NEW DRUG TARGET & PROMISING CHEMICAL STARTING POINT FOR TREATING CANCER, TYPE 2 DIABETES

NCL Innovations: Solutions from CSIR India
Technology

Treating Cancer, Diabetes – current strategies
• PI3-kinase (PI3K) pathway is a crucial set of reactions that occurs at the cellular level – which when disregulated leads to may diseases
  • Hyperactivation of this pathway plays an important role in causing cancer
  • Deficiencies in this pathway leads to type II diabetes
• This pathway offers promising targets for developing drugs to combat these diseases
• Conventional therapeutic strategies have targeted inhibiting downstream targets in this pathway, and have not concentrated on targeting protein-lipid interactions

Our Technology – Identifying a new strategy and potential drug molecules
• A new strategy is proposed by us which targets lipid-protein interactions (PIP3/protein binding) as a therapeutic strategy
• We have also developed promising chemical leads (small molecule antagonists for PIP3/protein binding) – which inhibits cancer cell survival, resulting in significant antitumor activity in vivo
• We have also developed a set of small molecule non-lipid antagonists of lipid-protein interactions, which can be used to design specific drugs
Applications

- New therapeutic strategies and drug development for the treatment of
  - Cancer
  - Type II diabetes
- Small molecules developed show promising results — serve as chemical starting points/leads in developing new drugs for cancer and diabetes
Market Potential

- Drugs for cancer and type-II diabetes have a very large market potential, and high growth rate.

- The world targeted cancer drug market is predicted to reach $51 billion by 2015*.

- The combined market globally for diabetes type 2 diagnostics and therapeutics has been predicted to reach $242 billion by the year 2013 at a growth rate of 2.5% a year^.

Value

- Can selectively inhibit PIP3-mediated signaling
- Found to be able to target a wide range of PIP3-dependent signaling events in vitro
- Significant anti-tumour activity in vivo
- Exhibit improved activity /PH domain selectivity compared to previously identified antagonists
- Promising chemical starting points that have been optimized, that have undergone successful animal trials
Technology Status, IP Status

- Demonstrated at lab scale (animal studies conducted using the small molecules developed – with promising results; various small molecules have been tested and optimized)
- Ready to be licensed/commercialized
- Patent application filed

(This technology was jointly developed by NCL, Pune and Tufts University, USA; patent application filed jointly)
Links & References

- [http://sackler.tufts.edu/Academics/Degree-Programs/PhD-Programs/Faculty-Research-Pages/Alexei-Degterev.aspx](http://sackler.tufts.edu/Academics/Degree-Programs/PhD-Programs/Faculty-Research-Pages/Alexei-Degterev.aspx)


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
## Technology Summary

<table>
<thead>
<tr>
<th>Technology title</th>
<th>New drug target &amp; promising chemical starting point for treating cancer, type 2 diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry /sector</td>
<td>Bio-pharmaceuticals</td>
</tr>
<tr>
<td>Year of development</td>
<td>2010</td>
</tr>
<tr>
<td>Related patents (with links)</td>
<td>US patent application filed (jointly filed by NCL, Pune and Tufts University, USA)</td>
</tr>
<tr>
<td>Technology readiness level</td>
<td>Demonstrated at lab scale</td>
</tr>
<tr>
<td>Licensing status</td>
<td>Ready to be licensed/commercialized</td>
</tr>
<tr>
<td>Encumbrances</td>
<td>None</td>
</tr>
<tr>
<td>Availability</td>
<td>Yes</td>
</tr>
</tbody>
</table>