes CNS lymphoma, glioma, disseminated encephalomyelitis, sarcoidosis exclusively in white matter, chemotherapy, and X-irradiation.
(G) **Acute disseminated or postinfectious encephalomyelitis** after virus infection. Subcortical white matter lesions (short arrow) involving subcortical U fibers with tangential lesions (long arrow).

Brain imaging is frequently normal in viral encephalitis. Occasionally, nonspecific changes consist of either sulcal effacement (H) (thin arrow), compared with normal sulcal spaces (thick arrow); or increased signal (I) (arrow), reflecting increased water content in the mildly swollen brain of the same patient. These changes developed in a patient with probable enterovirus encephalitis but can be produced by many viruses, as well as after head injury and in various metabolic encephalopathies.

Lumbar puncture and CSF analysis

This method is valuable in diagnosing viral infections of the CNS. CSF analysis typically involves determining the patients total white cell count, glucose level, and protein level in the CSF. Viral infection of the CNS tends to increase the total white cell count, while increasing the level of protein. The levels of glucose tend to be decreased by viral infection, due to an increased glucose consumption.

CSF nucleic acid amplification using Polymerase Chain Reaction (PCR)

PCR is frequently used to for rapid identification of specific DNA viruses from the CSF, while Reverse transcriptase PCR is commonly used to identify RNA viruses in the CSF[10]. The accuracy of this diagnostic tool is limited by the amount of the virus present in the CSF. Viral replication tends to peak early and then decline to undetectable levels in CNS infection[11]. Within the first 5 days of symptom onset, before the decline of viral replication, PCR assays have a higher incidence of detecting CNS infection. However, the sensitivity and specificity varies. On an average, PCR diagnosis of rabies, HIV, Herpes have high sensitivity and specificity than other neurotropic viruses[8].

Brain biopsy

In recent years, due to the development of less invasive diagnosis techniques, brain biopsies are no longer frequently used for diagnosing viral infections of the nervous system[7]. However, some viral infections of the CNS cannot be diagnosed without histological and electron microscopic evidence. In these cases, brain biopsies are only performed when the patient has a serious neurological illness and is in need of immediate therapy, an alternative procedure will not lead to a specific diagnosis, and the information gained by the brain biopsy will outweigh the risks.

Table 1: Major neurotropic viruses with their relative propensity to cause CNS dysfunction[8]

VIRUS	FAMILY		Meningitis	Encephalitis	ADEM	Myelitis
DNA	HERPES	HSV-1	+	++		+
		HSV-2	++	+		++
		VZV	+	++	+	++
		CMV	+	++		++
		EBV	+	+	+	+
		HHV-6	+	++		+
		HHV-7	+			
		HHV-8		+		
		SIMIAN HERPES B (cercopithecine herpes virus 1)		+++		++
	POLYOMA	JCV	Progressive multifocal leucoencepalopathy			
	ADENO		+	++		
	PARVO	B19	+	+		
	ORTHOPOX	MONKEYPOX		+?		
		SMALLPOX		+?		
RNA	ENTERO	POLIO	+	++	+	+++
		NONPOLIO				
		Echo	+++	+		+
		Coxsackie	+++	+		+
		ENTERO 71				
	ARBO					
	TOGA					
	FLAVI	WESTNILE	+	++		++
		St. LOUIS ENCEPHALITIS	+	++		++
		JAPANESE ENCEPHALITIS	+	+++		
		POWASSAN		++		
		MURRAY-VALLEY ENCEPHALITIS		+		
		TICKBORNE ENCEPHALITIS	+	++		+
		LOUPING III	+	+		
		KYASANUR-FOREST DISEASE	+	+		
		ROCIO		+		
		DENGUE		++		
		YELLOW FEVER		+		
	ALPHA	EQUINE ENCEPHALITIS				
		Eastern (EEE)	+	+++		
		Western (WEE)	+	++		
		Venezuelan (VEE)	++	+		
		Me TRI		+		
		SELMIKI FOREST				
	REO (orbo)	COLORADO TICK FEVER (COLTIVIRUS)	++	+		
		BANNA (SEADORNAVIRUS)		+		
	BUNYA	CALIFORNIA SEROGROUP				
		La Crosse	+	++		
		Jamestown Canyon	+	+		
		California encephalitis	+	+		
	PHLEBO	RIFT VALLEY FEVER	+	+		
		TOSCANA	++	++		
	RHABDO	RABIES		+++	+	+
		AUSTRALIAN-BAT LYSSA VIRUS		+		
	CHANDIPURA			++		
	PARAMYXO	MEASLES		+	+++	+
		MUMPS	++	+	+	+
	RUBELLA			+	+	+
	HENIPA	HENDRA		+		
		NIPAH		+		
	FILO	EBOLA				
		MARBURG				
	HEPATITIS	HEPATITIS C				
REVERSE Transcriptase	RETRO	HUMAN IMMUNODEFICIENCY (HIV)	++	+		+
	genus LENTI					
	VACCINIA				+	
	INFLUENZA				+	+
	PARAINFLUENZA		+	+	+	
	ROTA		+			
	ARENA	LYMHOCYTIC CHORIOMENINGITIS	++	+		++

Research and therapy

Use of antivirals to treat CNS infection

The use of antiviral treatment with both Multiple Sclerosis and AIDS dementia has proven ineffective as a treatment. In patients with Multiple Sclerosis, antiviral treatment of EBV with Acyclovir showed no significant difference from the placebo[12]. In patients with AIDS dementia, despite antiretroviral therapy, CNS function remains diminished[13].

Use of viruses for gene therapy

HSV-1 is a promising gene therapy agent, which could be used for gene delivery to neurons. This therapy may be used to treat metabolic brain diseases, neurodegenerative disorders, or to help enhance repair of brain tissue in neurological diseases[7].

Future of Neurovirology

New viruses and viral infections of the nervous system will continue to emerge and the field of Neurovirology must constantly expand to meet these growing needs. While the interest in researching viruses that infect the nervous system has increased dramatically over the past 40 years, there are three key components vital for the continued advancement of the field: first, training, where new researchers and clinicians need to be trained about the significance of viral infection in the progression of neurological diseases, second new technology needs to be refined and developed which will aid in the progression of research and third development of therapy where insight gained by research should be applied to the therapy of neurological diseases.

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Adansonia digitata L. – A medicinal tree with promising future in India

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Abstract
Adansonia digitata L. is a multipurpose tree species with immense medicinal potential. Almost all parts of the tree are edible and used for treatment of various ailments. Its high antioxidant capacity is behind its nutraceutical, therapeutical and cosmoceutical potential and thus also makes this plant commercially highly valuable. Looking to its multifarious importance and poor occurrence in the country, it needs urgent efforts for both *in situ* and *ex situ* conservation.

Keywords: Baobab tree, *Kalpavriksha*, Vitamin C, Skin ailments

Introduction

Adansonia digitata L. (Malvaceae) is a massive deciduous tree indigenous to tropical Africa where it is found in areas of South Africa, Botswana, Namibia, Mozambique and also occurs in semi arid and sub humid regions of western Madagascar. In Africa, the plant is called as Baobab or *'bu-hibab*' meaning the fruit with many seeds. It has also been referred to as '*arbre a palabre*' which means the place in the village where the elders meet to resolve the problems. It is also known as Monkey's Bread Tree due to liking of monkeys for its fruits. Alexander von Humbolt called it as 'the oldest organic monument of our planet'[1-3].


Fig. 1

In India, it is popularly known as '*Kalpavriksha*' due to some mythological significance as well as '*Gorakh-Amli*' and has been found in Uttar Pradesh, Madhya Pradesh, Bihar, Maharashtra and Rajasthan. In Rajasthan, giant Baobab trees have been located in Ajmer, Banswara, Chittorgarh and Udaipur districts. In Udaipur city, the single age old Baobab tree is present in RNT Medical College, where it is worshipped everyday by devotees (Figure 1). So, the Baobab tree faces a crisis of survival in the country[4].

Botanical description

The genus name *Adansonia* is given after a french botanist Michel Adanson while the species name *digitata* means hand-like; in reference to shape of its leaves. It is a large, round canopied tree with a swollen trunk, about 10-25 m in height with a maximum girth of 28 m. Bark is thick, fibrous and fire resistant. Leaves are alternate and digitately 3-9 foliate while flowers are waxy, white, pendulous and bisexual. Fruits indehiscent, ovoid, 12 cm. or more in length, with a hard woody shell covered with yellowish grey velvety hairs. Fruit contain numerous hard, brownish seeds, round or ovoid, up to 15 mm long, embedded in yellowish white floury acidic pulp (Figure 2 & 3). Baobab is mostly pollinated by bats. It has an extensive root system and high water holding capacity. It survives well in dry climate and also possesses fire resistant property[2,5,6].

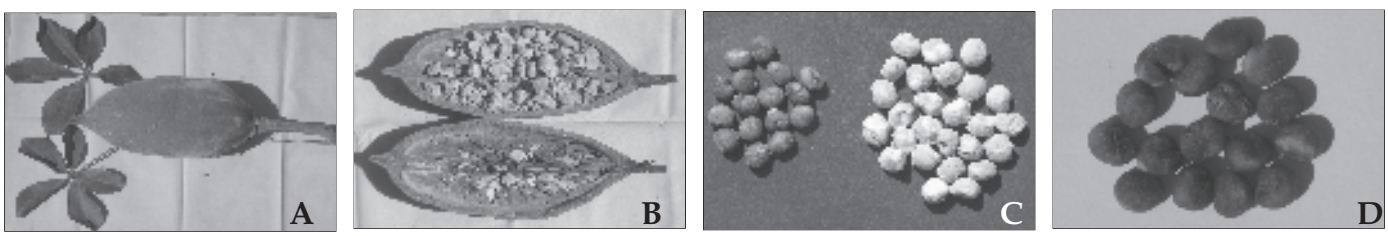

Fig. 2 (A-D): ***Adansonia digitata*** **(A) : Fruit & Leaves; (B) Split Fruit; (C-D) : Seeds**

Medicinal importance

Baobab tree has numerous medicinal uses. The tree is named as 'The small pharmacy' or 'Chemist tree' for the reason that almost all parts like leaves, bark, fruits and seeds are used as food stuff and medicine[7]. A variety of phytochemicals belonging to terpenoids, steroids, flavanoids, vitamins, amino acids, carbohydrates, lipids have been isolated from its various parts[2]. Table 1 demonstrates that leaves, fruit pulp and seeds of *A. digitata* are rich in calcium and magnesium with small amounts of copper, iron and potassium too[8,9].

Fruit pulp is known to have high Vitamin C content ranging from 1500-5000 mg/kg which is almost ten times of Oranges and is stable up to one year. Due to these high values, it possesses strong antioxidant potential[10]. It is dry, acidulous, mealy and rich in calcium, potassium, thiamine, nicotinic acid, mucilage, pectins, tartarate and free tartaric acids besides other organic acids[5]. Traditionally, the fruit pulp is employed as a base for jam making due to high pectin content. Dried fruit pulp is used to prepare famous 'Baobab milk'[6]. Milza[11] has reported that some soluble dietary fibres of the pulp have probiotic effect and stimulate the growth and metabolic activity of beneficial organisms. It is also used with buttermilk for treatment of diarrhea and dysentery in Indian Medicine system. It has also been reported to contain several sterols, saponins and triterpenes and also shown to demonstrate antioxidant, analgesic, anti-inflammatory, anti-viral, anti-diarrhoeal, anti-microbial, anti-pyretic and hepatoprotective activities in various scientific studies[12].

Fig. 3

Table 1: A comparative mineral account of different parts of *A. digitata*

Mineral content (mg/100g dw)	Leaves[8]	Fruit pulp[9]	Seed[9]
Calcium	2526.00	295.00	410.00
Copper	1.02	1.60	2.60
Iron	93.10	9.30	6.40
Potassium	-	1240.00	910.00
Magnesium	246.00	90.00	270.00
Manganese	6.82	-	-
Phosphorus	115.00	-	-
Sodium	-	27.90	28.30
Zinc	1.24	1.80	5.20

Fresh young leaves are excellent source of proteins, Vitamin A & C and minerals such as iron, magnesium, manganese, molybdenum, phosphorus, and zinc and thus a staple food source of rural populations in many parts of Africa while dried leaves are used throughout the year for making soups. Leaf infusion is used in the treatment of diarrhea, fever, inflammation, kidney diseases, blood purification and asthma[6]. Recently, larvicidal and repellent properties of its leaves have also been demonstrated against human malarial vector mosquito *Anopheles stephensi*[13].

The gum obtained from bark is used to treat sores while an alkaloid 'adansonin'isolated from gum is used for treatment of malaria fever[14]. Seeds are rich in protein and oil but have a relatively low fat value and eaten fresh or after drying by making its flour and used in soups or stews as a thickener. Seeds are rich in essential amino acids and most importantly in lysine. Oil obtained from seeds can be used as protecting, nourishing, moisturizing and regenerating agent and contains vitamin A, D, C and E. Linoleic acid; found in the seed oil, is the most frequently used fatty acid in the cosmetic products as it moisturizes the skin and also protect from sun burn[15]. Seed oil also alleviates burn pain and regenerates the epithelial tissues in a short time thereby improving skin tone and elasticity.

Other uses

Young leaves are used as vegetable and work as a staple food for many populations in Africa. Fibre isolated from bark, is used in making ropes, mats, bags, and hats. Whitish, spongy and light wood is mainly used for fuel. Leaves and pods are also used as cattle feed[6].


Fig. 4

Interest in Non-Timber Forest Products (NTFPs) is increasing rapidly in the world. In this regard, NTFPs of Baobab i.e. fruits, leaves, bark and seed oil are not only beneficial for rural communities for raising income but also equally beneficial commercially for pharmaceutical, nutraceutical and cosmetic industries.

Conservation aspect

Baobab tree is not native to India and due to its poor natural germination process, it is found at very few places in the country. However, looking to its immense medicinal and commercial potential, it could be promoted for plantation in Botanical gardens, Wild Life Sanctuaries, National Parks etc. In this regard, Society for Microvita Research and Integrated Medicine (SMRIM), Udaipur has initiated *ex-situ* conservation of this plants species for the first time in Udaipur in 2009 by raising saplings from seeds and planting them at various places in and around the city which has really helped in its conservation (Figure 4). However, large scale coordinated efforts are required in form of both *in situ* and *ex situ* conservation for this plant species in the country.

Conclusion

A. digitata possesses wide range of pharmaceutical activities and immense nutritive potential. It could be a boon for enhancement of Indian economy. However, extremely low presence of this medicinally important multipurpose tree species in Indian subcontinent, demands for its conservation. Due to its very poor germination ability, it is highly recommended that tissue culture techniques should be applied to propagate this plant species in short time.

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Microvita – the cause of creation of matter and life

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Scientists like spiritualists besides having in common for the search for truth, the fundamental truth they also have tremendous desire to find unity. That unity you see in spirituality is to experience the wholeness of the single Universal entity. In science, there is a strong desire to find unity. So within physics, the physicists are working very hard trying to find a fundamental theory of matter and energy – a unified field theory. Biologists also look for unified theories of evolution. In every scientific area, there is search for the unity within the diversity of observed phenomena to observe the underlying unity. This I would summarize as the essential aspect of science. Now microvita, a new scientific concept introduced by Shri P. R. Sarkar, in 1986 has the potential for being one of the mostly unifying ideas not only in physical sciences but in other branches of sciences that have come in many hundred of years. Because according to microvita theory, microvita are the fundamental entity of life, the fundamental creating entity of life, not only an entity which creates life and living beings, the entity which creates matter itself. Sarkar described microvita as being very small, very subtle living entities much smaller than even an electron. An electron is one of the smallest compound in an atom. Microvita compose the electron in such a way that millions of microvita create a single electron and billions of microvita create an atom. So such an entity so small, so subtle, it is not going to be easy to demonstrate and prove the existence of microvita in a laboratory. We can think of microvita for the time being as a creative scientific hypothesis. Sarkar told that microvita are living entities, very small but basically indestructible in the sense that they move throughout the universe. They can exist in any temp, and any pressure, move through galaxies, planets, stars and nothing can destroy them very easily.

Now there are different categories of microvita as positive, negative, neutral. They also affect human beings, animals, plants and matter. Negative microvita are more matter oriented whereas positive microvita are more mind oriented. Negative microvita create a direction towards crudification and positive microvita create a direction towards more and more subtle expression. Microvita are also divided in terms of their relative crudeness and subtlety. The crude variety according to Sarkar, can be somehow seen in a very powerful microscope, and He identifies these microvita very close to viruses. He says that virus is not a disease causing entity, in fact microvita are disease causing entities and are more subtler than physical viruses which are observed by the biologists in their microscopes. Microvita move through different media such as sound, touch, smell etc. The other types of microvita cant be seen directly but somehow their existence can be shown by their actions and by their activity. This type of microvita can move through not only physical media but by mind as well. So microvita can move in physical, mental, or psychic space. This is something what physicists do not have a really good idea about what is mental or psychic space. A psychic space is a particular subtle region that exists in our minds but which is not physical in nature both more subtle. So these microvita can move in psychic space so they can move from one mind to another and in this they carry ideas from one mind to another. Microvitum is able to transmit a particular idea from one mind to another mind or a person who can control microvita will be able to spread his ideas with the help of microvita to the society at large.

The subtlest category of microvita exist at borderline as Sarkar describes them, between the psychic and the spiritual space. These are psycho-spiritual microvita and these microvita influence the human mind in such a way that the mind is attracted towards spirituality or they may be helpful in guiding a person in their spiritual practices. These types of microvita has been called luminous bodies in the past and in the Indian tradition, they are called *Siddhas* and sometimes other names such as *Yakshas, Kinnara, Vidhyadhara, Prakrtilina, Videhiliina* etc. Different types of luminous bodies are called as *Devyoniis.* Sarkar told that these are actually microvita in collective form. So the ancient traditional knowledge has been modernized and put in a scientific context by Sarkar. This is one very interesting synthesis of modern and ancient wisdom that is achieved by Sarkar. Now these microvita influence not only the physical body causing physical diseases but they can influence mind and create mental diseases as well. So, negative microvita can cause physical illness, positive microvita can restore physical health also. From a practical point of view we must accumulate as much positive microvita as possible. Negative microvita do exist in the body but we cant avoid them completely but we can try to attract more positive microvita into our bodies and minds and several ways for doing that exist and one is meditation itself which creates a positive vibration in mind and attracts positive microvita to the mind. Good music, good literature, good company are other ways to attract positive microvita to the mind. In this way, a person's physical health will be improved and so also psychic health leading towards the spiritual goal. So, microvita are agents of physical, psycho–spiritual evolution. Agents, because they are not the original controllers as they are created by Cosmic mind itself. The Cosmic mind itself is an evolutionary product of pure consciousness and has created microvita which are the agents of evolution in this physical world.

According to philosophy of *Brahmcakra*, the whole Universe is itself a thought projection of Cosmic mind and thus life and mind come into existence and that evolves through the plant, animal up to human stage. At the human stage, the mind continues to evolve with the help of spiritual practices back to the Cosmic mind and then back to the pure consciousness. This is the cosmic cycle of evolution and microvita seems to be involved at every stage of the evolutionary process. If we take example of creation of matter, scientists don't know exactly how matter first comes into existence and there are different theories for that. The Big Bang theory assumes that Universe was created out of nothing. There was no time, no space, no matter, no energy and somehow this universe came into existence like an explosion. But this is not logical because how can something come from nothing ? The Yoga philosophy, on the other hand, is more logical because it says that this Universe is a projection of Cosmic Consciousness and this consciousness using its creative power transforms itself into Cosmic mind which in turn transforms part of itself into the physical world. It may come as a burst, as an explosion, but it has to come from something. This is the contribution the spiritual philosophy can make to modern science to show that you cant get something from nothing even if you are talking about the origin of the Universe. Now microvita, are not the same as energy although there is a close relationship between microvita and energy. Energy itself is indestructible. Microvita can live and can also die. They are not indestructible in the same ways as energy. Energy can be transformed to one another. Physical energy is a blind force and doesn't have intelligence. It must be organized and directed by intelligence. Normally, it is human intelligence that think and organize energy in our own lives. But what about the organization of energy when human beings are not there. Still energy expresses organization as if intelligence has created it. So, microvita can be considered as the intelligent organizers of energy. Microvita have a quality of energy but they are not the same as energy rather they can be thought of if you like as the carriers of energy.

Everything in this Universe has a certain rhythm, a certain wavelength has a certain vibration. So microvita also would have a certain wavelength, vibration that would depend on how the energy is being carried by the microvitum. A microvitum moving very fast would carry more energy and moving very slowly would carry less energy. Now physics itself describes the fundamental entities of matter as waves and particles; like an electron is considered to be a wave and also particle. Millions of photons coming from light are waves and also particles. Microvita can be thought of as creating the fundamental particles of physics like electrons and photons by their movement. Millions of microvita moving together would organize their own energy to create the fundamental particles. For example, light. Any one who has studied atomic physics would know that photon of light has a certain spin and it also moves in a certain direction and wavelength. So, something having a definite spin, and moves in certain direction, actually creates a shape as a spiro or a helix. So, the microvita can be considered as fundamental entities which may move in a spiro motion. Now this spiro motion, if millions of microvita moving together, that spiro motion is called a photon. But if the same spiro moving microvita did not move in a straight line but turned into a curve and close upon themselves and continue to circulate their energies in a closed form then that entity created would be a particle. In other words, matter would be created when spiro moving group of microvita move in a closed form, those microvita would be called an electron or a photon whereas if they move in a different manner they are called a photon.

So, microvita are more fundamental than electron or photon. They are the fundamental organizing entities for matter and the different patterns they organize themselves into, would create different sub-atomic particles and when those sub-atomic particles move in space, they also create a wave vibration and that wavelength depends on their velocity. So, the interacting microvita in these subatomic particles could create their wavelength that is observed in physics experiments. Microvita research should be done in area of physics to see how microvita can organize the most fundamental particles and then how those particles combine to create atoms and molecules.

Next interesting question and area of research is the origin of life itself because the life also is not explained scientifically. How life came into existence ? There are certain ideas but no proof. If microvita are considered as fundamental organizers of energy then microvita also organize atoms and molecules into simple living structures which we call life. If we think of DNA molecule we must think why fundamental molecule of life has double helix, and how did spiro motion created by microvita has a spiro motion. Spiro is a very important form in science. Not only in science, but also in spirituality like Kundalini is coiled three and half times. Spiro form in kundalini, microvita, DNA and even in history. History does not move in a pure cyclic movement but in a spiro movement; never returning to the same place, always moving forward but not in a straight line. So, this form of spiro is very much associated with life process. Sarkar described microvita in a spiro movement. So, this is one area of research that unify different areas of knowledge. We know about structure of viruses but we don't know wherefrom. Somebody says that they come from a combination of atoms and molecules. While other scientists mention that they come from living cells.

The theory of microvita can really throw more light on the different unknown facts of creation of matter and life.

Courtesy : Cosmic Society, May-June, 1992

Congratulations

L-24

Prof. D. P. Singh

Head, Department of Medicine, RNT Medical College, Udaipur
Appointed as **Principal & Controller,** R.N.T. Medical College and associated group of Hospitals, Udaipur, Rajasthan.

L-52

Dr. Satish Kumar Sharma

Assistant Conservator of Forest
Received **Mirza Raja Ram Singh Award** in the field of Ecological balance by Maharaja Sawai Man Singh II Museum Trust, Jaipur for his invaluable services towards environment in Rajasthan.

L-03

Dr. P. C. Jain

Received **Community Service Award 2013-14** in the **Individual category** by Indian Medical Association (IMA) and **Best Environmentalist of the Year (2013-14)** by Rotary Club, Udaipur, for his outstanding contribution in De-Addiction of drugs and Roof Top Rain Water Harvesting in Udaipur.

L-01

Dr. S. K. Verma

Assistant Professor, Dept of Medicine, PMCH, Udaipur & President, SMRIM
Felicitated with Fellowship of **Eurasian Academy of Environmental Sciences** for his continuous efforts for conservation of Semal tree in Udaipur, Rajasthan.

L-10

Dr. Renu Khamesara

Principal specialist, Medicine, RNT Medical College, Udaipur
Awarded with a **Certificate of appreciation** from Dist. Collector, Udaipur on 15th August, 2014 for her selfless free services to patients with neurological disorders and cancer in villages nearby Udaipur city.

BOOK-POST

To,

From :

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Articles are invited for 2015 issues of BOMRIM on the following themes

* Intelligence in organic life

* Recent discoveries of Intelligence in biological organisms

-Editors

WHAT IS MICROVITA ?

Microvita : *Micro*- Small, *Vita*- Living

Definition : Entities or objects which come within the realm of both physicality and psychic expressions, which are smaller or subtler than atoms, electrons or protons; and in the psychic realm, may be subtler than ectoplasm or its extra-psychic coverage; endoplasm have been termed as "Microvita" (Singular- Microvitum) by Shri P. R .Sarkar.

Physicality : The position of microvita is just between ectoplasm and electron, but they are neither ectoplasm nor electron.

Categories :

A) Based on density or subtlety -

First : Coming within the scope of a highly developed microscope.

Second : Not coming within the scope of a perception but coming within the scope of perception as a result of their expression or actional vibration.

Third : Not coming within the scope of common perception but coming within the scope of a special type of perception which is actually the reflection of conception within the periphery of perception.

B) Based on nature -

1. Positive
2. Negative
3. Neutral/Ordinary

Movement :

- Move throughout the entire universe.
- Move unbarred, without caring for the atmospheric conditions.
- Move through a medium or media i.e. sound, form, figure, smell, tactuality or ideas.

Root cause of life :

Microvita create minds and bodies and also destroy minds and physical bodies. The root cause of life is not the unicellular protozoa or unit protoplasmic cell, but this unit microvitum.

READERS Suggestions/Comments/Articles are welcomed
E-mail : skvermaster@gmail.com

AIMS AND OBJECTIVES OF SMRIM

1. To propagate the knowledge and science of microvita by psycho-spiritual practice in individual and collective life.
2. To increase moral values, to generate scientific thinking, to remove dogma with the spread of knowledge of microvita at school, college and university levels.
3. To initiate and inspire about research on Yogic, Vaedic, Naturopathic, Ayurvedic and Homoeopathic schools of medicine.
4. To incorporate faculty of Physics, Chemistry, Botany and Medicine for research on microvita and integrated medicine; including research on medicinal plants and Homoeopathic medicine.
5. To organize free medical camps in villages and cities involving specialists of different system of medicine.
6. To publish result of the research in national and international journals and interact with other people working in the field in and out of the country.
7. To make judicious use of different systems of medicine and microvita for the treatment of diabetes, hypertension, heart diseases, cancer and diseases of modern era.
8. To establish laboratory and research centers for relentless research on microvita and integrated medicine for the welfare of entire humanity.

Who can join?

Any person interested in serving humanity through research on microvita and integrated medicine and abides rules and regulations of the society can become the member of the society.

Life Membership fee : Rs. 2000/- (Once)

NOTE With the issuance of ISSN the standard abbreviation of BOMRIM will be *Bull. Microvita Res. Integr. Med.*

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