Standard of medical sciences

We welcome the suggestion made by Suryanarayanan[1] that some recognized body in India such as the University Grants Commission (UGC) should list the standard journals in each field published from India in order to judge the quality of scientific research publications. In the field of medicine and allied health sciences, journals indexed by *PubMed/MedLine/Index Medicus* are considered as standard[2]. There are around 50 medicine-related Indian journals indexed by *PubMed*. The best way to judge the quality of scientific publications by Indians in the field of health sciences is to look for publications indexed by *PubMed*. This would cover not only the standard Indian health sciences journals, but also journals from other countries. Publications in national and international journals not indexed by *PubMed* should not be considered on par with those published in journals indexed by *PubMed*, particularly in procedures such as recruitment of candidates for a job, academic career advancement promotions and even while considering scientific research proposals for funding. A leap ahead would be to consider publications in journals with an impact factor (IF) conferred by Thomson Scientific/Institute for Scientific Information. Of all the medicine-related Indian journals indexed by *PubMed*, only four, namely *Indian Journal of Medical Research*, *National Medical Journal of India*, *Neurology India* and *Indian Pediatrics*, boast of recent impact factors of 1.670, 0.889, 0.645 and 0.750 respectively; *Indian Pediatrics* being the neonate in the elite list of exclusive medical journals of India with an impact factor[3]. In the field of health sciences, *PubMed* and *Thomson Scientific* stand out as the two frontline premier indexing agencies that recognized bodies such as the UGC should consider, if at all, while listing and grading Indian health sciences journals.

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3. *Journal Citation Reports 2007*, Science Edition (CD ROM), Thomson Scientific, Philadelphia, 2008.

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Natural products-based drug discovery: some bottlenecks and considerations

Natural products have played a key role in pharma research, as many medicines are either natural products or derivatives thereof. Indeed, it is estimated that about 40% of all medicines is either natural products or their semi-synthetic derivatives. This may not be surprising as herbal medicine is a tradition of healthcare since ancient times and with natural extracts screening has been one of the roots of pharma research, where erythromycin and rifampicin (bacterial infections), statins (cholesterol lowering/hyperlipidemia), quinines and artimesinin (malaria), paclitaxel, vinblastin and vincristin (cancer), are a few well-known natural products-based medicines. For bacterial infections, over 80% of all medicines in clinical use is either natural products or their derivatives, while for anti-cancer agents over 60% of all drugs is either natural products or derivatives thereof[1].

It is not uncommon for natural products to have complex molecular structures[2,3], with cyclic semi-rigid scaffolds, several chiral centres, more than five H-bond donors, more than ten H-bond acceptors, more than five rotatable C–C bonds, a large polar surface area, and a molecular weight above 500. While this may lead to moderate levels of bioavailability and corresponding dosage regimens to achieve the required efficacy, there may be a latent advantage in such complex structures, as has been previously hypothesized[4]. This complexity has occasionally been thought to be a constraint for the total chemical synthesis of natural products-based libraries in a given time and resource frame.

To address such points and bypass such potential bottlenecks, it becomes evident that the time and resource framework for natural products-based drug discovery requires special considerations. Several aspects that have been given due consideration elsewhere include (a) the use of specialized reagents for asymmetric synthesis[5], (b) the isolation of natural products from natural sources and the use of these as scaffolds for natural products-based library synthesis[6], and (c) the optimization of over-producing microbial strains for natural products biosynthesis.

It is of some potential interest to outline an aspect based on biotechnology approaches. Some natural products may be beyond the scope of total chemical synthesis, and the over-production of these from natural sources may not be feasible, at the present time. This could be a limitation for some natural products-based drug discovery projects. This may be an area where biotechnology will have a significant role to play, such that the genes that are responsible for natural products biosynthesis are cloned from the relevant species, and are used to genetically transform the bacterium,