Workshop on Research and innovation for new therapies – Open Source Drug Discovery (OSDD) and other collaborative models

Uppsala Health Summit 2015

June 3rd, 2015 10h30 – 14h30
Uppsala Konsert&Kongress, Vaksala torg, Uppsala

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A CSIR led team India consortium with global partnership for affordable healthcare

How can we work together

Involve the scientific community with out borders in a seamless manner

Encourage and train youngsters

Share the knowledge created

The first disease target: Tuberculosis (TB)
Why Open Source Drug discovery? Why TB?

- Many eye balls make the bug shallow!
- Lack of market incentive for TB
- Successful Open Source Models
  - Human Genome Sequencing Initiative
  - Open Source Software Initiative (eg: Linux OS)
  - Android
- The WWW
OSDD: Attribution and IP

• Patent only to ensure that:
  – Quality assurance in downstream processes
  – Subsequent innovations remain in open source
  – Affordability: through non exclusive licenses

• All contributions on the OSDD portal (www.osdd.net) attributed to the authors with date and time stamp

• Real time data sharing

• Click wrap license agreement
  – All contributions treated as Protected Collective Information
    • mandates sharing,
    • attribution,
    • contribute back
Connect... Integrate...

Seamless access to Information & Tools
Ensuring relevancy in an ever exploding information base

People
- Brainstorm Beyond Boundaries
- Harnessing the Innovation at the Fringes

Science 2.0
- Discussions to Discovery
- End to End Integration

Information

Process

Challenge ... is balancing the three dimensions

Courtesy: HHMI
OSDD Philosophy

- **Open Access** of Data, Resources and Results to foster collaboration to accelerate drug discovery

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- **Affordability:** through non exclusive licenses; generic manufacturers
OSDD Strategy To Drug Discovery & Development

Strategy > Open Innovation with best minds from academia / industry

Development Strategy > Industry / CRO's Participation - Open Data - community inputs

Clinical Trials Strategy > Public funds to support clinical trials led by public funded institutions in collaboration with CROs / pharma for process accuracy.

Registered Drug

Clinical Trials

Optimised Candidate Drug

Validated / Quality Lead

Market Strategy > Generic industry to manufacture drugs with more than one player for market competition.
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<th><strong>TB ALLIANCE</strong></th>
<th>Novel Combination of TB Drugs</th>
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<td><strong>MMV</strong></td>
<td>Pre-Clinical Compound offered to OSDD</td>
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<td><strong>DNDi</strong></td>
<td>Assisting to progress OSDD’s in house molecule</td>
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<td><strong>RSC</strong></td>
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<td><strong>GlaxoSmithKline</strong></td>
<td>3 Hit to Lead Candidates offered to OSDD</td>
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OSDD is Now an Internationally Reputed Drug Discovery Initiative Pioneered by Government of India
Ongoing work

- Community effort is ongoing to further understand the biology of Mtb
- System level analysis of metabolic impact of critically approved drugs
- In-silico druggable target identification
- Dedicated chemical synthesis lab
- Targeted synthesis
- Diversity oriented synthesis
- Large scale mol bank
- Screening facility against M smegmatis and M tuberculosis
- DMPK analysis and in vivo will be facilitated
- Clinical trial on MDR patients with the combination regimen of PaMZ
The requirement of clinical trials for new TB drugs

Pitfalls of the current regimen:
- Limited efficacy
- Side effects
- Long duration of treatment
- Non-compliance

Current MDR regimen:
- Levofloxacin
- Pyrazinamide
- Ethambutol
- Ethionamide
- Cycloserine
- Kanamycin

Solution for the above problem:
Combination regimen brought forward by TB Alliance
Public funding is required for affordable pricing of drugs in infectious diseases
Collaborative forums with main focus on infectious diseases

About CPTR Through partnership, CPTR speeds the development of new and markedly improved drug regimens for tuberculosis. Founding partners: TB Alliance, The BMGF, Critical Path Institute and several pharma as partners

Medicines for Malaria Venture (MMV)

Drugs for Neglected Diseases Initiative (DNDi)

GSK’s Diseases of the Developing World Center at Tres Cantos

R4D (Research for Development) of TB Alliance

The Lilly TB Drug Discovery Initiative (TBDDI) with IDRI

**TB Drug** Accelerator A groundbreaking collaborative between drug makers and research institutions seeks to leverage collective abilities to speed up the discovery of essential new treatments for tuberculosis (TB)

**Innovative Medicines Initiative (IMI)** is a gathering of stakeholders, led by the pharmaceutical industry. New Drugs for Bad Bugs (ND4BB) is one of several projects
**Others**

**TriSano** is an open-source, citizen-focused surveillance and outbreak management system for infectious disease, environmental hazards, and bioterrorism attacks.

**Spatiotemporal Epidemiological Modeler (STEM)** is an open-source tool that has the capabilities to forecast and analyze the possible spread of infectious disease, such as bird flu, dengue fever, the H5N1 virus, and others. It allows users to create spatial and temporal models of emerging infectious diseases.

**www.bcgatlas.org** This interactive website provides detailed information on current and past BCG policies and practices for over 180 countries.

**FRED** (Framework for Reconstructing Epidemic Dynamics): an open-source software system.

**MIDAS** (Models of Infectious Disease Agent Study)
Diagnostics

Tuberculosis Clinical Diagnostics Research Consortium (TB CDRC) at John Hopkins by (NIAID) of the NIH. The CDRC contributes to the science of diagnostics and will inform and advise scientists and manufacturers on further development and refinement of diagnostics that promise to accelerate and improve the accuracy of TB diagnosis and the rapid detection of drug resistance.

Genomic Data Sharing from NIH The goal of the project is to identify genotypic markers (i.e., genetic mutations) for resistance to the panoply of anti-tuberculosis drugs to assist future rapid diagnostic development, global TB surveillance, and potentially the development of new TB treatments.

Tuberculosis Drug Resistance Mutation Database The Brigham and Women's Hospital funded by BMGF
From insilico studies to laboratory work to medicines for the patients