A LIBRARY OF NEW SMALL MOLECULES THAT COULD BE USED AS ANTICANCER, ANTIVIRAL DRUGS

NCL Innovations: Solutions from CSIR India

Technology

Nucleosides as antiviral, anticancer drugs

- Nucleosides are compounds containing a purine or pyrimidine base linked to a sugar. Several nucleoside analogues are used as antiviral or as anticancer agents
- Modification of sugar backbone in nucleosides and having access to collections of distinctive small molecules by modifying the sugar backbone is important for identifying new therapeutic candidates for various diseases.
- Recent strategy involves spiroannulation of the sugar backbone resulting in modified nucleosides. Current schemes follow "one scheme one nucleoside" approach – which is very limiting as each modification has to done separately.

Our technology

- Our technology provides a strategy that allows to synthesize modified nucleosides (spironucleosides) with enormous flexibility to modulate the substituents and properties of the resulting compounds.
- The provision to manipulate the substrate flexibility at the final/penultimate steps – allows this approach to yield a small library of modified nucleosides without synthesizing every compound from the beginning.

NCL INNOVATIONS
Solutions from CSIR India

Applications

- Drug discovery
- Developing therapeutics for various diseases
  - Genetic disorders and infections
  - Anti viral and anti cancer agents
- Chemical genetics
- Identifying new drug candidates

NCL INNOVATIONS
Solutions from CSIR India

Market Potential

- There are large R&D efforts underway worldwide to identify suitable anti-cancer and ant-viral drugs/agents
- The global cancer therapeutics market is relying heavily of new drug development and is expected to reach $60.6 billion in 2011*
- The antiviral drug market for 2008 was valued to have been at $20 billion**

* http://www.frost.com/prod/servlet/report-toc.pag?repid=F404-01-00-00-00 (viewed 22/05/11)
** www.leaddiscovery.co.uk/reports/1295/Global_Antivirals_Market_Analysis_Forecasts_20082023_Global_Antivirals_Market_Analysis_Forecasts_20082023elease/3608/cancer_therapeutics_market_to_reach_59_7_billion_reveals_kalorama_study.html (viewed 27/05/11)

NCL INNOVATIONS
Solutions from CSIR India

Value

- Flexible process that allows to create a small library of modified nucleosides without undergoing cumbersome processes of synthesizing every molecule from scratch
  - These libraries of compounds can be used to identify potential drugs, and also significantly reduced development time and effots
- Good yield in the presence of the recommended catalysts
- The cycloaddition process used here is of high synthetic efficiency
- Easy and flexible penultimate bicycloannulation step involved

NCL INNOVATIONS
Solutions from CSIR India

Technology Status, IP Status

- Patent application filed
- Demonstrated at lab level
- Ready to be licensed

NCL INNOVATIONS
Solutions from CSIR India

Links & References

- Schreiber, S. L. (2009) Molecular diversity by design, Nature- News and Views, Vol. 457. Pg: 153- 154.
- Micklefield, J. (2001)Backbone Modification of Nucleic Acids: Synthesis, Structure and Therapeutic Applications, Current Medicinal Chemistry, 8, 1157-1179
- Ramana, C.V. et al. (2011)Target cum Flexibility: an alkyne [2+2+2]-cyclotrimerization strategy for synthesis of trinem libaray, Tetrahedron Letters, Vol 52 (1), Pg 38-41.

Contact Info:

Dr. Magesh N.
Scientist, NCL Innovations
National Chemical Laboratory
Pune - 411008
Phone: +91-20-2590-2982
Fax: +91-20-2590-2983
Email: m(dot)nandagopal(at)ncl(dot)res(dot)in

NCL INNOVATIONS
Solutions from CSIR India

Summary

Technology Summary	
Technology title	A library of new synthetic small molecules for Anti cancer and anti viral therapeutics
Industry /sector	Pharmaceuticals
Year of development	2010
Related patents (with links)	PCT application filed
Technology readiness level	Demonstrated at lab level
Licensing status	Ready to be licensed
Encumbrances	None
Availability	Yes

NCL INNOVATIONS
Solutions from CSIR India