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Approaches in identification of suitable natural anticancer and anti-inflammatory molecules

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Statement of the Problem: Several herbal and ayurvedic preparations are currently used to treat the cancer patients. Although, several herbs used in such treatment contains pharmacologically important molecules but they are yet to be identified and their mode of action is not studied in detail. Cancer is defined as a wound that never heals due to its complicated cellular organizations. Thus, the main objective of present investigation was to identify the herbal leads that target the inflammatory tumor environment through modern approaches.

Purpose: India is the major country that is rich in the biodiverse compounds to treat disorders through herbal and ayurvedic approaches. Several natural lead molecules are being reported and continuously being investigated globally. The good examples are being curcurmin and taxol derivatives of natural origin that is effective against cancer and inflammatory disorders. Identification of small molecule drugs from herbs by increasing the selectivity towards tumor is the prime importance of the study. In this context, we have investigated several diverse herbal lead molecules that aimed to increase the selectivity and inflammatory aspects of heterogenic cancer components.

Methodology & Theoretical Orientation: The major photochemical components of herbs used in treatment of various disorders was screened to identify an active components based on preliminary studies. Further, through virtual screening, the compounds were identified against cancer specific targets by computational approaches. The results were validated by in vitro interaction studies and cell-based studies.

Findings: The lead molecules were obtained that can be used for in vivo studies for development of anticancer drugs. The findings also enriched the knowledge regarding mechanistic approach of ayurvedic drugs being used.

Conclusion & Significance: The active herbal constituents that target the multiple pathways which are deregulated in cancer was very useful to for identification of some pharmacologically important lead backbone and other vital components present in the herbs increased the selectively towards cancer could be identified. This study also enriched the knowledge regarding the mechanism of action of some Indian ayurvedic herbal preparations.

Recent Publications

1. Veena V, Popavath P R, Kennedy R K and Sakthivel N (2015) In vitro antiproliferative, proapoptotic, antimetastatic and anti-inflammatory potential of 2, 4-diacteylphloroglucinol (DAPG) by Pseudomonas aeruginosa strain FP10. Apoptosis 20:1281-95.
2. Veena V, Kennedy R K, Lakshmi P, Krishna R and Sakthivel N (2016) Anti-leukemic, anti-lung and anti-breast cancer potential of the microbial polyketide, 2,4-diacetylphloroglucinol (DAPG) and its interaction with the metastatic proteins than the antiapoptotic Bcl-2 proteins. Molecular and Cellular Biochemistry doi: 10.1007/s11010-016-2657-6.
3. Kennedy R K, Naik P R, Veena V, Lakshmi B S, Lakshmi P, Krishna R and Sakthivel N (2015) 5-Methyl phenazine-1-carboxylic acid: A novel bioactive metabolite by a rhizosphere soil bacterium that exhibits potent antimicrobial and anticancer activities. Chemico-Biological Interactions 231:71-82.

4. Lalitha P, Veena V, Vidhyapriya V, Lakshmi P, Krishna R and Sakthivel N (2016) Anticancer potential of pyrrole (1,2,a) pyrazine-1,4,dione, hexahydro3-(2-methyl propyl) (PPDHMP) extracted from a new marine bacterium, *Staphylococcus* sp. strain MB30. Apoptosis 21:566-577.
5. Kennedy R K, Veena V, Naik P R, Lakshmi P, Krishna R, Sudharani S and Sakthivel N (2015) Phenazine-1-carboxamide (PCN) from Pseudomonas sp. strain PUP6 selectively induced apoptosis in lung (A549) and breast (MDA MB-231) cancer cells by inhibition of antiapoptotic Bcl-2 family proteins. Apoptosis: 20:858–868.

Biography

V Veena is currently working as Assistant Professor and Research Coordinator at School of Chemical and Biological Sciences, REVA University, Bangalore, India. She obtained her Doctoral studies from Pondicherry University, India in 2016. She has eight years of research experiences and two year of teaching experience for post graduate and graduate students. Her area of research includes small molecules of diverse origin for cancer therapy and nanophotosensitisers for cancer therapy. She is recipient of junior and senior research fellow, a prestigious merit-based award given by Council for Scientific and Industrial Research (CSIR) and University Grant Commission (UGC), Government of India. She was also awarded Research Project Assistant in UGC-SAP (special assistant program) by Department of Biotechnology, Pondicherry University, India. Her research contributions was published peer reviewed international journals and she is also serving as a Reviewer of some journals.

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