SBV IMPROVER: The Species Translation Challenge

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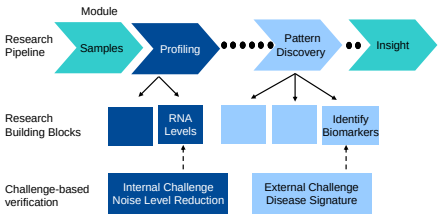
sbv IMPROVER at a Glance

sbv IMPROVER stands for systems biology verification, Industrial Methodology for Process Verification in Research. This approach aims to provide a measure of quality control of industrial research and development by verifying the soundness of the methods used. sbv IMPROVER is a collaborative effort involving scientists from IBM Research and Philip Morris International. For more information see Nature Biotechnology, 2011 Sep 8;29(9):811-5.

It is different from other approaches such as DREAM as it focuses on the verification of processes in an industrial context, and not on basic questions in science. sbv IMPROVER could allow an organization to benchmark its methods and verify that these are state-of-the-art performance for their industrial processes.

Today, the scope of sbv IMPROVER is the verification of methods and concepts in systems biology research. However, this could be extended as the sbv IMPROVER vision could be applied to verify research processes in industries such as pharmaceuticals, biotechnology, nutrition and environmental safety, to name but a few.

A complex research program is typically built upon research projects (consisting of "building blocks") that synergistically support each other towards a final goal.
A building block is a standalone research process of a complex workflow. It has a defined input that results in a defined output.



Wisdom of Crowds Applied to Solve Challenges

A challenge is a scientific problem presented to the community. Some of its basic elements are:

- The need for a "Gold Standard" or a solution to the challenge. Each prediction is compared to the Gold Standard
- Guidelines about the metrics to be used to evaluate predictions are given prior to the receipt of the predictions

Crowd sourcing is characterized by:

- Contribution by many participants
- Participants produce independent methods and submit different solutions which tackle different aspects of a complex problem
- The combination of solutions often outperforms the best performing submissions
- This phenomenon is often referred to as the **"Wisdom of Crowds"**

The approach has the following **advantages**:

- It nucleates a community around a given scientific problem
- Allows for easy comparison of performance of different methods on the same data set
- Establishes the state-of-the-art technology in a field, and identifies complementary methods to solve a problem

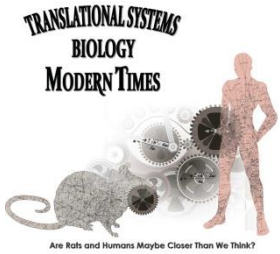
The Species Translation Challenge

GOAL

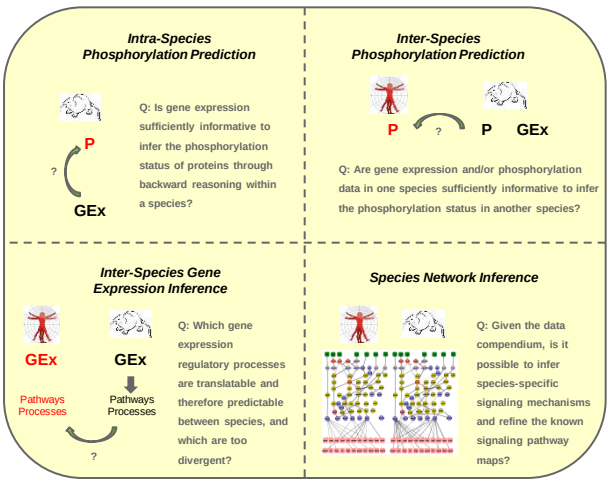
Rodent studies have proved indispensable as models of human diseases and have undoubtedly helped to unravel molecular mechanisms. Yet few studies have addressed whether or not biological events observed in mice or rats are "translatable" to humans. Providing some answers to this fundamental question will be invaluable to the community as rodent models continue to be a central tool in biomedical research.

The Species Translation Challenge will pose central questions to:

- Understand the DEGREE OF SIMILARITY in biological processes across species
- PREDICT biological functions across species
- Establish computational methods that are most robust for inferring gene, phosphorylation and pathway response from one species to another



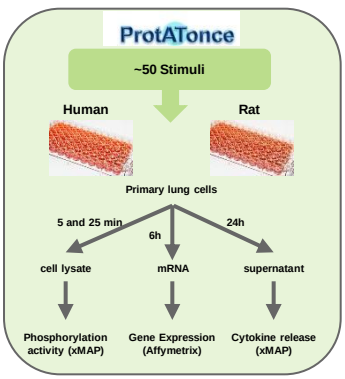
SUB-CHALLENGES



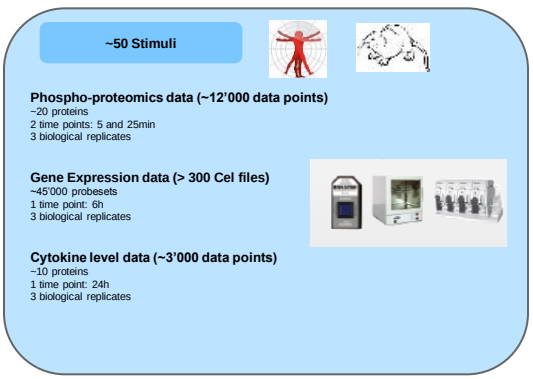
How to Participate?

- This Species Translation Challenge will be launched in Q2 2013
- Full details will be provided on www.sbvimprover.com
- You can participate as part of a team or as an individual
- You must register on the website

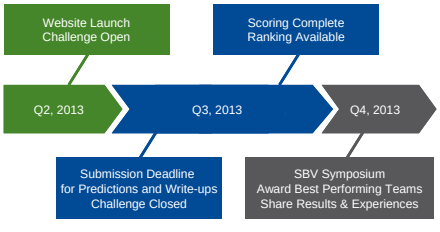
EXPERIMENT



DATA COMPENDIUM



Provisional Challenge Timeline



29th-31st of October 2013 in Europe

Why you should be Part of sbv IMPROVER?

- Research grant funding for the best performing teams
- Receive independent assessment of your methods
- Gain access to high quality data
- Enhance your visibility and gain recognition
- The results of each challenge and the identity of the best performing teams will be published in a peer-reviewed scientific journal
- At the end of each challenge, a symposium will be held to announce the best performing teams and to provide a forum for discussion of the challenges and related topics
- The best performing team will be invited to present their approach at the symposium
- We plan to publish all symposia proceedings in peer-reviewed scientific journals

Further Information

For further information, please visit: **www.sbvimprover.com**

sbv IMPROVER
SYSTEMS BIOLOGY VERIFICATION

The sbv IMPROVER project, the website, and the Symposium are part of a collaborative project designed to enable scientists to learn about and contribute to the development of a new crowd sourcing method for verification of scientific data and results. The project team includes scientists from Philip Morris International's Research and Development department and IBM's Thomas J. Watson Research Center. The project is funded by PMI.