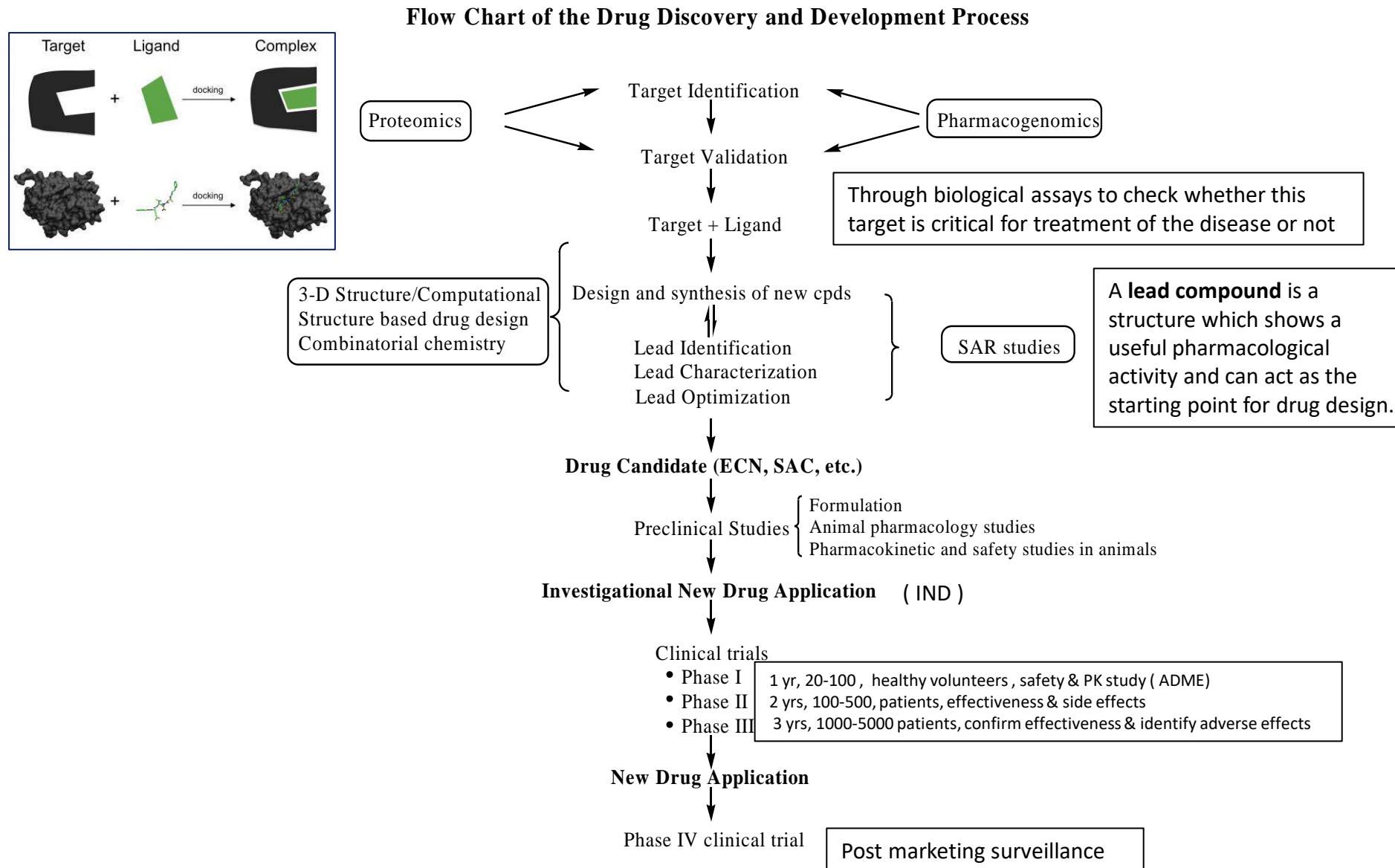


Introduction to Drug Discovery and Development

By:
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Introduction to Drug Discovery and Development



How much does it take to put one new drug in the market?

From initiation of preclinical development to first marketing, it is estimated to take

\$230 million (Tufts University, 1987)

\$802 million (Tufts University, 2001)

\$897 million (Tufts University, 2003, incl post approval R&D)

\$1.7 billion (Bain & Co., 2003)

\$2.6 billion (Tufts, 2014)

Average 12 years

Drug development is a high risk business.

Of each 5,000-10,000 compounds synthesized,

250 will reach animal testing

5 will reach clinical testing

1 will reach the market place

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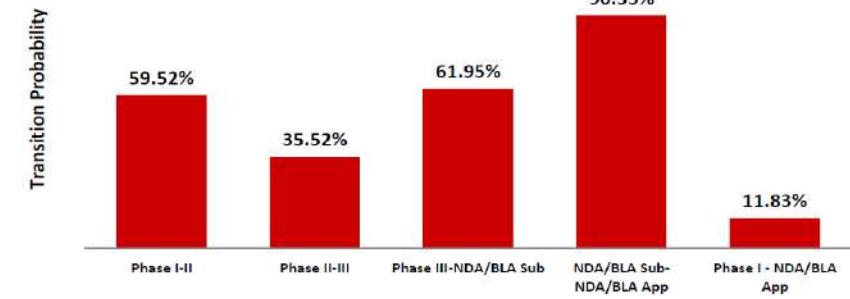
Source of Drugs

Drugs from natural sources (50%)

- ✓ Plants (25%)
- ✓ Animals (6%)
- ✓ Minerals (7%)
- ✓ Microorganisms (12%)

Drugs from chemical synthesis (50%)

Clinical Phase Transition Probabilities and Overall Clinical Approval Success Rate*



*Therapeutic new molecular entities and new therapeutically significant biologic entities first tested in humans, 1995-2007

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Introduction to Drug Discovery and Development

Thalomid® (Thalidomide)

- ❑ Has a chiral centre and was used as a racemate (1:1 mixture) of dextrorotatory (R)- and levorotatory (S)-thalidomide.
- ❑ Pregnant women to help combat morning sickness.
- ❑ Only the R-enantiomer has the desired calming and sleep-inducing properties whereas the S-enantiomer causes the teratogenic effects.
- ❑ Strangulating the blood supply to the embryo's limbs.

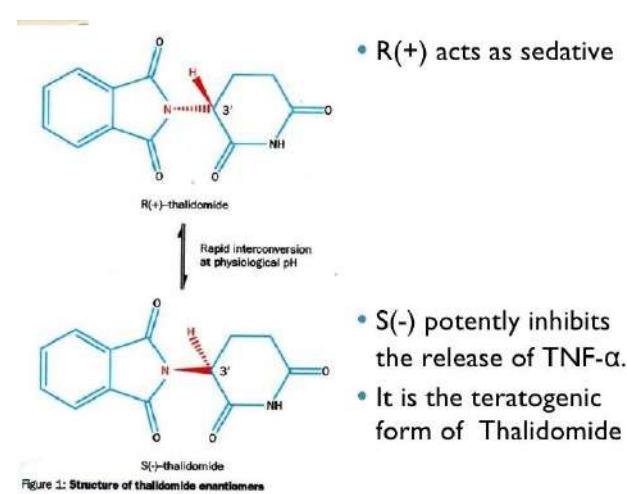
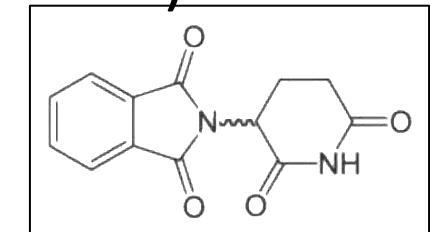


Figure 1: Structure of thalidomide enantiomers

Introduction to Drug Discovery and Development

Thalomid® (Thalidomide)

- This antiangiogenic effect turns Thalidomide into an interesting agent for fighting **cancer** as the tumor growth can be affected by inhibition of its vasculogenesis.
- There are also promising reports on positive effects of thalidomide in treatment of **HIV** and **leprosy**.

