From Chairman's Desk

Contribution of Botanicals in Drug Discovery

Nature has provided enough to keep humans healthy. Botanicals remained the major source of drug till semi-synthetics, synthetics and biotechnology opened new vista. Botanicals gave enough clue and cue to boost drug discovery research. The very first synthetic drug aspirin is an example that plant in itself is a big synthetic laboratory and it is the phytochemical present in the plant part(s) which is responsible for medicinal effect(s). It is widely reported that 25% of all modern medicines in market are directly or indirectly derived from plants. In 2001 it was reported by D S Fabricant and N R Farnsworth that they had identified 122 compounds used in modern medicine which were derived from 94 species of plants and 80% of them were used in ethnomedicine. Pharmaceuticals like artemisinin, aspirin, atropine, d-tubocurarine, digitalis, morphine, pilocarpine, quinine, reserpine, taxol, vinblastine, vincristine are few examples of the vast treasure of phyto-chemicals, that have a long history of use as remedies. These 94 plants are only tip of the iceberg. There are many more in nature's stores that remain to be explored in depth and documented, on modern scientific lines of research.

Plants have also given important lead compounds for semi synthetic bioactive patentable drugs of high potency and low toxicity. Drugs like amiodarone, metformin, nabilone, oxycodon, taxotere, teniposide, and verapamil are few of the best examples of such gift of nature.

Synthesis based drug discovery has become a high risk research area because of very high attrition, highly time consuming (10 plus years), and huge investment. In November, 2014 issue of *Chemical & Engineering News,* Rick Mullin reported that cost to develop a new pharmaceutical drug now exceeds $2.5bn. Based on the *Tufts Center for the Study of Drug Development data since 1970s, he concluded that there has been 145% increase in cost of drug development since 2003.*

The success rates from Phase I clinical trial to registration of the product of ten big companies during 1991-2000, as reported by Ismail Kola and John Landis in Nature Reviews/Drug Discovery in 2004 revealed an overall clinical success to 11%, with less than 5% for Women health products to 20% for cardiovascular drugs.

Thus the high risk, long period of time and huge money factors of drug discovery are indicative that botanicals need to be revisited because they are in use since evolution of mankind and they have offered important modern medicines. Hence, instead of creating vast chemical library of compounds, if the vast treasure of phyto-chemicals can be explored on priority basis with a outcome based research approach perhaps all the three factors affecting drug discovery may be overcome. This needs reorientation of research policy on botanicals. Instead of piecemeal research projects, perpetuating research projects should be encouraged and entertained so that every research ultimately culminates in useful industrially exploitable and commercially viable medicine with better efficiency and better toxicity. Time is now ripe to turn to the nature.

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