Research strategy and Ayurveda

The Ayurvedic system of medicine has descriptions of about a thousand plants and minerals for the management of curable diseases. The theory of disease-management in this system is based on the regulation of three body humours, i.e. *vata*, *pitta* and *kapha*.

After realization of the fact that the slogan of WHO 'To achieve health for all by A.D. 2000' could not be achieved by the allopathy system of medicine alone, the policy-makers of health management started developing traditional medicines of different countries.

In this regard, Ayurveda being one of the oldest systems of medicine, owns the maximum responsibility. The world is looking towards India for new drugs to manage various challenging diseases such as AIDS, Alzheimer's disease, arthritis, diabetes, etc.

Surprisingly, we are not ready to accept this challenge. This is because of the wrong and discriminative policy of the Government of India. Proper recognition and suitable funds are not being given for this system of medicine.

I personally feel that the Government and other funding agencies of this country should recognize this Indian system of medicine as the 'Area of priority'. The infrastructure of each unit of Ayurvedic research and teaching could be strengthened by providing manpower and financial resources.

The responsibility of research may be given to the leading laboratories of the CSIR and ICMR and the scientists of these organizations may be requested to work in close collaboration with Ayurvedic experts, because research on medicinal plants without taking into consideration the basic concepts of Ayurveda will not be of much help to the development of this system of medicine.

The universities may fill up the vacant posts in this discipline by appointing persons having good research background because at the moment, research is the need of the day and a good researcher is always a good teacher.

Central Council of Research in Ayurveda and Siddha (CCRAS) needs complete restructuring. A scheme of golden handshake is necessary as about 90% of its budjet is utilized for the salaries only. Its projects may be reduced in number and the persons working on these projects may be transferred to leading scientists in different institutions who are working in similar fields.

Above all, the Ministry of Health, Government of India, which has a separate Department of Indian System of Medicine (ISM) should be very cautious about investing money. Expenditure without specific accountability is of no use. The basic projects may be sanctioned in joint collaboration of a modern scientist with an Ayurvedic expert, because this is the transition period for the development of Ayurvedic medicine. It will take some time when both the components, as described above, will thoroughly understand each other.

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NEWS

Chemical science on Internet

Internet is the world's largest network of computer networks. About 7 million computers are connected this way to Internet (August 1995 figure), with North America accounting for about 70% of this figure (*Science*, 1995, **267**, 168 and **270**, 741).

In India, the Internet has reached some of the CSIR labs, a few Universities and very few private industries and financial institutions.

Most of the Internet users are not interested in writing computer programs, but want to access information. Information is available on almost any subject or topic on Internet. Several search techniques are available to scan the sea of information and select the relevant portions. One of the newest and most popular programs which can do this job is the World Wide Web (WWW). It links related information. Rather than transferring files between computers, the network is used to navigate through an information space of distributed items of information, which could be text, graphics or video clips, etc. When an item or topic is selected from a menu, more information about the topic is obtained or directions (or pointers) to the information is given. This way an information could be linked to more information (known as hyper-text). Also this entire information could be downloaded for personal perusal at a later date.

Internet users pay only for access to the network, not for the number of bits of information they send once they are in. There is a threat for the tradition of open information exchange, as commercialization is raising fears that pricing changes will squeeze e-mail and database browsing.

Chemical sites in Internet

The Internet can be used by a chemist to download a 3D image of a particular protein from a database, take part in an electronic conference on some topic, publish or read a paper in an electronic journal, download chemical education aids for a course in general chemistry, check out academic employment possibilities, advertise for a job, scan data from databases, read various manufacturers' product catalogues. These are some of the chemistry resources avail-

able on computer screens through the Internet's WWW. A good starting point for finding chemistry resources on the WWW is through one of a number of pointers or gateways to an array of those resources. Examples of such gateways are ChemDex, available at the University of Sheffield in UK and the chemical information sources from Indiana University, USA.

The November 1995 issue of *Chem. Eng. News* lists the best-of-the Web related to the field of chemistry and biology with their Web addresses. The list consists of about 60 sites, which makes up just a portion of all the chemistry sites available on the Web. The following list gives a flavour of the best of chemical sites on the Internet.

Pointers

- Virtual chemistry list at the University of California.
- ChemDex list at the University of Sheffield, UK.
- Internet chemistry resources.
- Australian chemistry resources.
- Chemistry education resources.
- Chemical engineering virtual library.
- NIH GenoBase database gateway.
- Index of polymers and plastics resources.

Value-added processing of chemical information

- 2D to 3D coordinate conversion.
- Structural classification of proteins.
- Molecular biology images.
- Biochemical compounds databases.
- Fullerene databases.
- Fischer Scientific catalog.
- Computer simulation of condensed phases.
- Periodic tables
- Instability dynamics of fractures
- Principles of protein structure
- Molecular hyperglossary

Molecular modelling

- Molecular modelling and protein databases
- AMBER
- BIOSYM/MSI life sciences
- NIH molecular modelling
- MDL info system. ISIS/Draw
- XMol information
- Cambridge Soft corp
- Representation of molecular models and rendering techniques.

Conferences and talks

- Trends in organic chemistry, computational chemistry conference, NMR 95 poster session, Glycosine conference.

Visual sources and programs

- Virtual reality modelling
- Hyperactive molecules
- Chemistry at the Centre for Scientific Computing, Finland.

Teaching sources

- GC/MS of Jamaican coffee
- Multimedia chemistry at the University of California
- Chemistry Hypermedia project at Virginia Tech
- Global instructional chemistry.

Electronic journals

- *Journal of Molecular Modelling*
- *Network Science*
- Elsevier publications
- *Journal of Biological Chemistry*
- *Journal of Computer-aided Molecular Design*
- *Journal of Chemical Physics*
- *Protein Science.*

Organizations

- American Chemical Society, Chemical Abstract Serv. and Royal Society of Chemistry.

The gene sequence data is stored in two databases, the GenBank and Genome sequence database, both consisting of over 200 million base pairs from humans and more than 8000 other species. The data can be browsed by biologists through WWW (*Science*, 1995, **269**, 1356).

The Web is also being used to bridge communications between chemists and biologists, for example Chemistry & Biology serves as a networking tool in the area of fluorosensor design. A network named BiomedNet is being developed as a worldwide club for biomedical scientists. Network Science, another network was created mainly for the sake of molecular modelling and chemical information. Worldwide Chemnet provides a site to bring buyers of chemicals together with manufactures, distributors and packagers. Many chemical, software and modelling companies also have their home page on the Web describing their products.

Thus it is seen that the World Wide Web is already having, and increasingly will have, a profound impact on the way that science is done and, we in India cannot be left behind in this scientific information revolution.

D. Mukesh, Alchemie Research Centre, Thane-Belapur Road.

RESEARCH NEWS

How does a fungus know the time of day?

L. Geetha and Raghavendra Gadagkar

The timing of sunrise and sunset has a remarkable influence on the lives of plants and animals. Diurnal animals, like most birds, wake up at sunrise and begin their activities as if they know that an early bird gets the worm. So do most of the mammals including humans, except perhaps students in the hostel! Conversely, nocturnal animals wake up at sunset and go to sleep at dawn[1]. Nowhere can this be witnessed more spectacularly than in the caves of Madurai