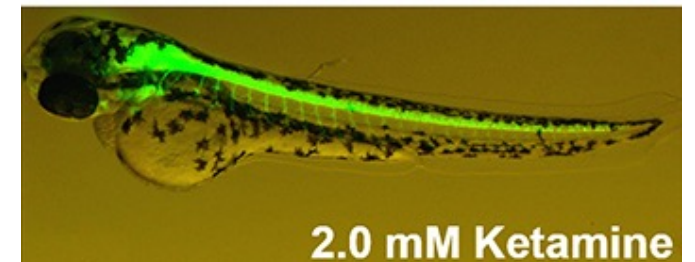
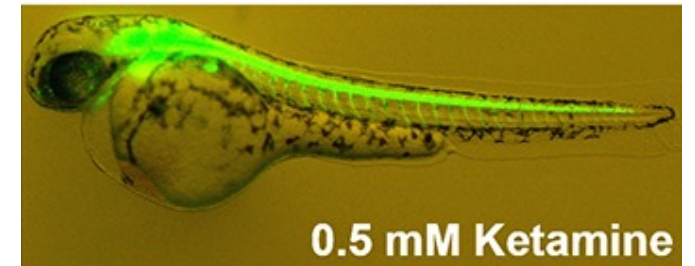
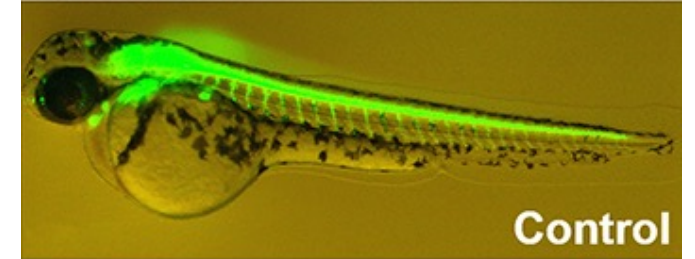
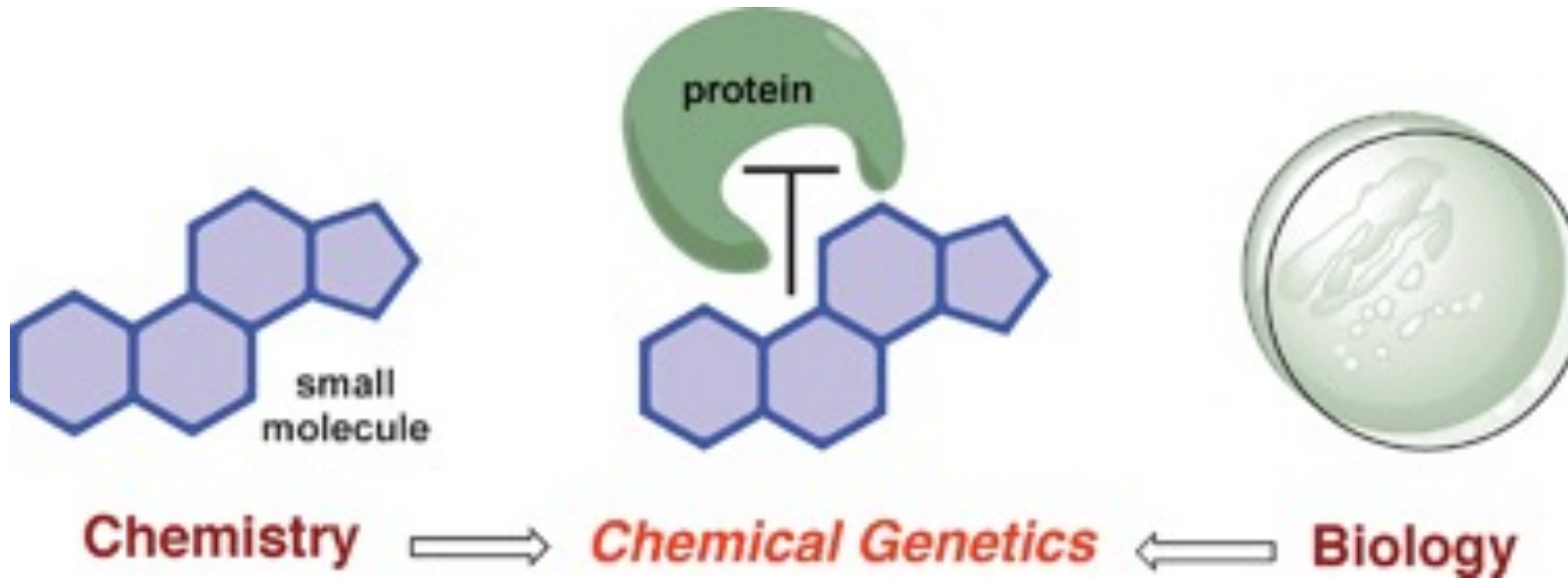




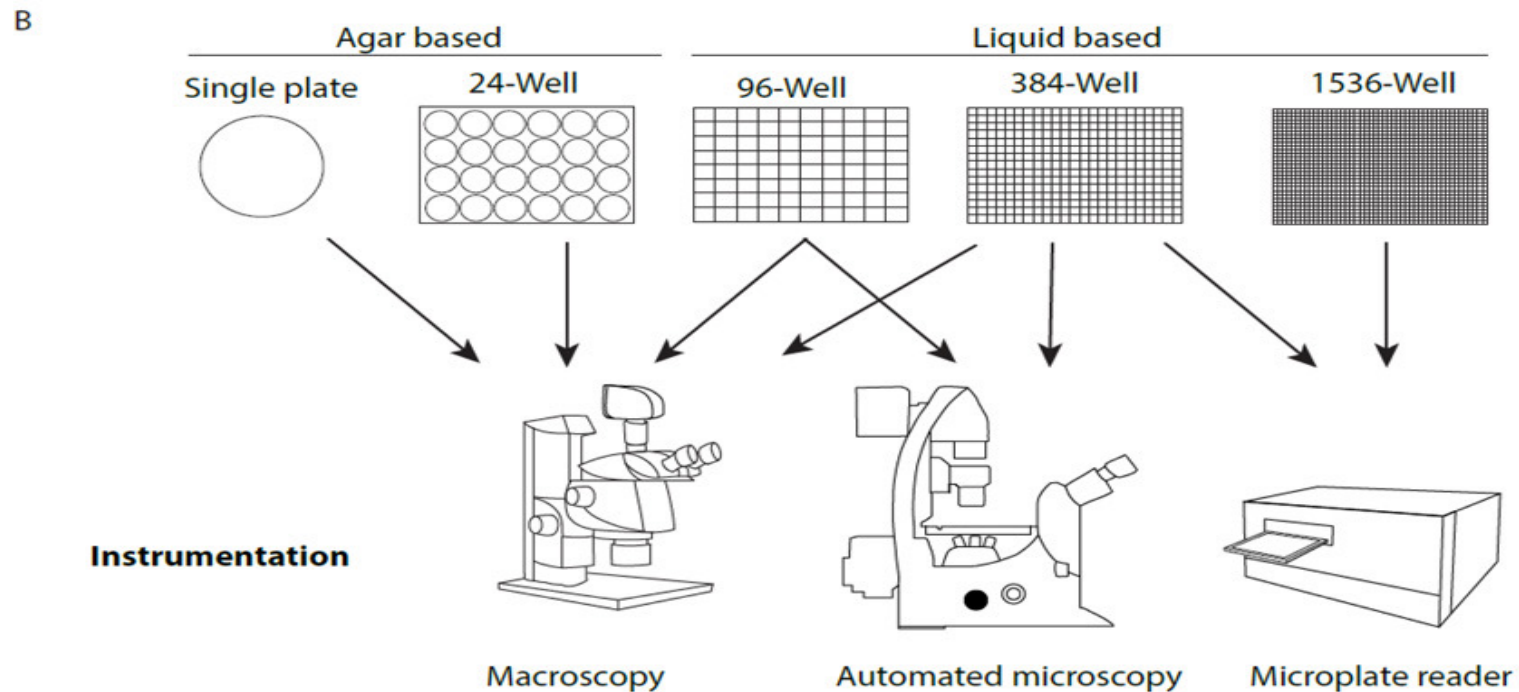
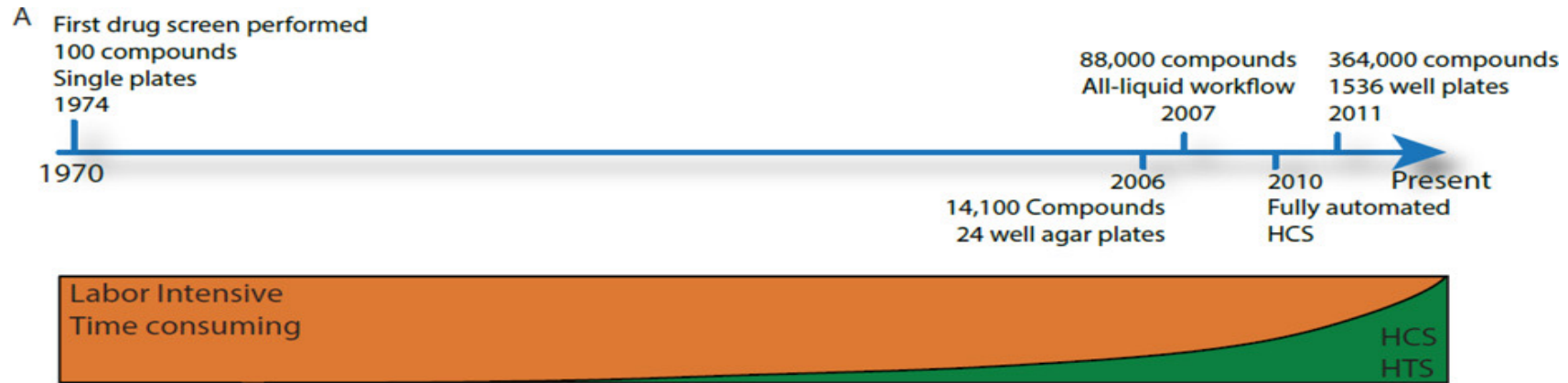
Chemical Genetics

Nick Puster

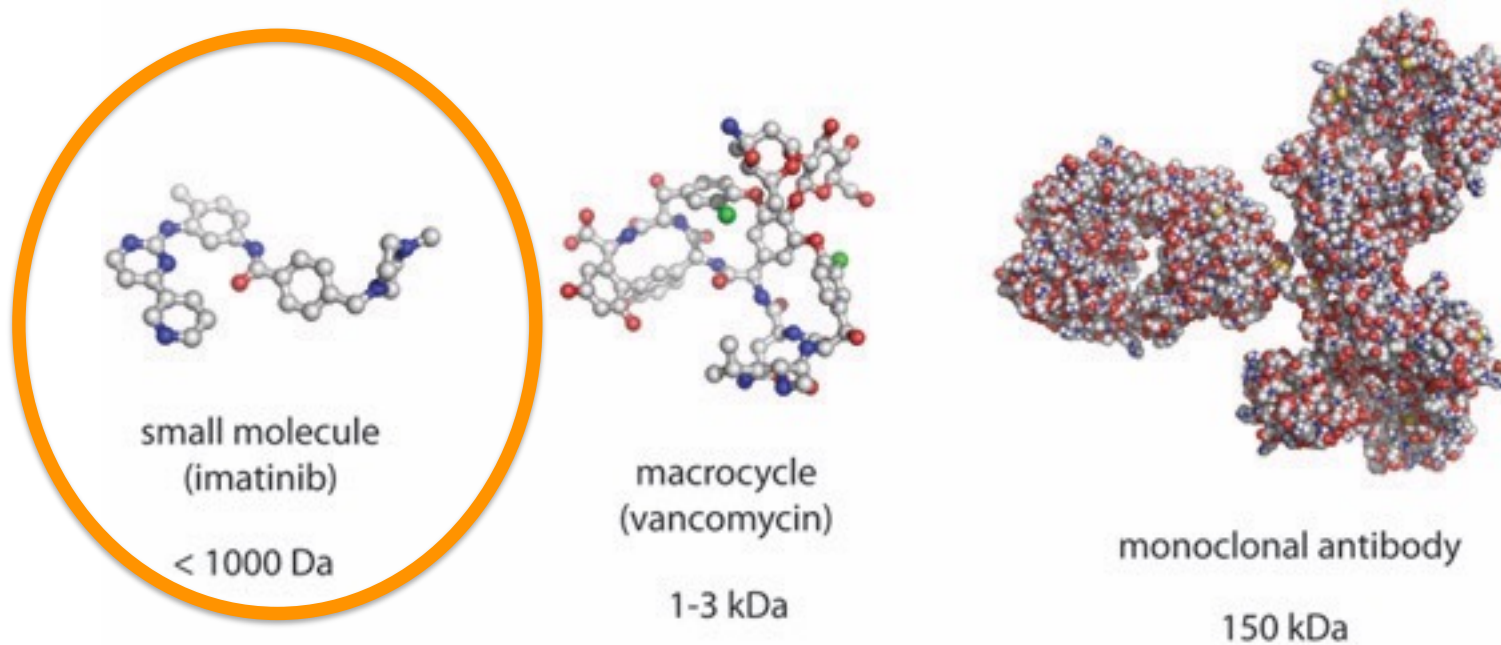
What is Chemical Genetics and why is it important?



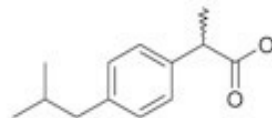
What is the history of Chemical Genetics?



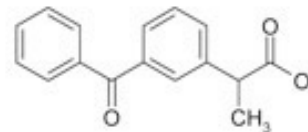
What are small molecules?



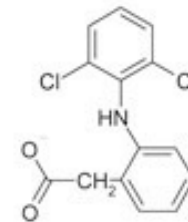
Examples



Ibuprofen



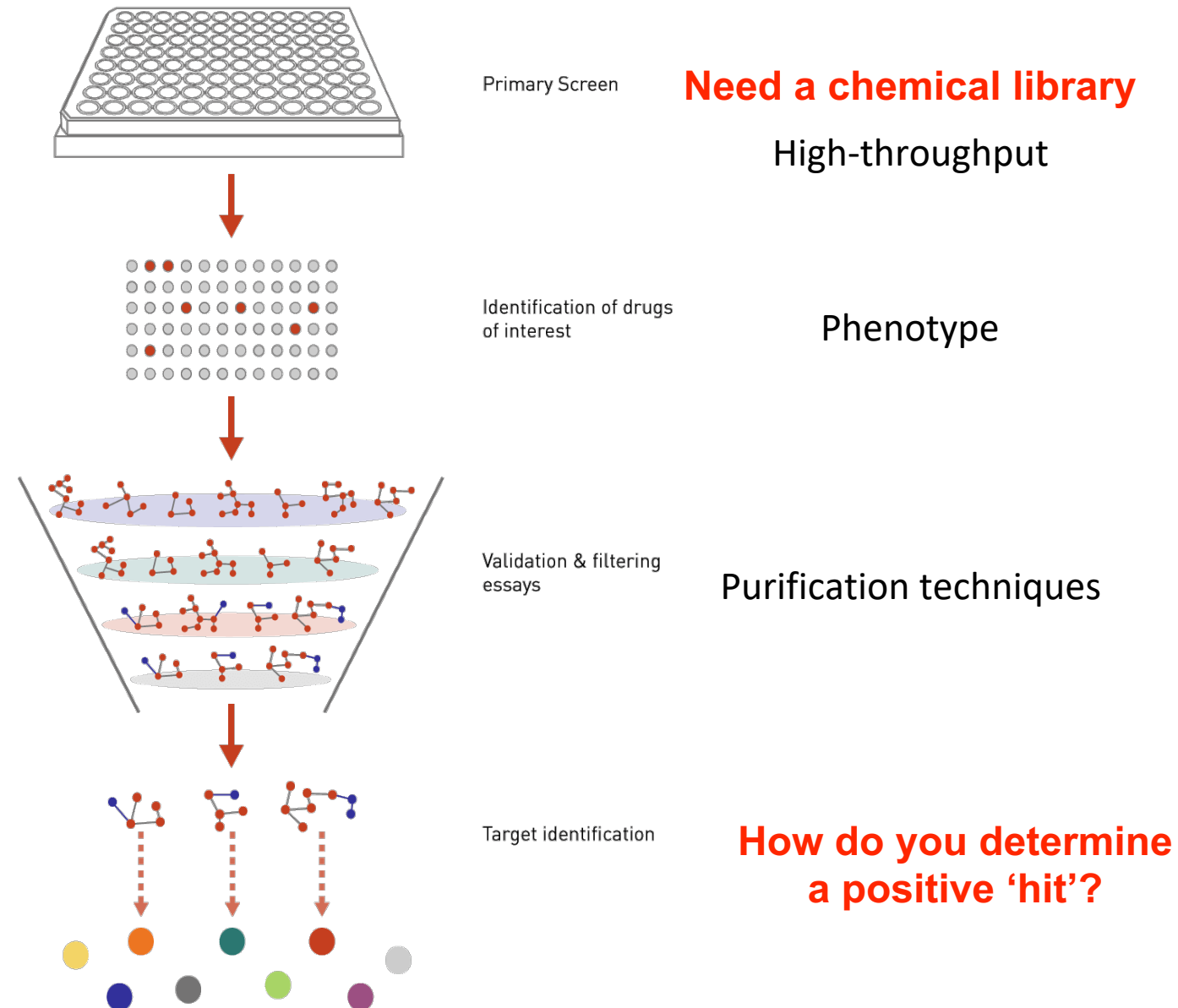
Ketoprofen



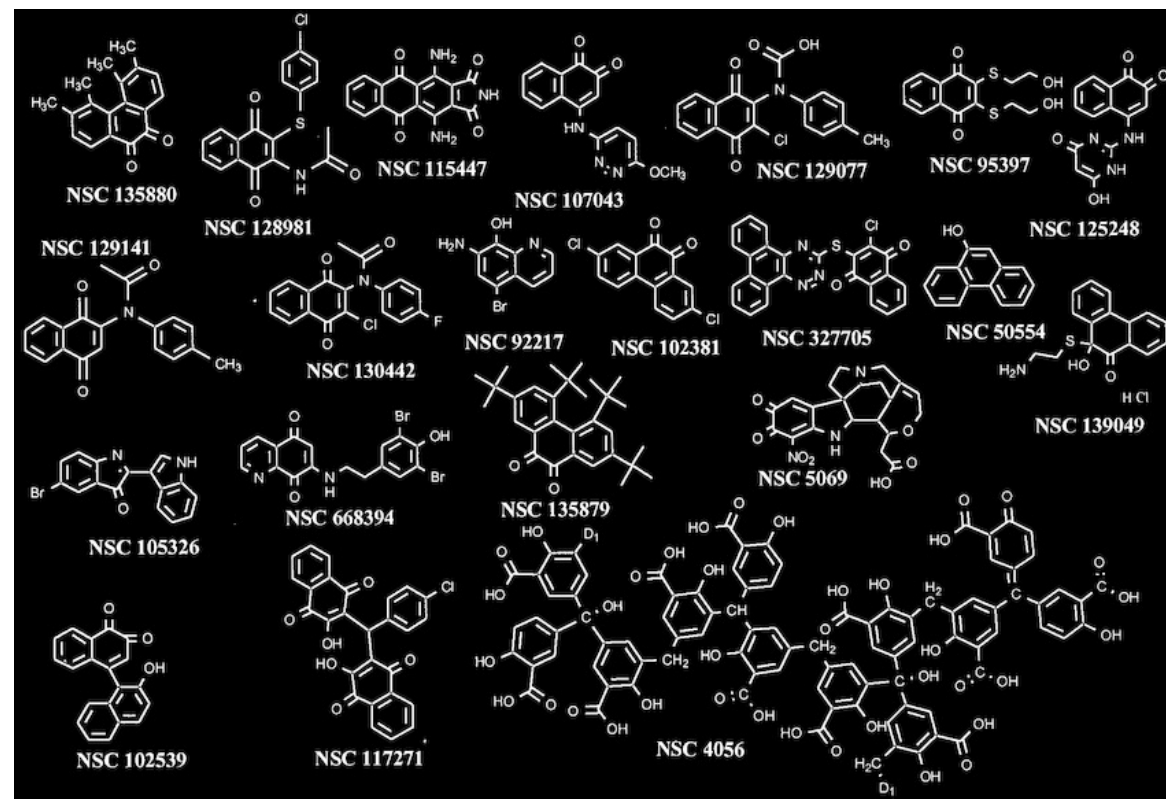
Diclofenac

Advantage: can inhibit one of several functions

How does a Chemical Genetics assay work?



What is a Chemical Library?



What types of chemical libraries are there?

**Diversity
Oriented**



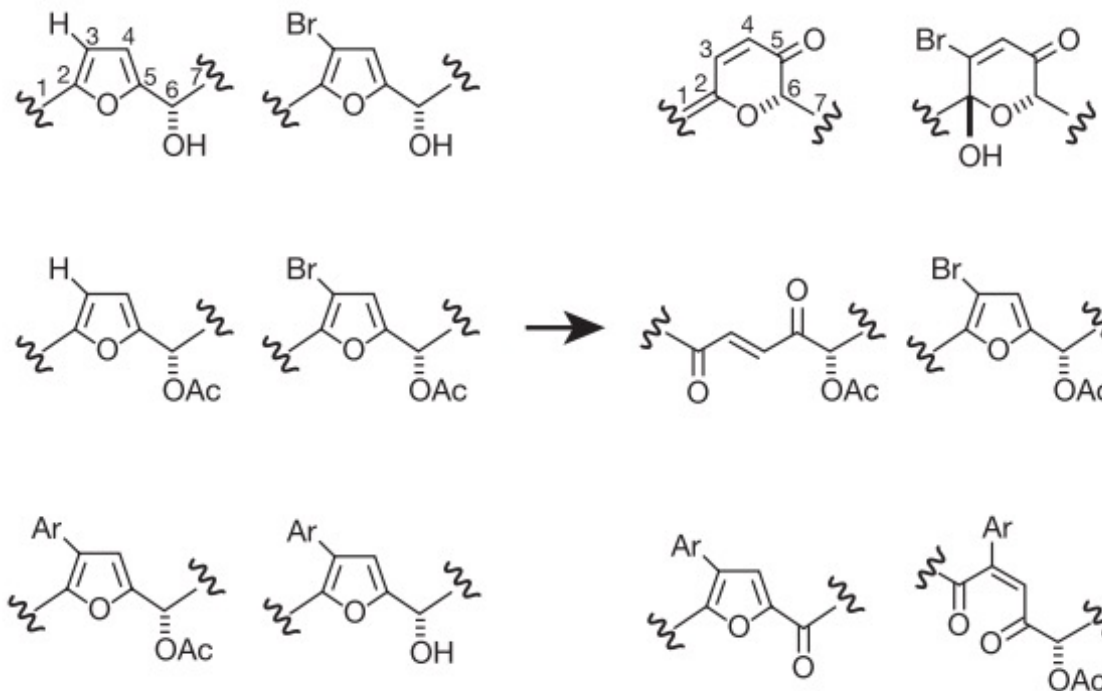
Focused



Small molecules may be known or synthesized

What do these chemical libraries look like?

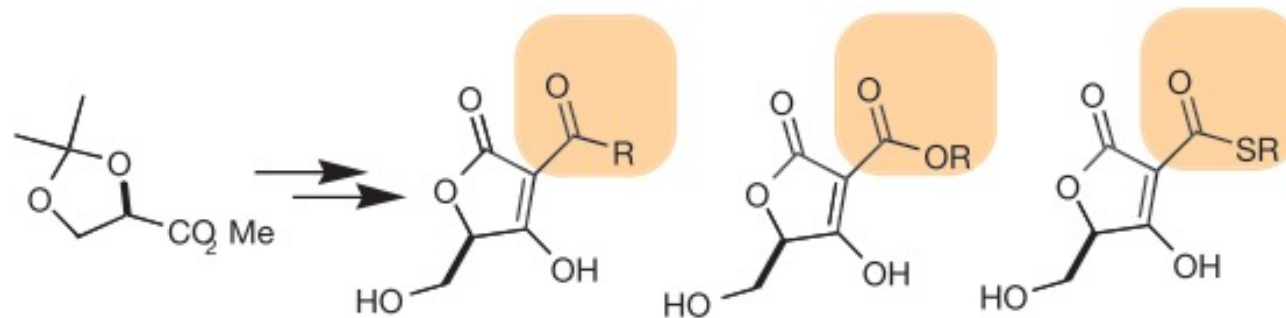
Diversity-oriented



Broad
Pre-compiled

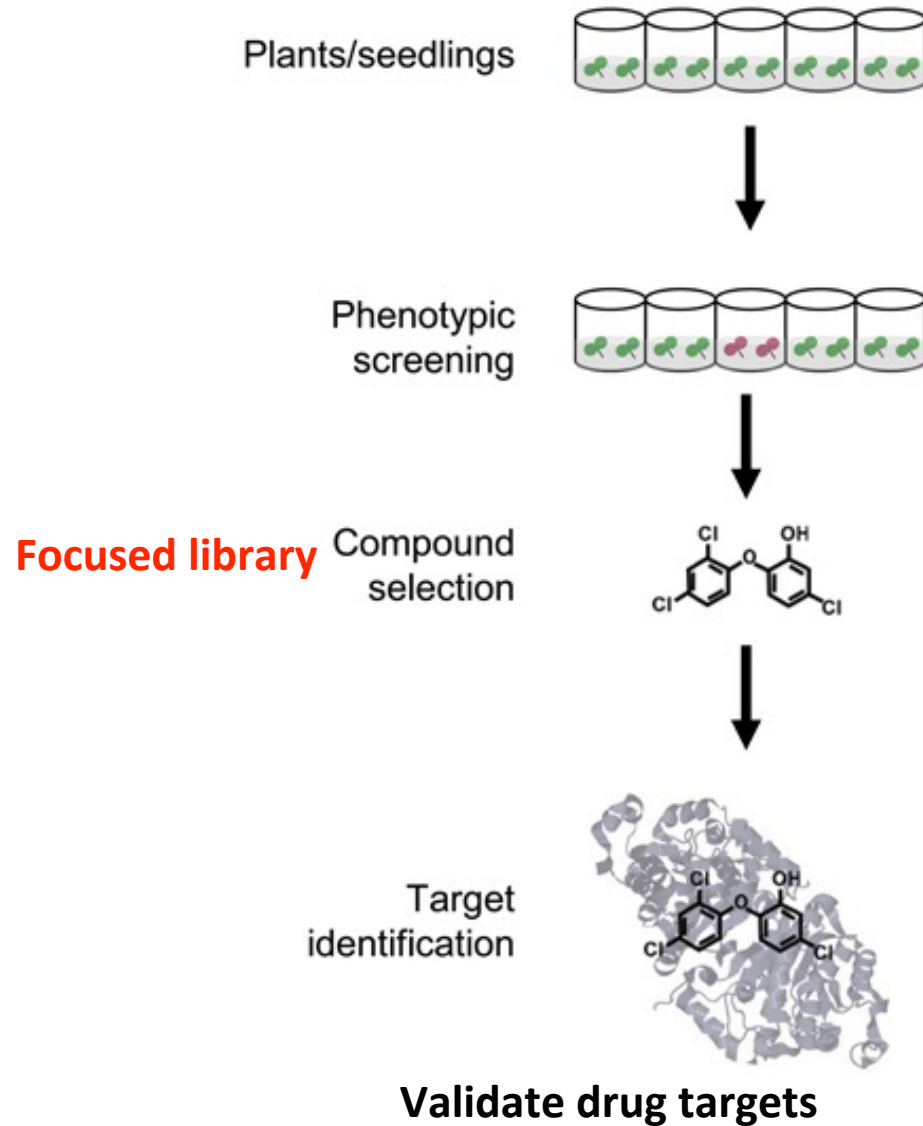
Focused

Target protein
classes
Higher rate of
hits

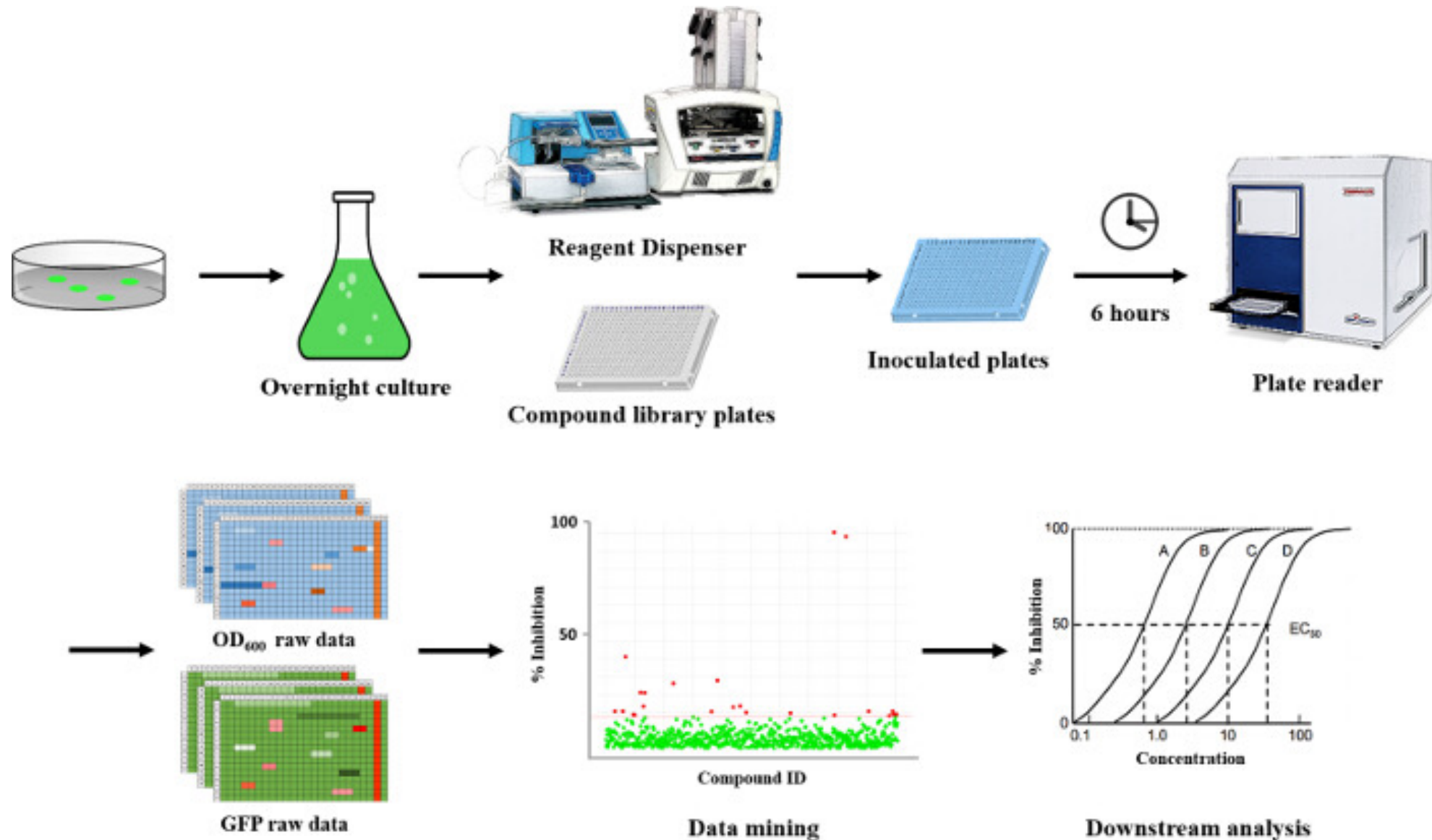


What ways can you do a chemical genetics screen?

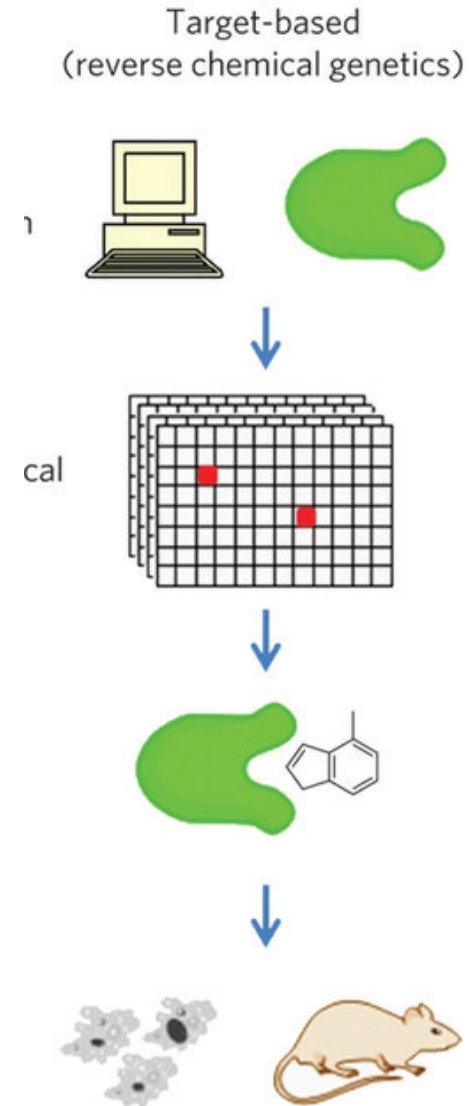
Phenotypic chemical screening



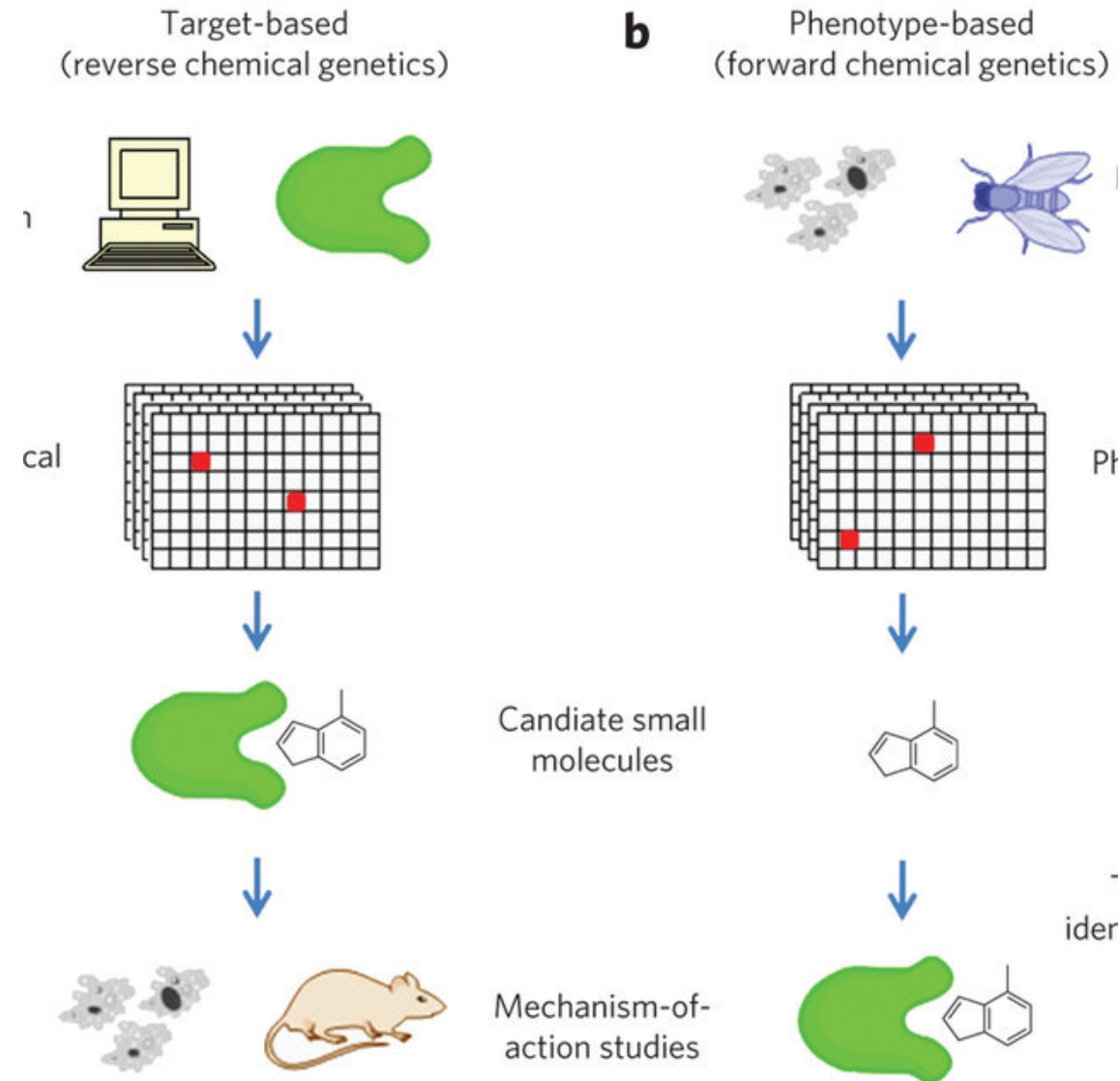
What is High Throughput Screening(HTS)?



What are the two ways you can perform chemical genomics screens?



What are the two ways you can perform chemical genomics screens?



How does a High Content Analysis screen work ?

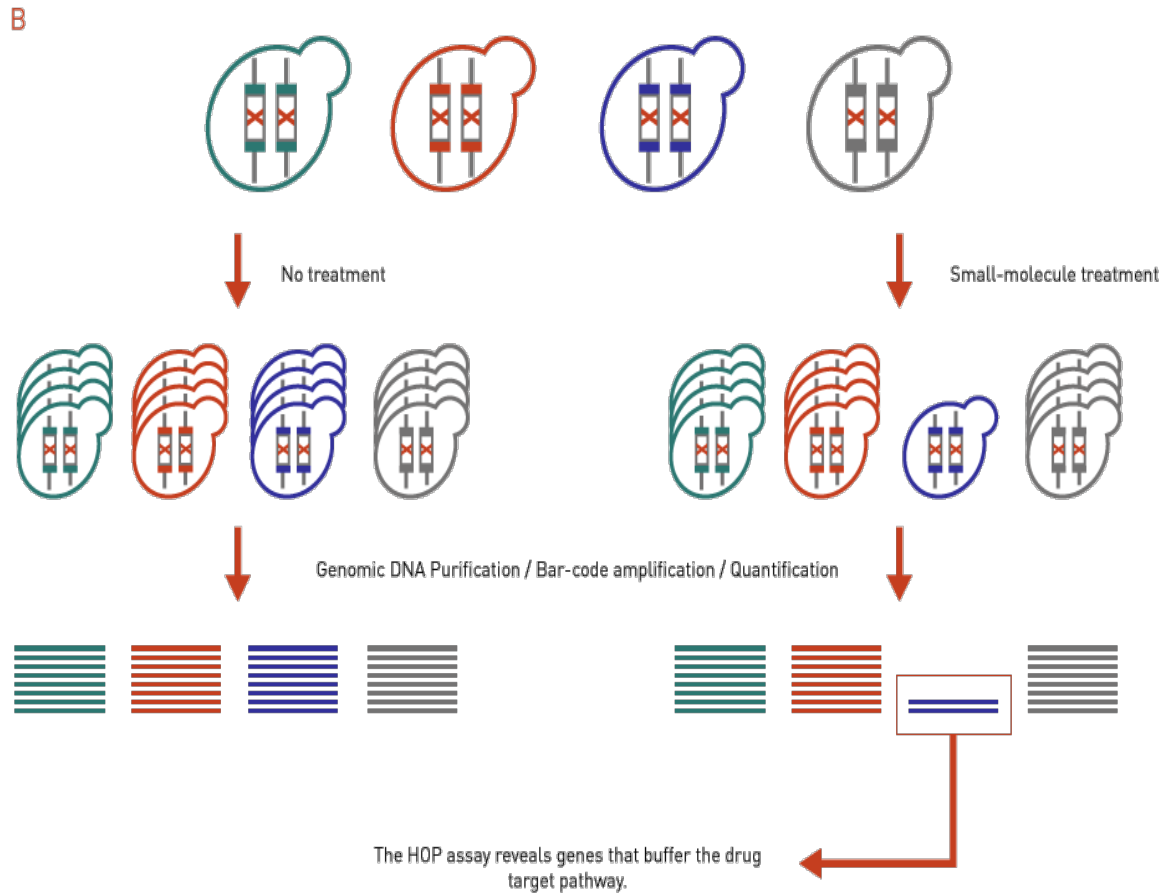
IHC and mounting of brain sections in multi-well plates



1

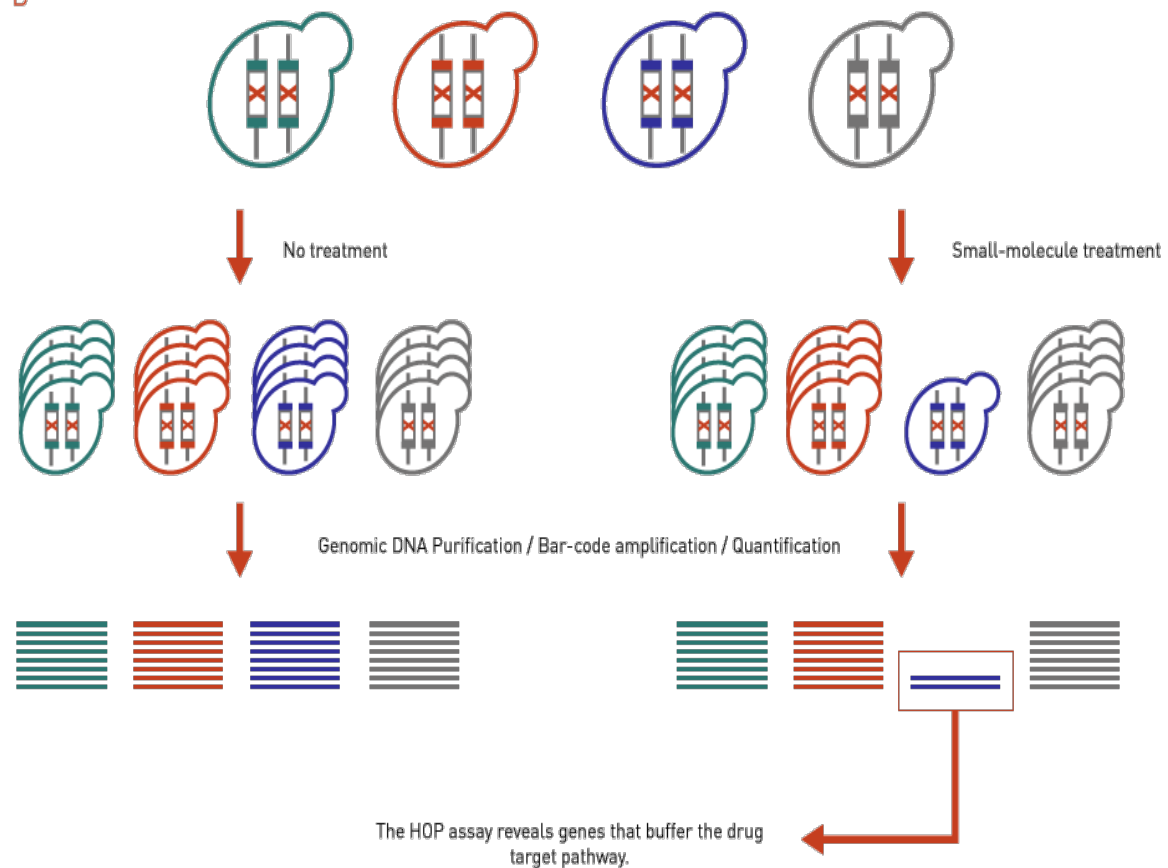


What are some ways to determine Hits?

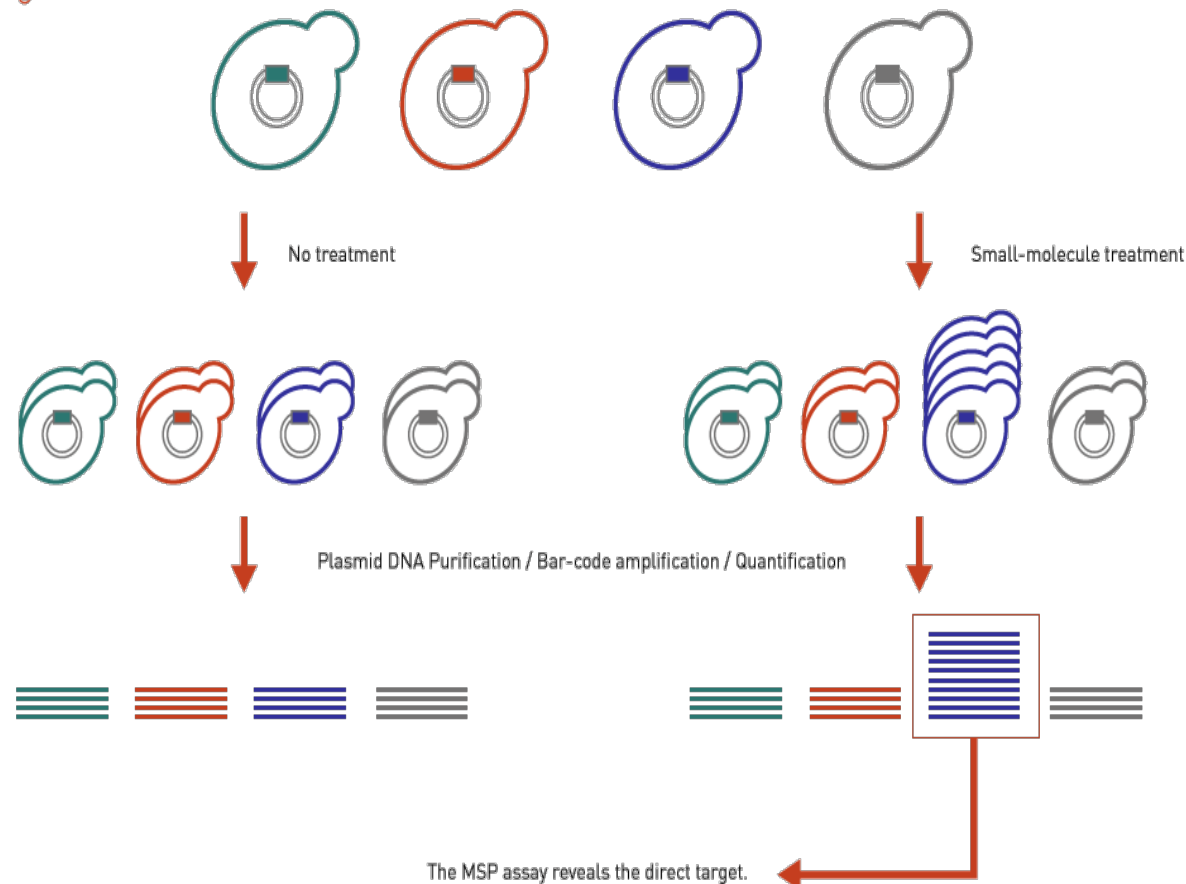


What are some ways to determine Hits?

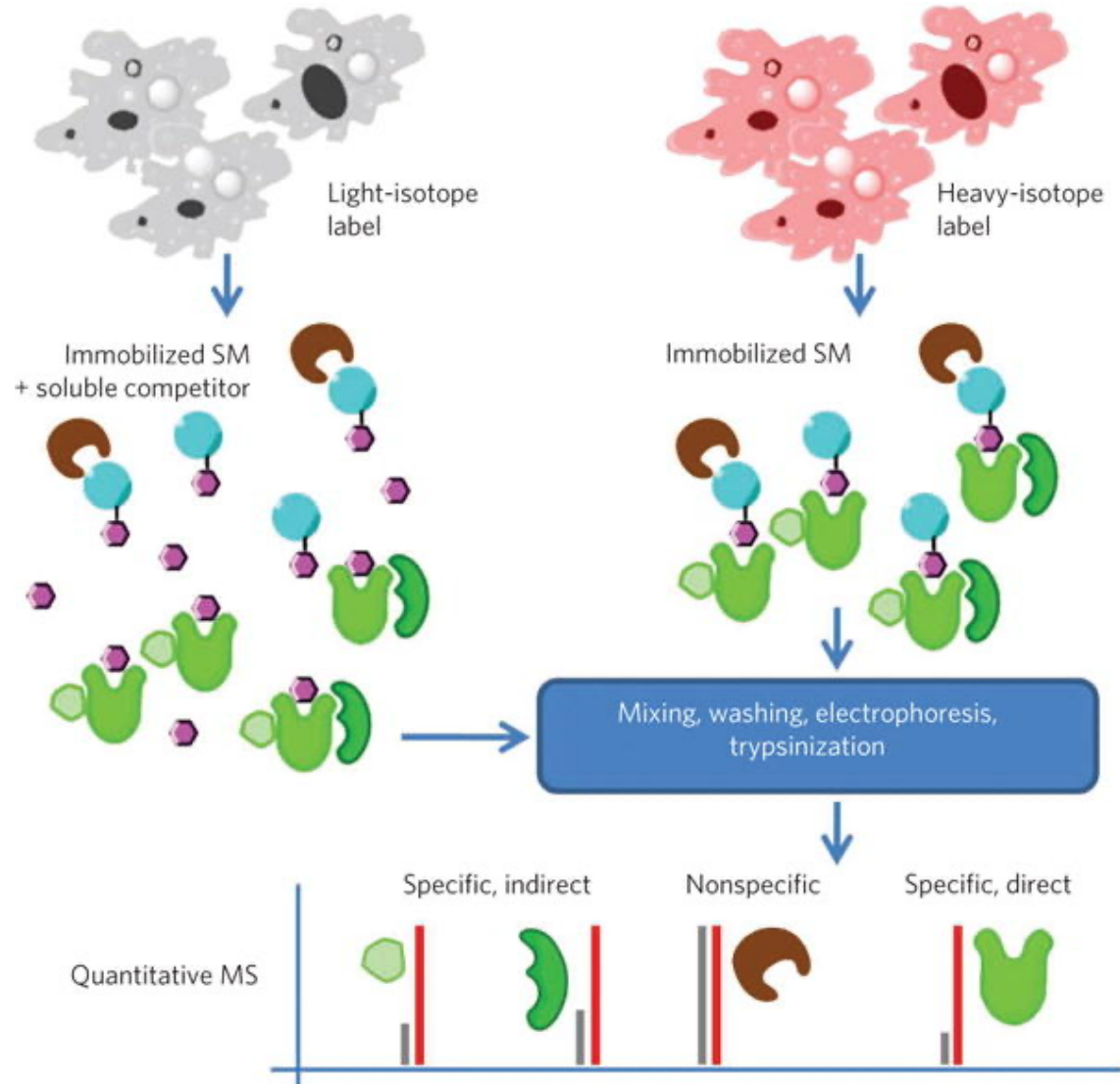
B



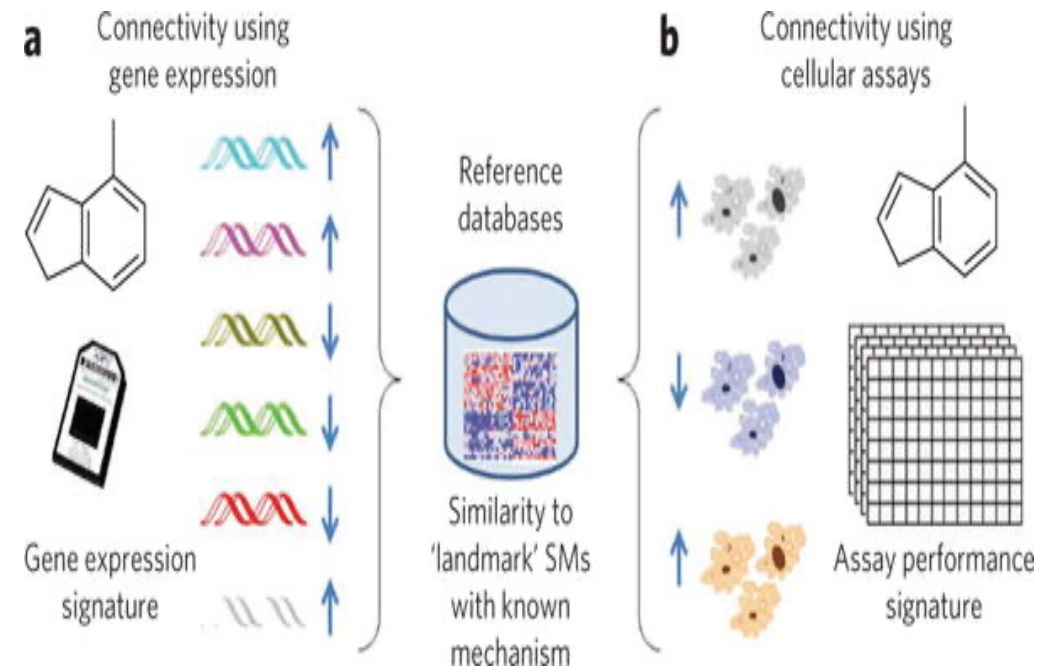
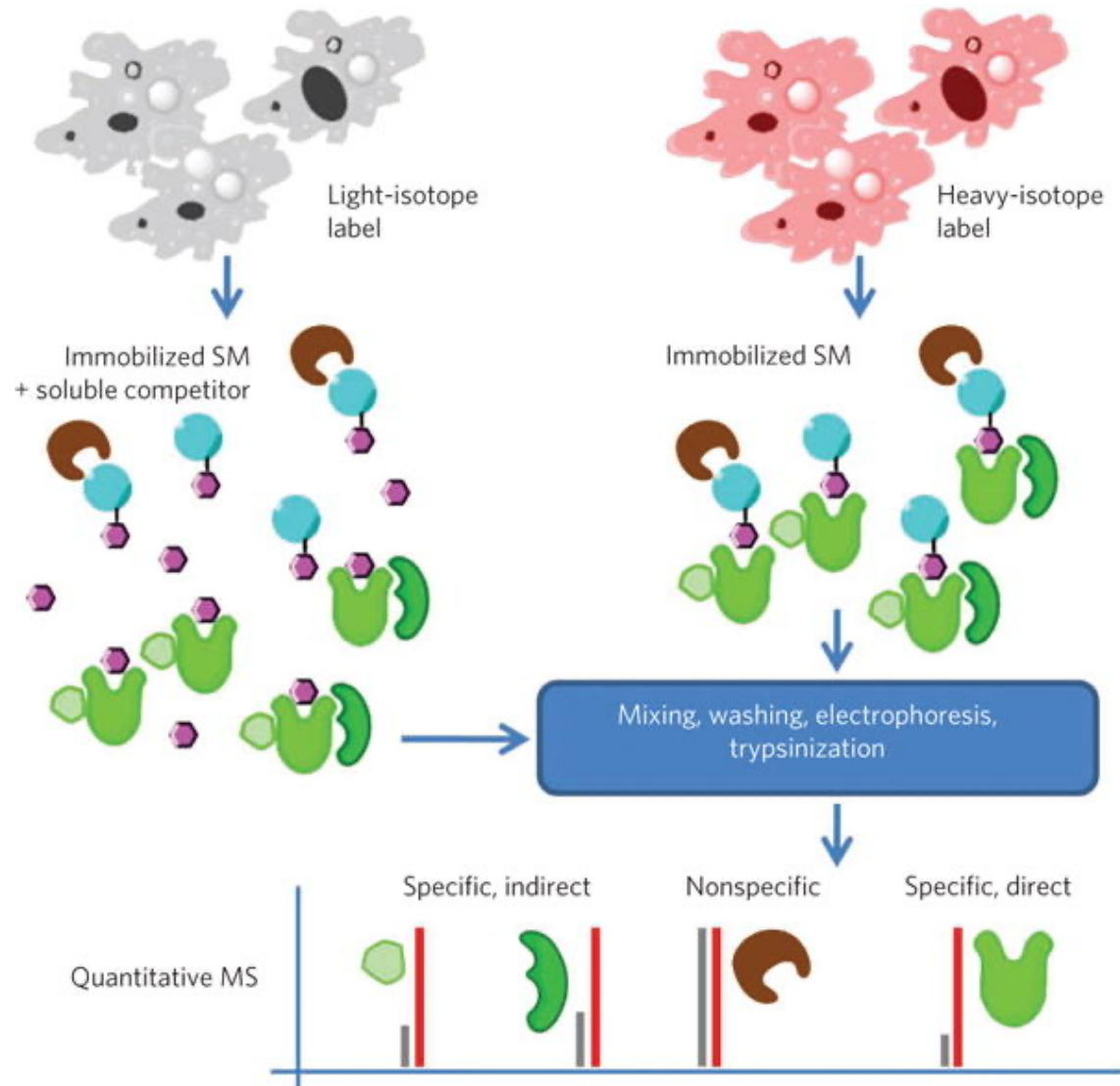
C



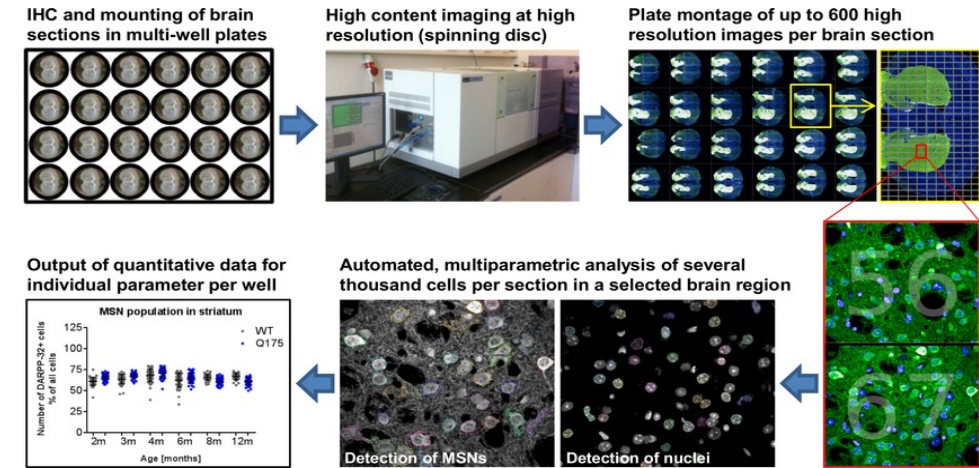
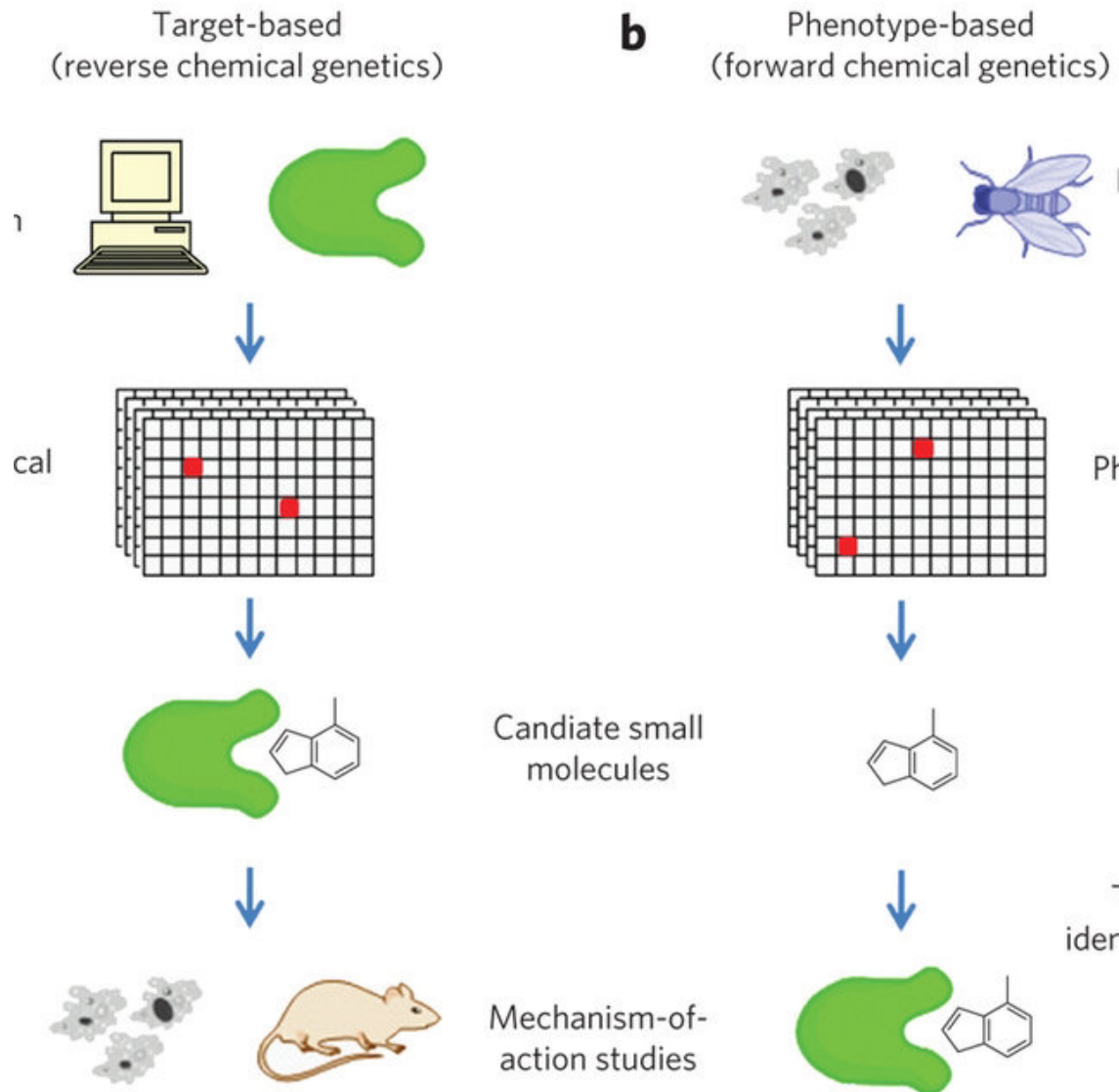
How do you determine new small molecule target?



How do you determine new small molecule target?

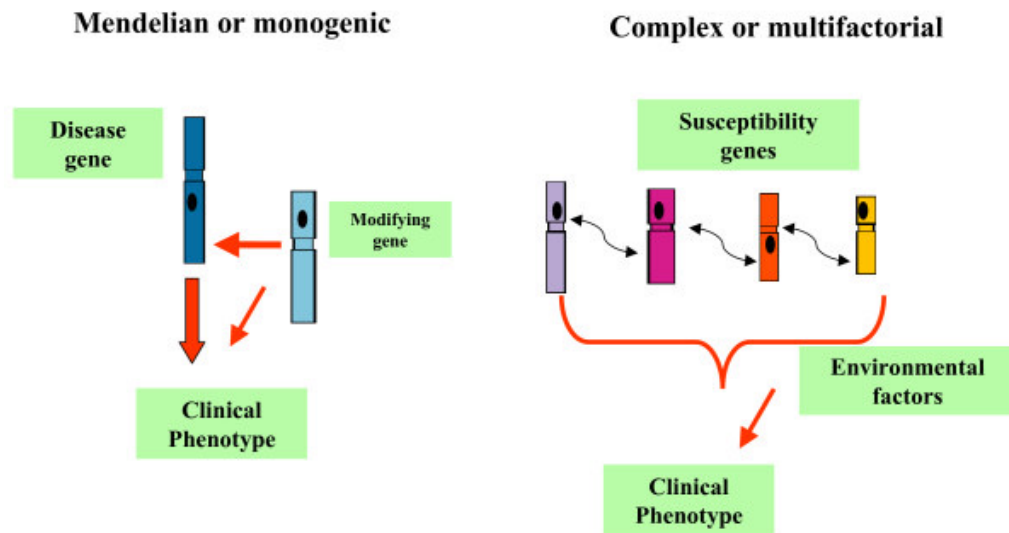


Summary of different kinds of Biochemical assays

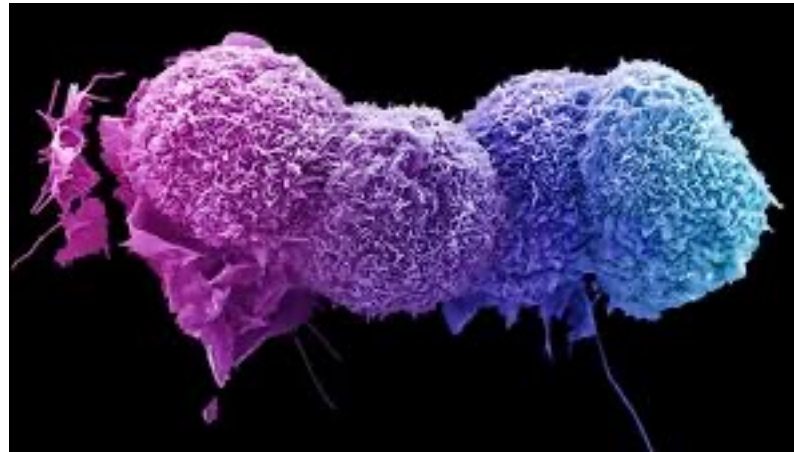


- Allow you to look at different processes
- Allow you to start from different places
- All follow initial step of chemical library creation

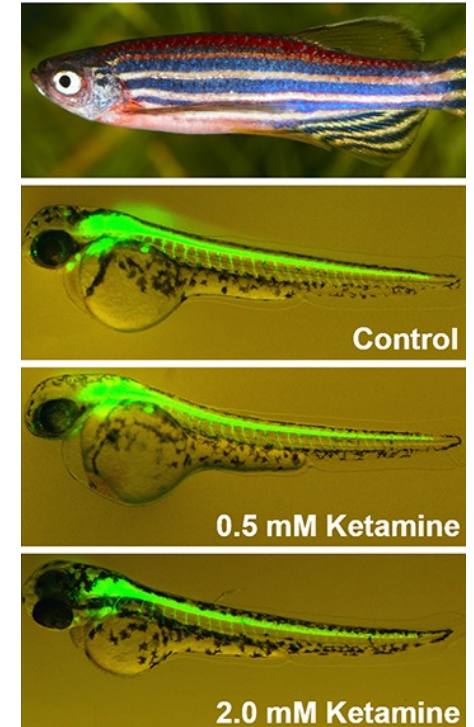
What are the three biggest areas of Chemical Genetics focus?



Monogenic Diseases

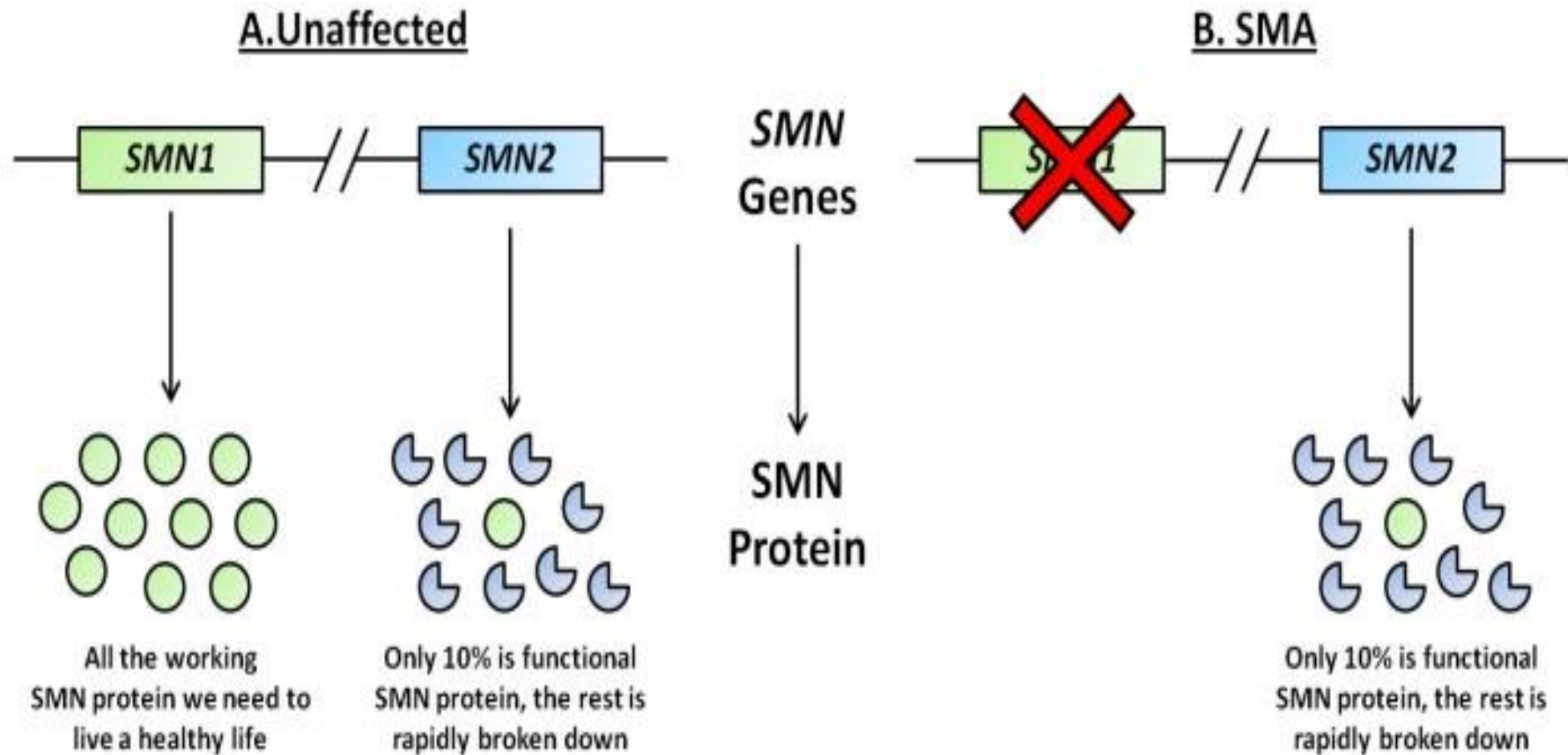


Cancer

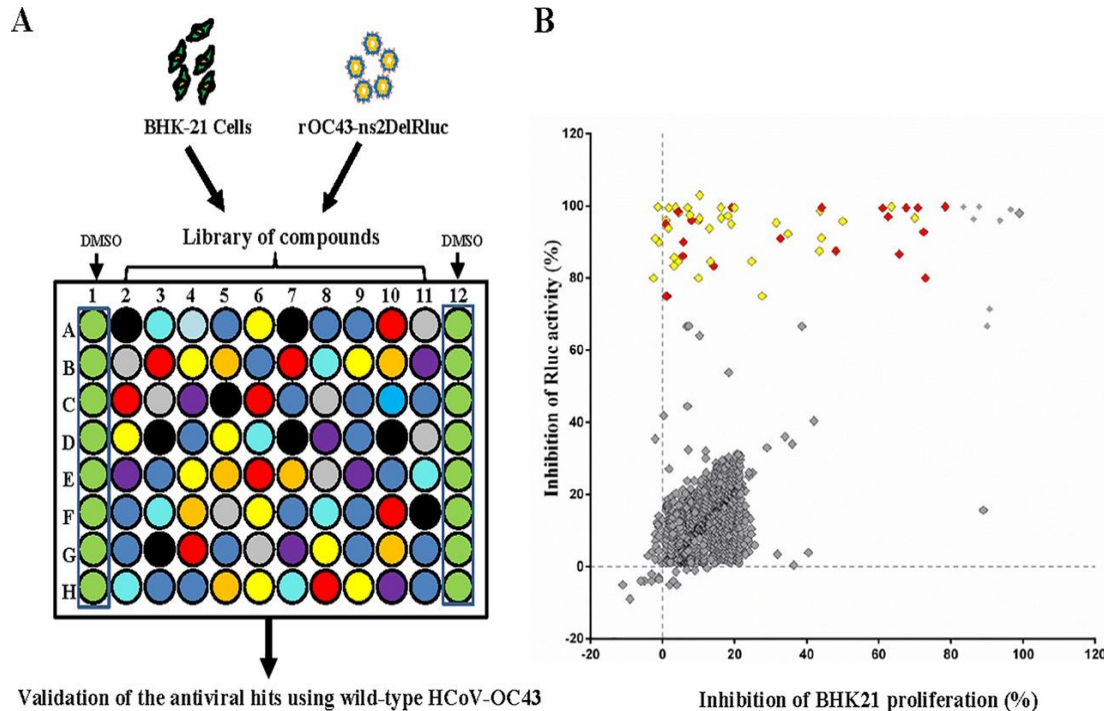


Basic Research

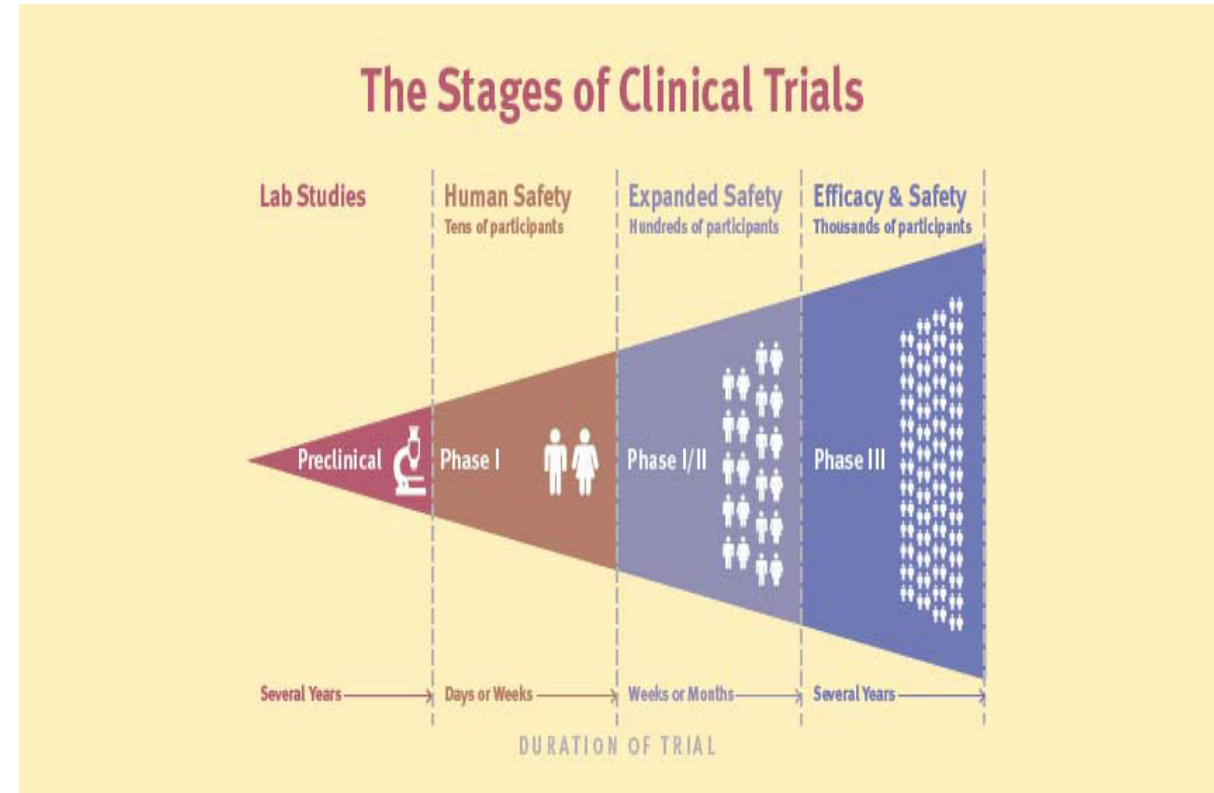
How is Chemical Genetics helping cure Spinal Muscular Atrophy?



What are the Pros and Cons of Chemical Genetics?

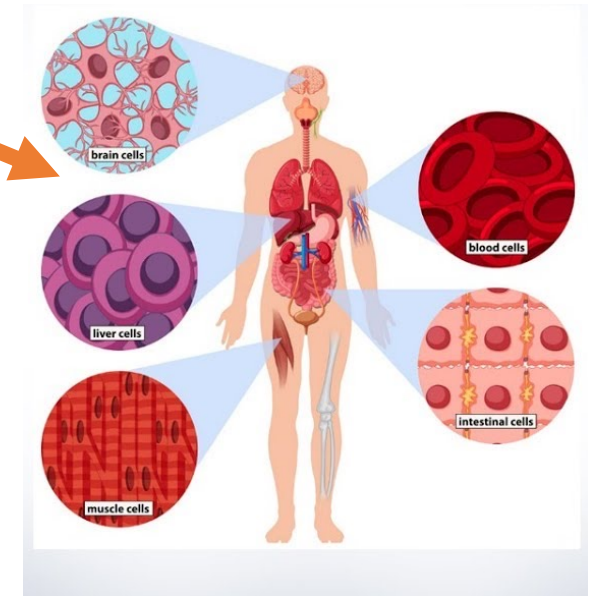
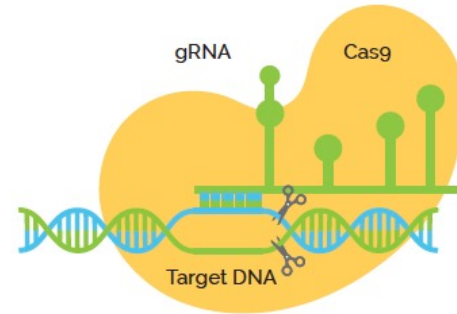


- Great for finding specific molecules that do what you want
- Protein of interest is not removed
- Good for research



- Many chemicals fail late state clinical trial studies
- Not as many drugs as statistically expected

What is the future for Chemical Genetics?



Who is Sandra Richter and the Oates Lab?

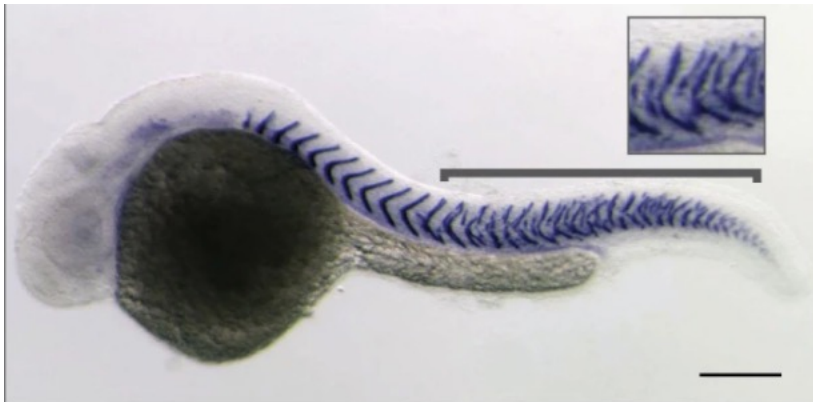
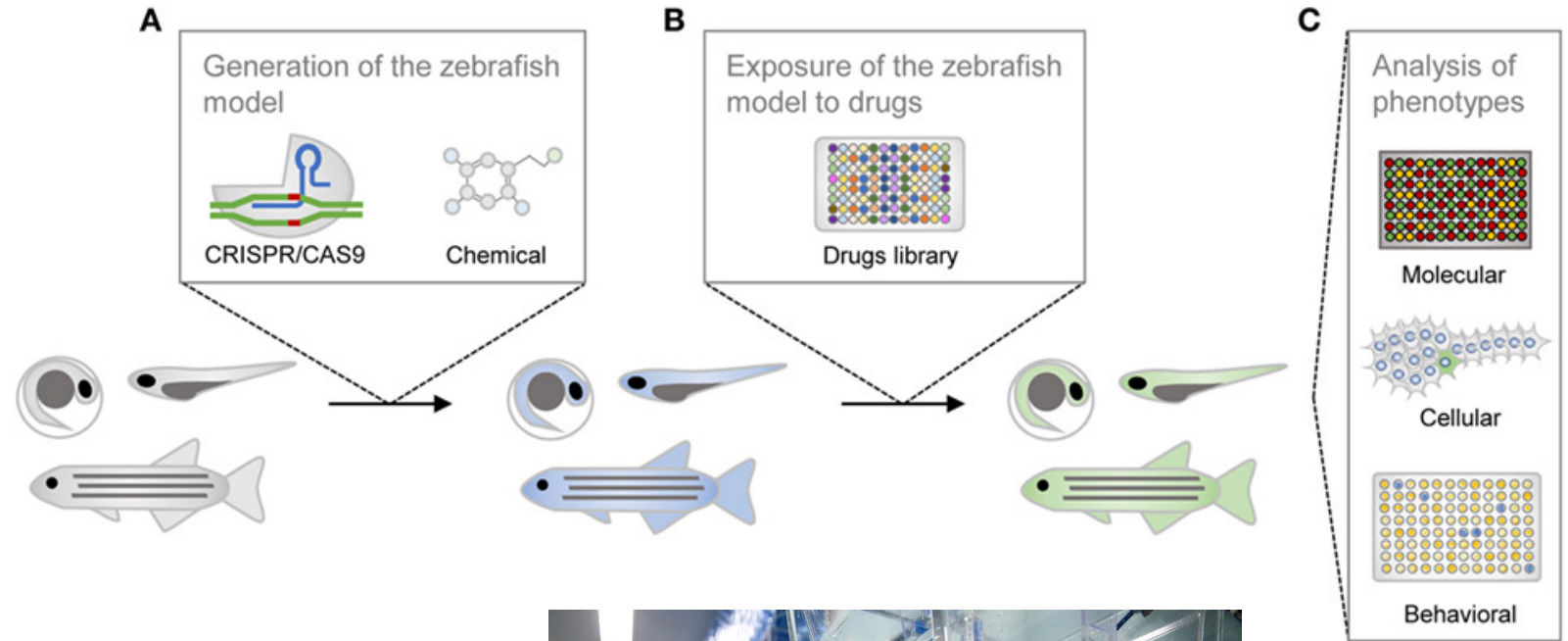
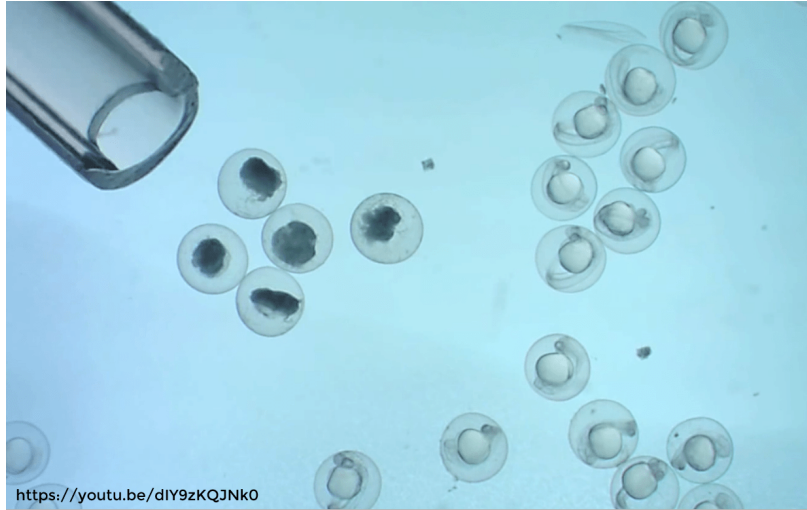
OATES LAB



Timing
Oscillators
Patterns Lab



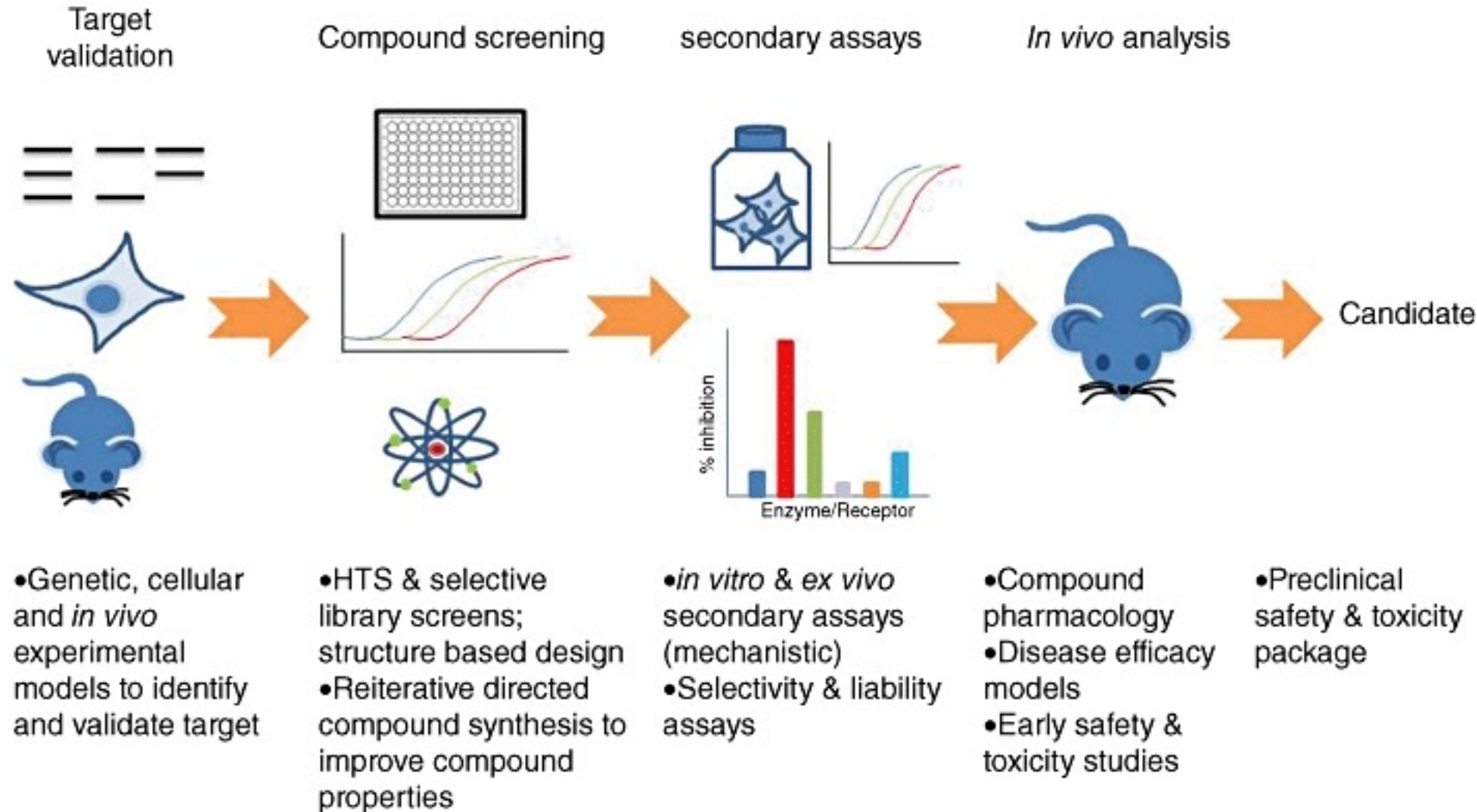
Why are zebrafish a good model organism for Chemical Genetics?



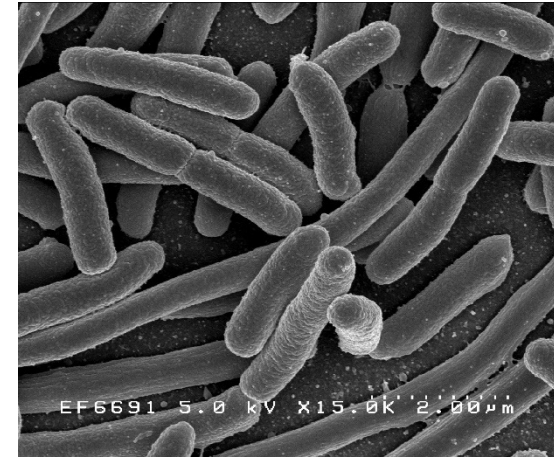
References

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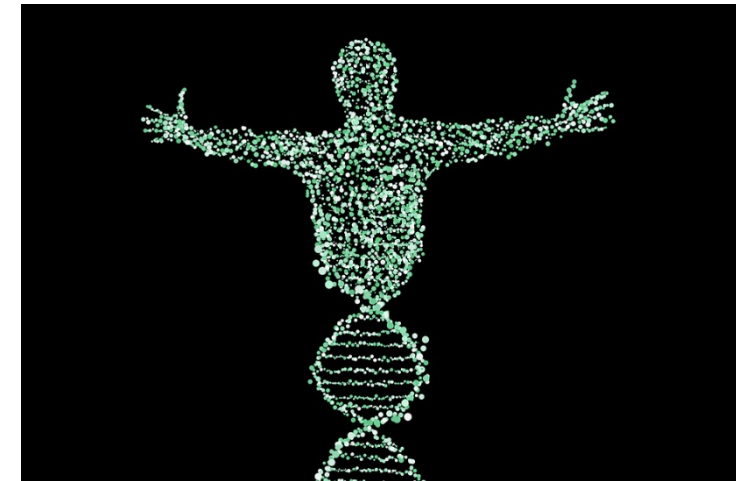
Drug Discovery



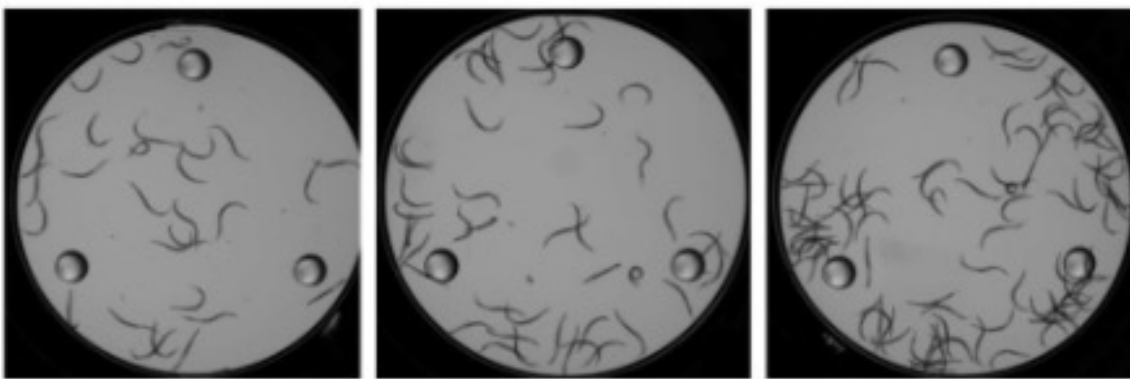
C. Elegans



E. Coli



Human Gene Orthologs



Hard to picture

Environmental Modifications not possible in Zebrafish



Humidity



Diet



Oxygen Levels

Questions?

