Bioinformatics and the Pharmaceutical industry

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Bioinformatics and drug discovery

- Drug discovery is the step-by-step process by which new candidate drugs are discovered.

- In the highly competitive pharmaceutical industry, the first company patent a new chemical entity for a specific treatment takes all the spoils.

- That is why pharmaceutical companies invest heavily in all those approaches that show potential to accelerate any phase of the drug development process and bioinformatics is one of them.
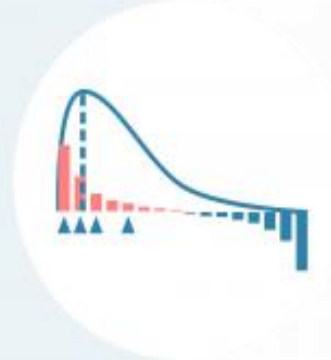
Drug target identification

- Prediction and identification of biologically active candidates and mining and storage of related information is one of the major thrusts of the current bioinformatics approaches.
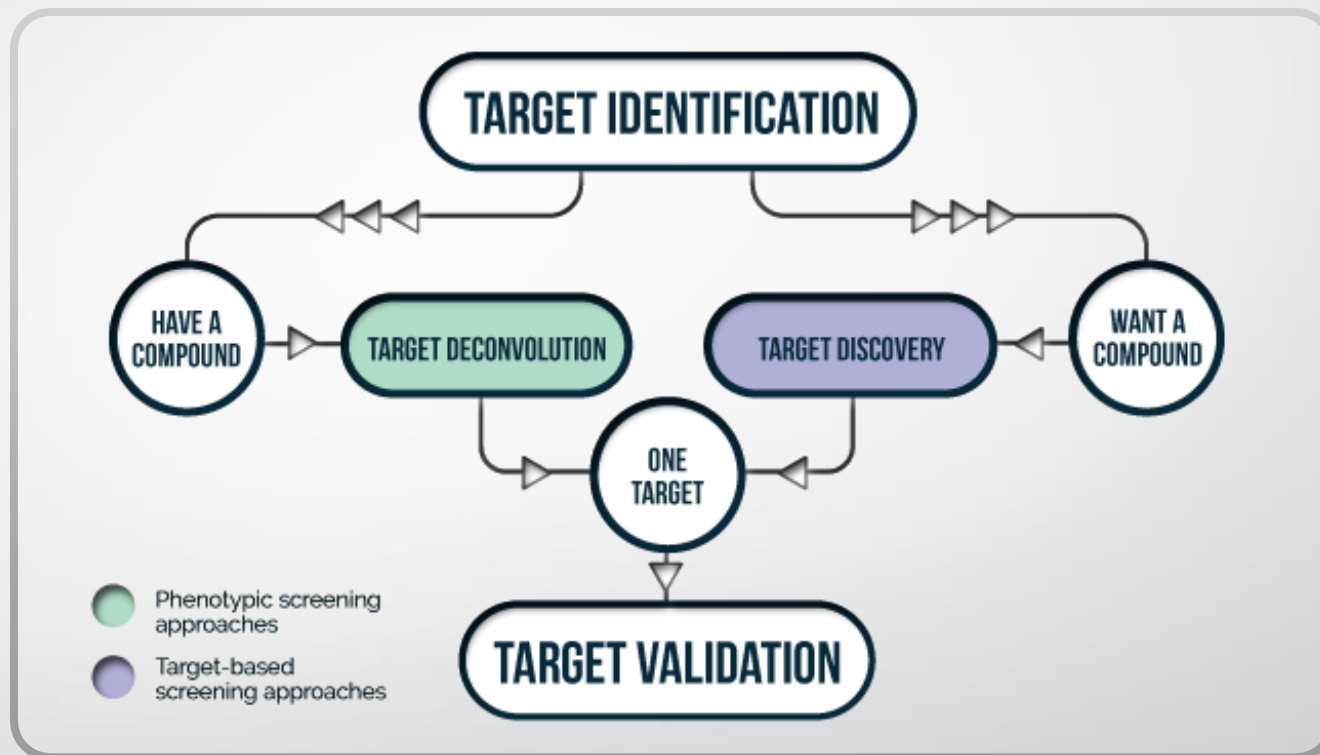
Drug target identification

- Drugs are usually only developed when the drug target for discovery is increasing exponentially.

- Mining and warehousing of the human genome sequence using bioinformatics has helped to define and classify the nucleotide compositions.
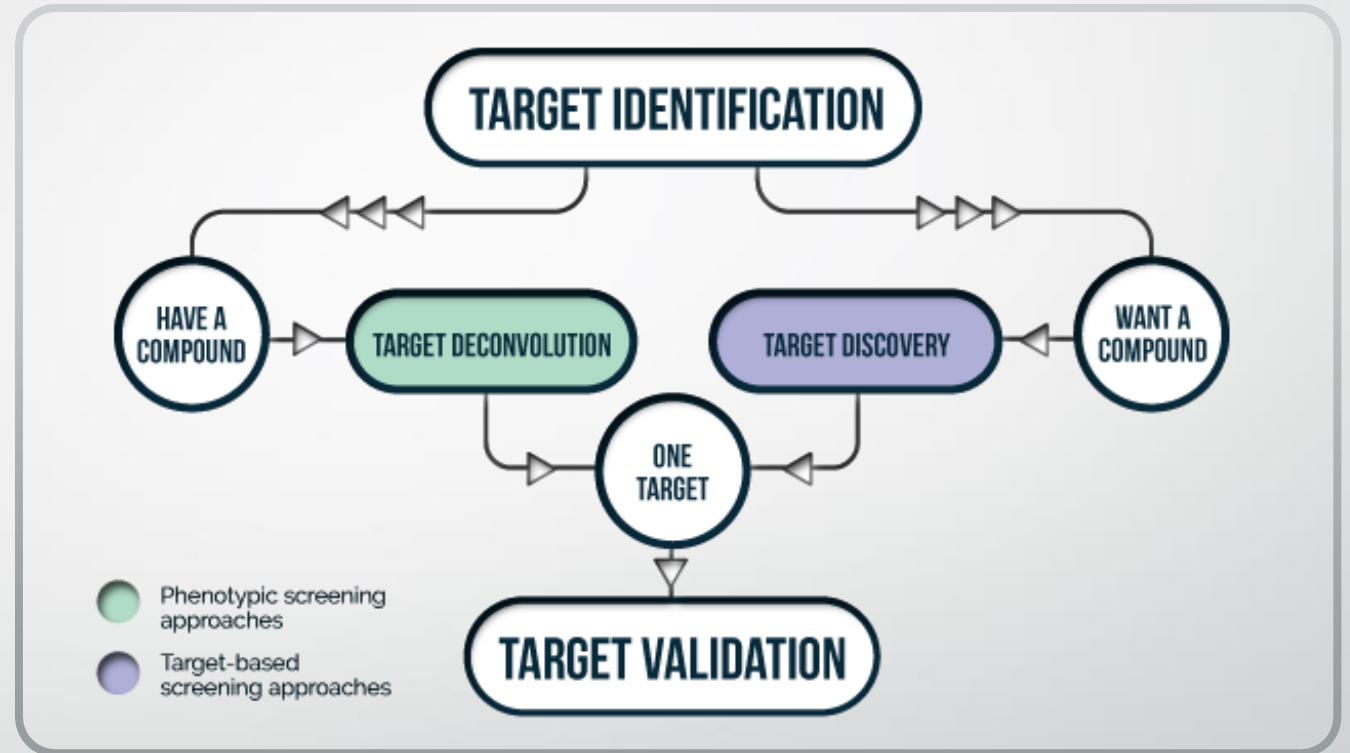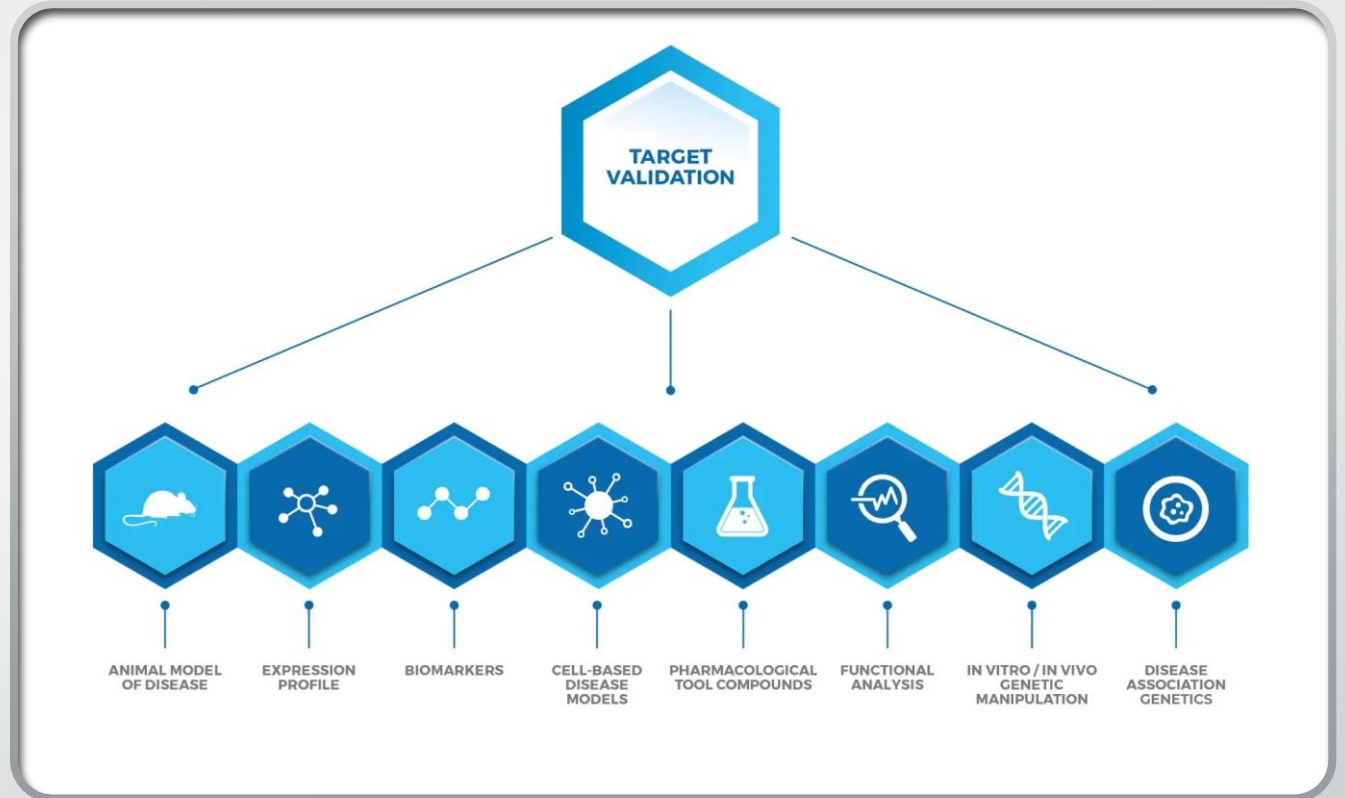
Drug target validation

- Bioinformatics provides strategies and algorithm to predict new drug targets and to store and manage available drug target information.
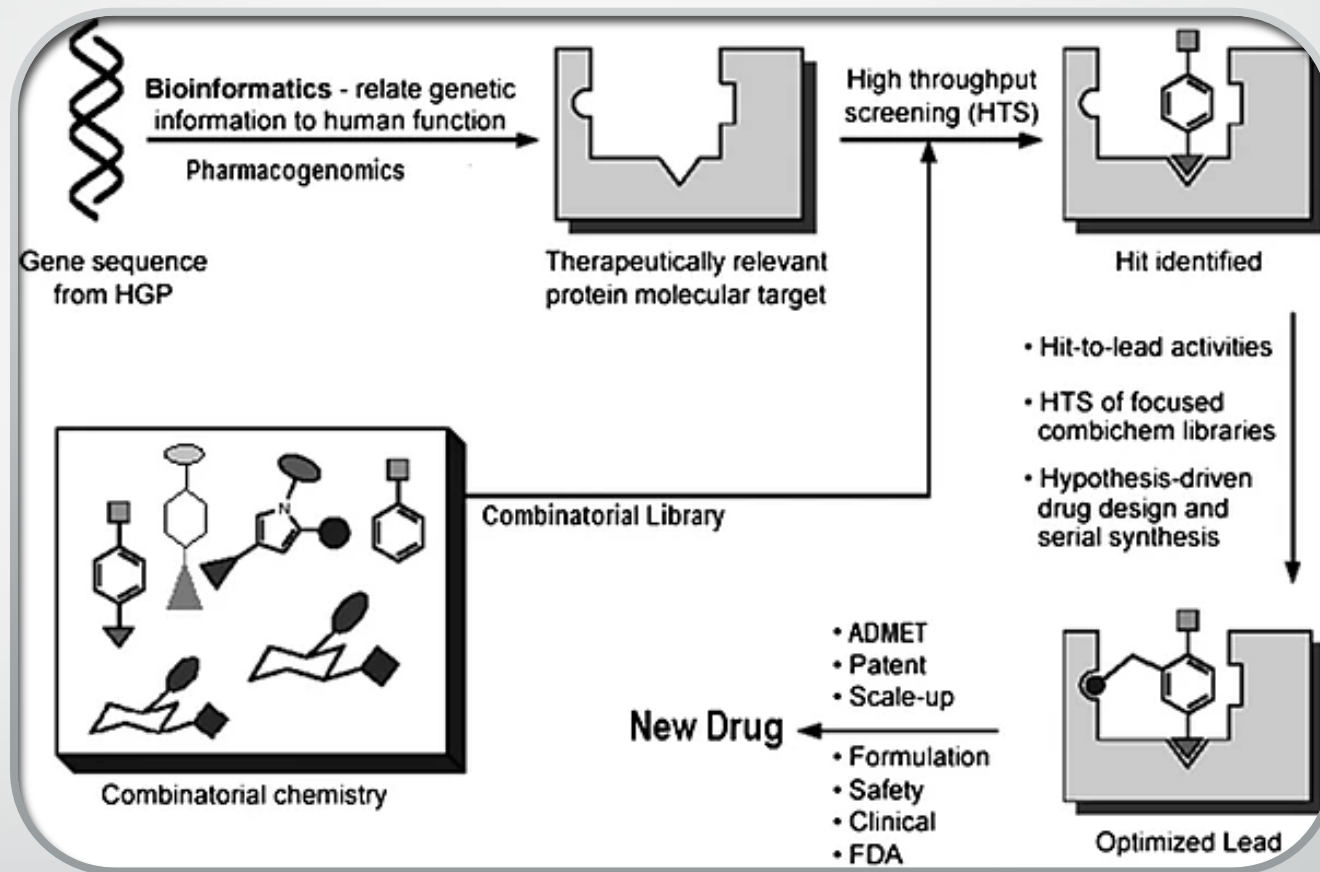
Drug target validation

- Target validation is an area where bioinformatics is playing a significant role.

- It helps to moderate the potential for failure in the clinical testing and approval phases.

Clinical stage

- Is divided into 3 phases of clinical trials/

- Phase 1 trials: assess what dose of the drug the human body can tolerate and may assess an element of drug effectiveness.

- Phase 2 trials: test the drug in the relevant patient population.

- Phase 3 trials: researchers compare the trial drug to current drugs already available to treat the same condition.

Drug repurposing

- Bioinformatics providers can also support the pharmaceutical industry when it comes to drug repurposing via:
- Signature generation of compound effects.
- In silico assessment of potential indications for repurposing using on- and off-target effects.
- Data landscaping and mining for markers in potential indications of interest.

Benefits of Bioinformatics to the pharmaceutical industry

- The analyses it provides are key information throughout the entire drug discovery and development process, from aiding the identification and validation of drug targets and leads through to helping assess the outcomes of phase 1,2 and 3 clinical trials.

- It also supports drug repurposing efforts.