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A Review Paper on Natural Products in Drug Innovation Procedure

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ABSTRACT: ***As a source of medicinal agents, natural products and their associated moieties have traditionally been unbelievable. Research into natural products in the pharmaceutical industry has declined over the last 5-10 years due to issues such as the lack of consistency with high-throughput screening of conventional natural-product extract libraries. Natural-product structures have long been recognized to have the characteristics of high chemical diversity, biochemical specificity and other molecular properties that make them favorable to drug discovery as lead structures, and that help to distinguish them from synthetic and combinatorial compound libraries. Over the past decades, recent developments in genomics and structural biology have painted a better image of the variety of proteins targeted by the molecules of natural products. Besides these, emerging methods for lead generation have contributed to a renewed interest in drug development in natural products. This paper provides a detailed review on the procedure of the natural products in the drug innovation.***

KEYWORDS: Drug, Human, Molecules, Natural Products, System.

INTRODUCTION

Due to the prevalence of many diseases without adequate medicinal products available, there is a need for a drug development process. Among the numerous industrial pharmaceutical methods used for drug discovery, one of the pioneering processes is the research and development process. In fact, before allowing a new drug to be registered, tens of thousands of compounds must be tested in order to enter the market (Figure 1)[1]. This phase of low productivity is lengthy and very costly. Three primary innovations have been implemented in order to safeguard biomedical innovation:

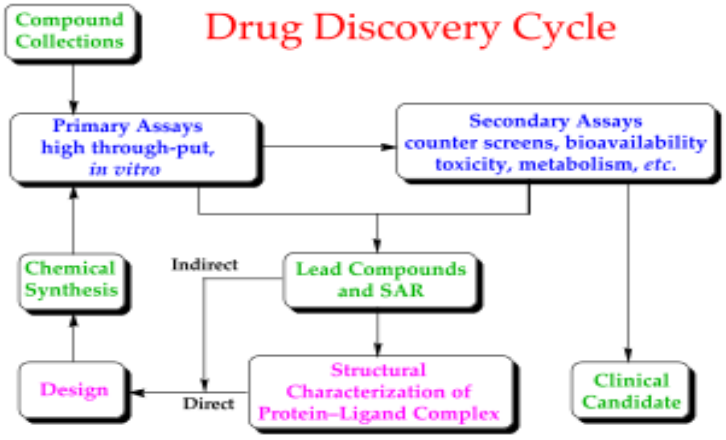

Figure 1: Depicts the schematic diagram of the drug discovery procedure[2]**.**

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Table 1: Illustrates the plants as a source of natural products and their biological events[3]**.**

Source	Chemical constituents	Biological action	Marketed/traditional formulation
Achyranthes aspera	Achyranthine	Diuretic	Cystone
Adhatoda vasica	Vasicine	Bronchodilator	Diakof , Koflet
Aegle marmelos	Aegelin, Marmelosin	In bowel disease	Diarex
Aloe vera	Aloin	Demulcent	Clarina
Antethum graveolens	Anethole	Carminative	Bonnisan
Areca catechu	Tannins	Antiobesity	Koflet, Bioslim
Argyreia nervosa	Alkaloids	Aphrodisiac	Confido
Artemisia annua	Artemisinin	Antimalarial	Suteether
Asparagus adscendens	Asparanin, Sarasapogenin	Fertility enhancer	Spermon

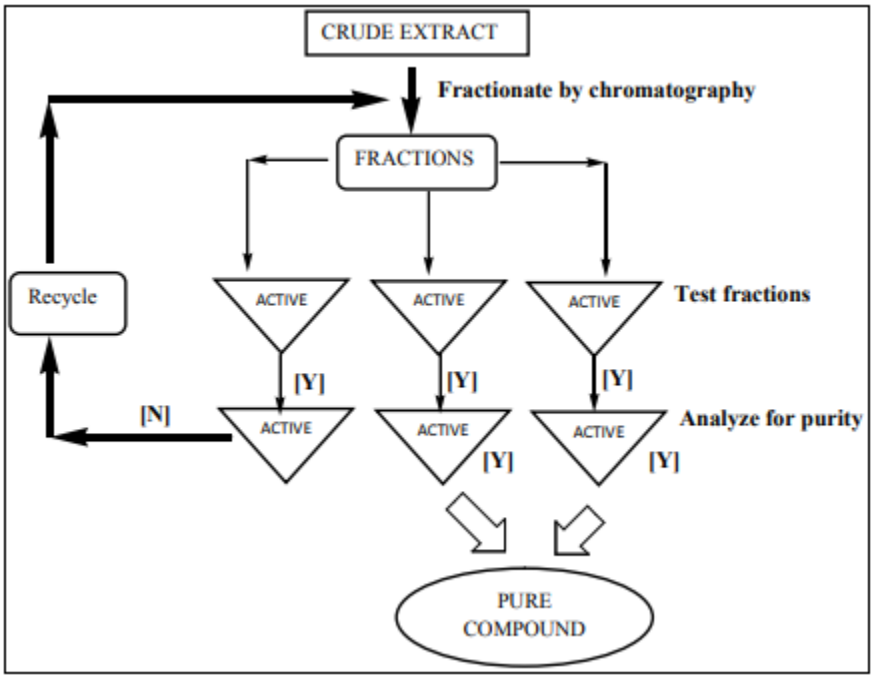


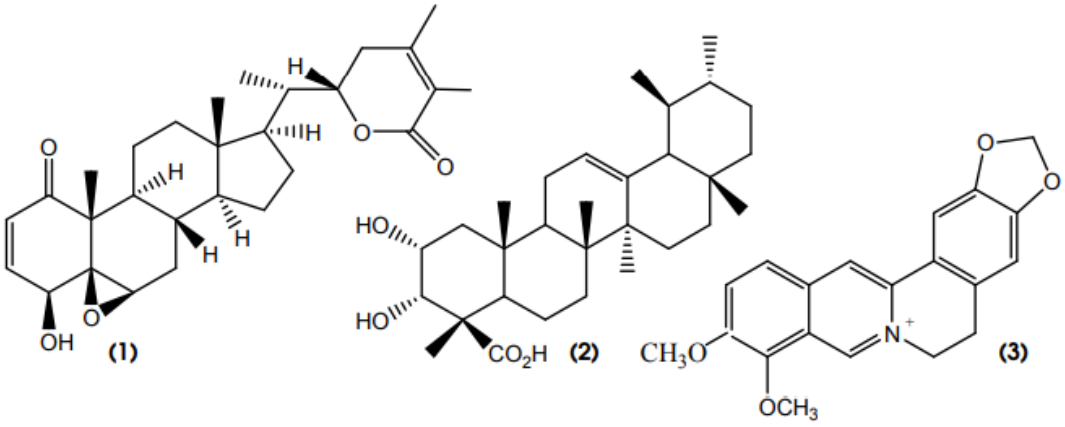
Figure 2: Illustrates paradigm for bioassay-guided purification[4]**.**

The different foundations for the drug discovery process are the recognition of the active ingredient from conventional remedies, serendipity, de novo, isosteric substitution, group reversal, biotechnology, natural products etc.[5]. Natural products (secondary metabolites) have become the most reliable predictor of possible drug outcomes. Synonymous with secondary metabolites, the term natural products is often used. It is a chemical compound or material found in nature created by a living organism that typically has a pharmacological or biological function to be used in the process of drug discovery[6]. Since early human history, natural products have been studied and

used to alleviate diseases. Figure 1 depicts the schematic diagram of the drug discovery procedure. Table 1 illustrates the plants as a source of natural products and their biological events. Figure 2 illustrates paradigm for bioassay-guided purification. Figure 3 illustrates anti-inflammatory agents.

DISCUSSION

Since early human history, natural products have been studied and used to alleviate diseases. In the early 1900s, 80% of all drugs were derived from plant sources before the synthetic period. The Indian medicine system has a long tradition and is one of the oldest organized medicine systems[7]. It makes use of natural products such as plant, terrestrial and marine animal preparation derived from microorganisms to cure the terrible disease. A significant amount of drug content was a solely natural product or was inspired by molecules derived from natural sources prior to the advent of high-throughput screening (HTS) and the post-genomic period. A study of the origins of new drugs from 1981 to 2007 shows that nearly half of the drugs approved since 1994 were based on natural products.. In human therapy, natural products have always played an important role and constitute an immense reservoir of bioactive chemical diversity and help to understand the cellular pathways that are an integral component of the process of drug development. The future of the exploration of natural drug products will be complementary to more holistic current clinical skills such that full benefits can be accrued to patients and the environment[8].



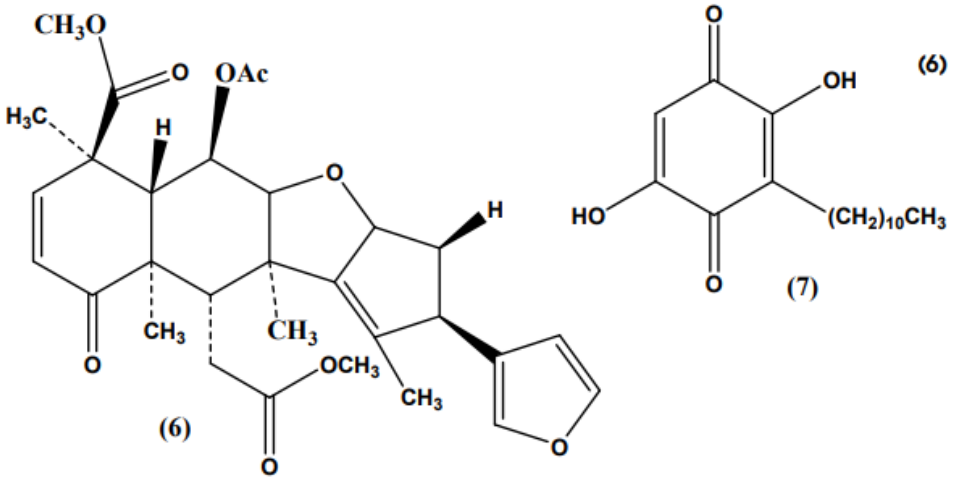


Figure 3: Illustrates anti-inflammatory agents[9]**.**

CONCLUSION

Instead of considering natural products as a stand-alone method separate from combinatorial synthesis, natural products as building blocks for molecular libraries are now much more successful in implementing strategies that incorporate both approaches. The specific molecular diversity of natural products can seem to be leveraged in the design of combinatorial libraries in different ways. The goal-oriented or focused-library approach seeks to develop structural changes in analogue patterns, systemic fashion on an existing bioactive natural product scaffold in order to enhance its intrinsic biological activity or drug-like properties. Today, relative to the age in which natural products were pre-eminent sources of drug leads, the drug development engine operates at an accelerated pace, various methods have been developed to capture their intrinsic value. The key breakthroughs in the technologies of separation and structure determination have minimized the barriers inherent in screening mixtures of structurally complex molecules. In pursuit of new drugs, the confluence of these technologies with developments in genomics, metabolic engineering and chemical synthesis offers the new approach along with the technologies to investigate the extraordinary chemical complexity of the 'small molecules' of nature.

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