Biosciences and open access

Hans Söderlund
VTT Technical Research Centre of Finland

Wikipedia definition of open access

- **Open access** (OA) means immediate, free and unrestricted online access to digital scholarly material primarily peer-reviewed research articles in scholarly journals. OA was made possible by the advent of the Internet.

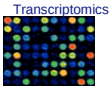
Data not published nor utilised is a lost investment in knowledge

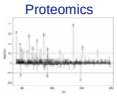
However,

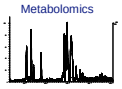
The key issue is full access to complete datasets, not only to articles and presentations

A living organism is interacting with its environment, organs with the organism, cells with each other
The environment affects the gene expression which controls the proteome which directs the metabolism which controls the organism and its gene expression

Many research projects generate systems biology data only to use a tiny fraction of it.
Exploring "unused" data creates new knowledge

Transcriptomics 

Proteomics 

Metabolomics 

Patenting or publishing?

- Patenting and publishing are not mutually exclusive
- The patent system is created to open inventions for improvement
- However, there are differences
  - A patent is directed towards a concept and the inventor(s) are the ones who got the idea
  - A paper is supposed to prove a statement and the authors are those who generate the proof

Why patenting?

- Science generates new knowledge
- When applicable the results have a value beyond culture
- Applied research is an investment in knowledge
- If all inventions are free, there is no incitament for investment
- A patent does not give the right to use an invention, it allows the owner to prevent others from using it
- In an open market patents should be sold and bought, in balance for the actors

Why trade secrets?

- If an invention cannot be protected or a patent cannot be controlled
- The information is lost for others, no additative value

Biotechnology – from promises to applications 1

Medical biotech: Said by some to be a dead end alley but

- No new drugs are developed without it
- Several top selling drugs are proteins
- Personalized medicine made possible
- However, severe errors in estimating time frames

Plant biotech: Claimed by some to be a disaster but

- Not a single adverse effect reported
- Significant improvement of quality, environment and biodiversity
- Improved yields have become necessary when biomass enters the energy sector.
- Climate change requires novel pest defence

Biotechnology – from promises to applications 2

Food biotech: Horrifying? but

- It is everywhere through enzyme processes
- Improved quality and nutritional value through plant biotech, eventually also farm animal breeding biotech
- Is the time ripe also for GMO microbiology processes?

Environmental biotech: The accepted technology

- A working concept by reducing environmentally harmful wastes
- Biorefineries a must – first pilots in action (Ethanol, lactic acid etc.)

➢ Research must continue

- ➢Knowledge shared
- ➢IP protected

The problem

- The patent system was created for machines, not for biotech
- The biotech patent djungel is in some cases unpenetrable
- When so, the system suffocates itself and open trade becomes too complex and inefficient.
- A trend towards trade secrets from patenting will harm open access to knowledge and hence retard development