

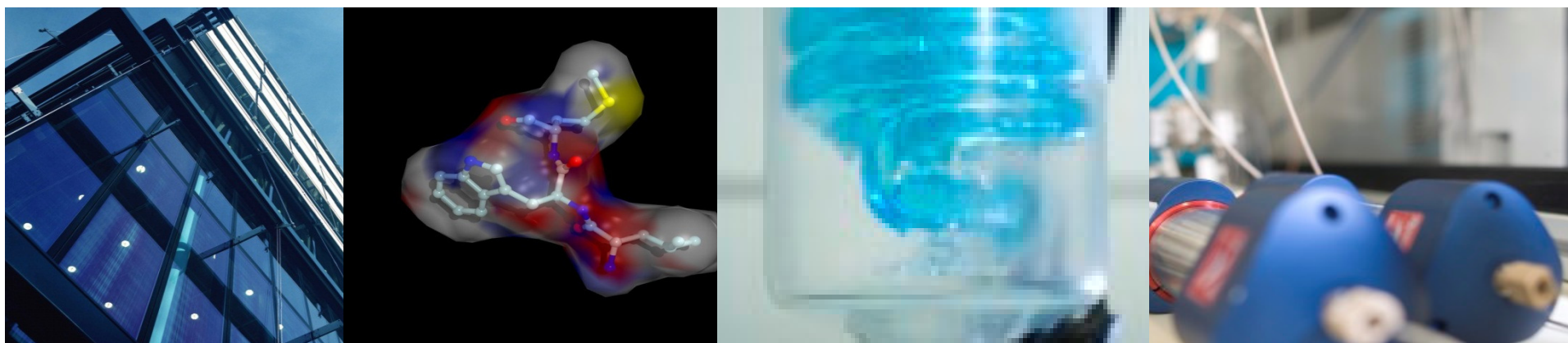
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# Biopharmaceutical Innovation: The Complexity of The R&D Process

*WIPO IGC 21*

*Geneva, 17 April 2012*

*Markus Boehringer, Roche*



Many fascinating projects –



Xeloda

medical  
innovation

idea

improved healthcare  
better quality of life



Pegasys

many fascinating projects –  
a layman's perspective



Xeloda

idea



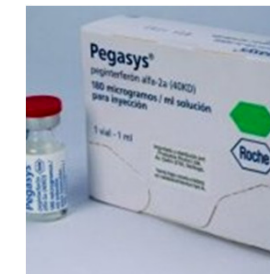
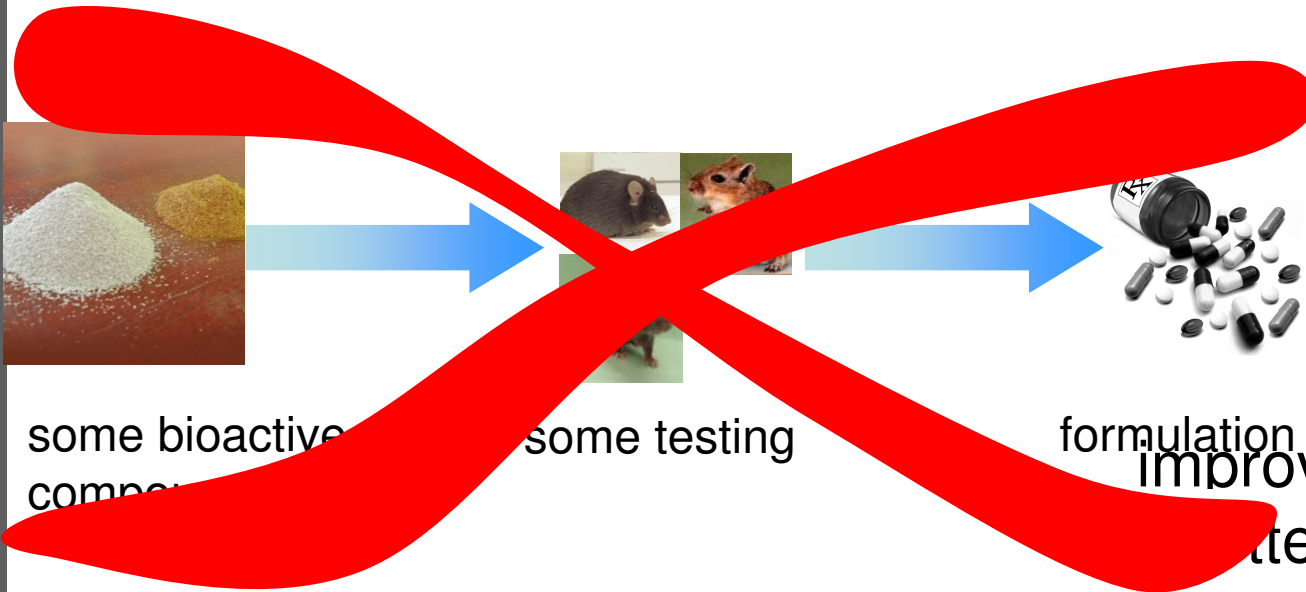
some bioactive  
comp



some testing



formulation  
improv  
te

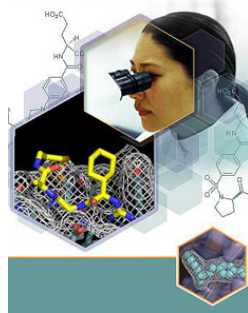


Pegasis

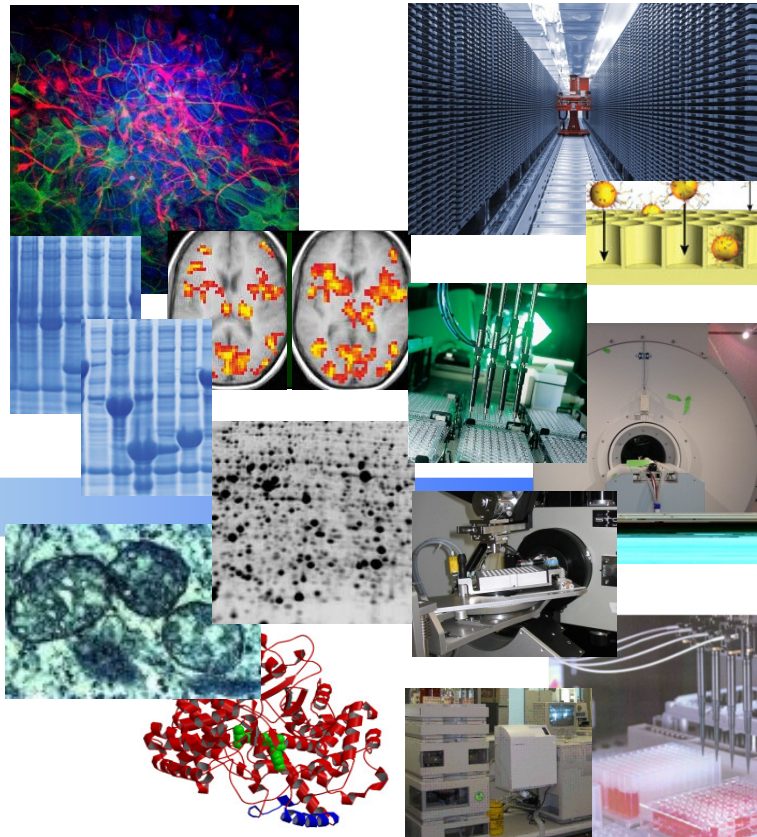
many fascinating projects –  
the reality is different



highly complex multidisciplinary R&D



frontier science & high-technology



Xeloda

medical  
innovation



Pegasys

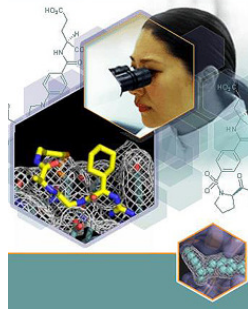
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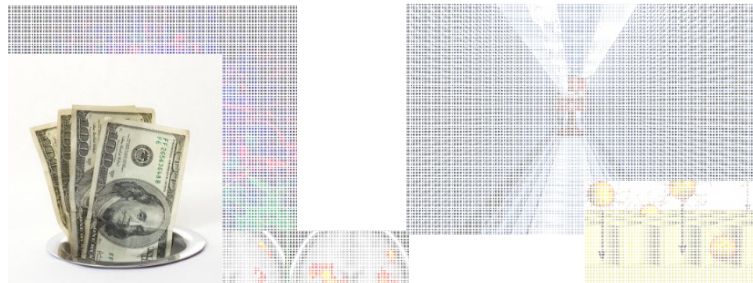
many fascinating projects –  
the reality is different



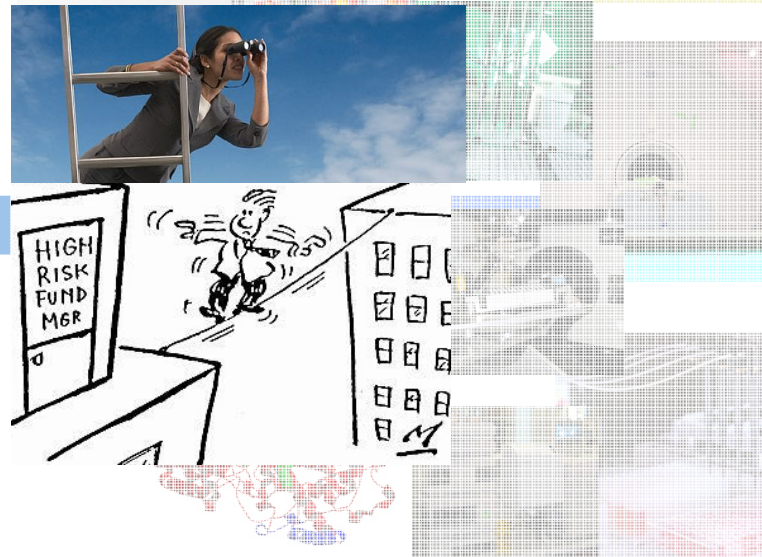
highly complex multidisciplinary R&D



frontier science & high-technology



high cost  
long-term  
high risk



Xeloda

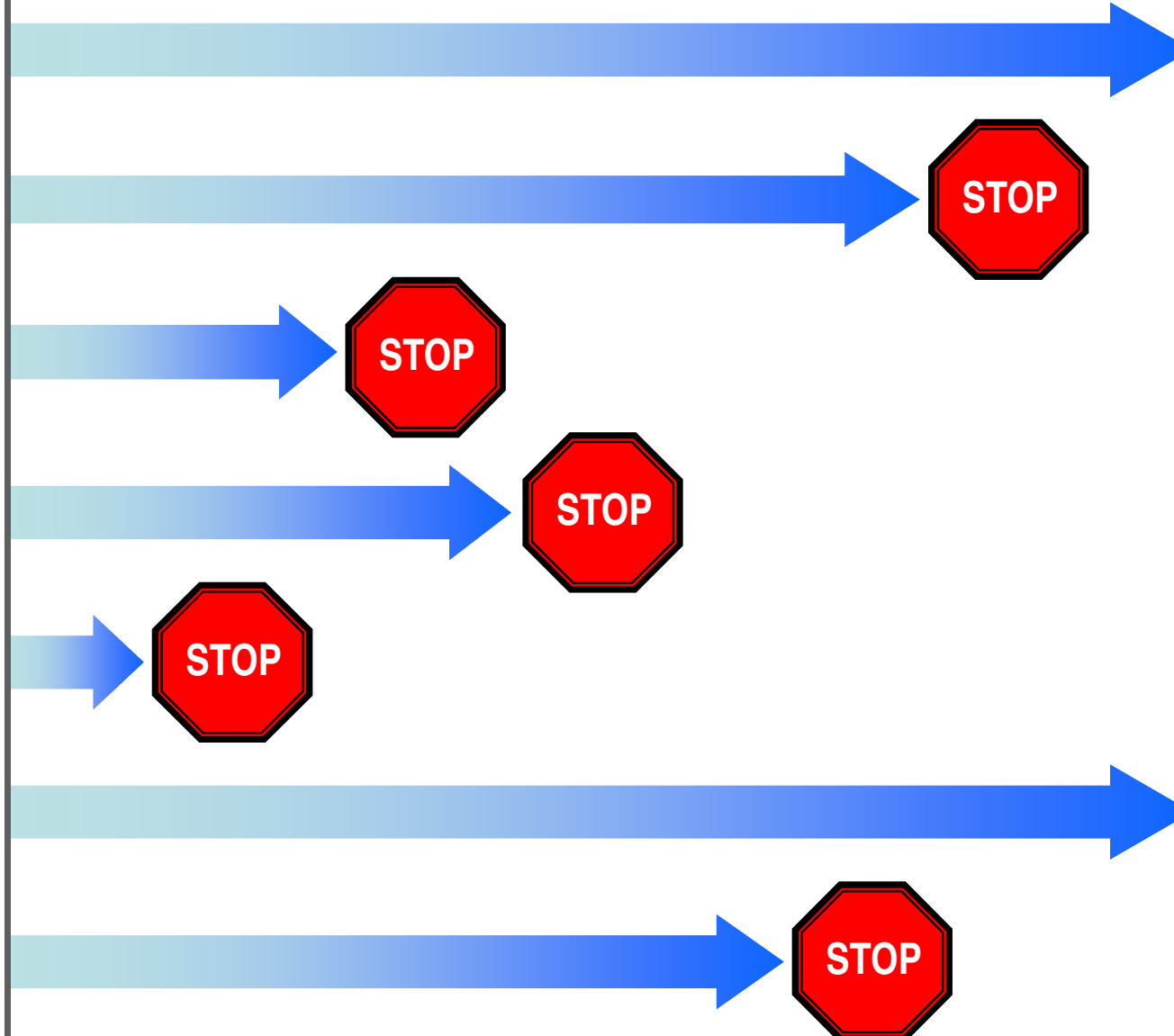
medical  
innovation



Pegasys

many fascinating projects –  
but only a few are successful

idea

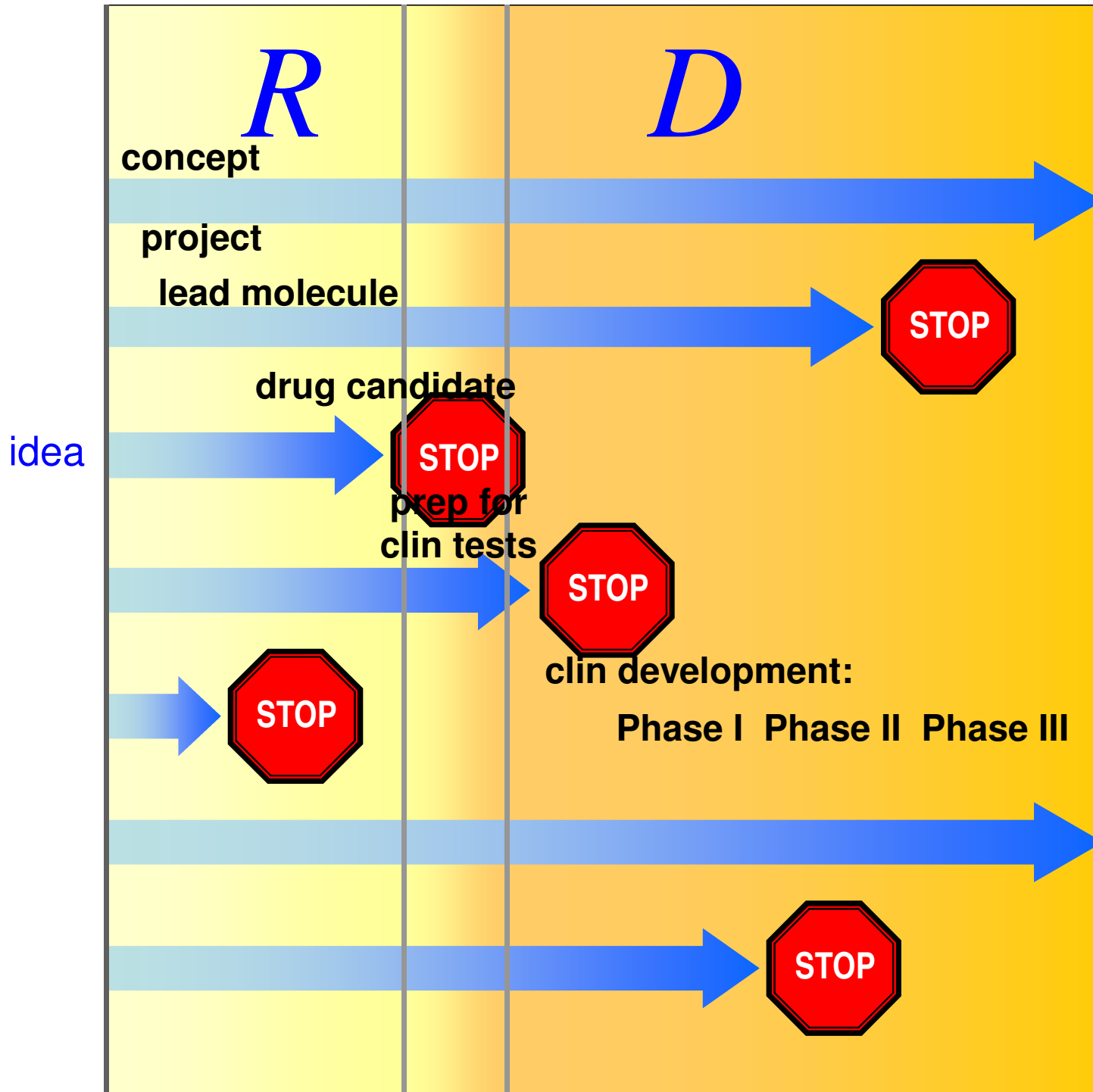


Xeloda

medical  
innovation

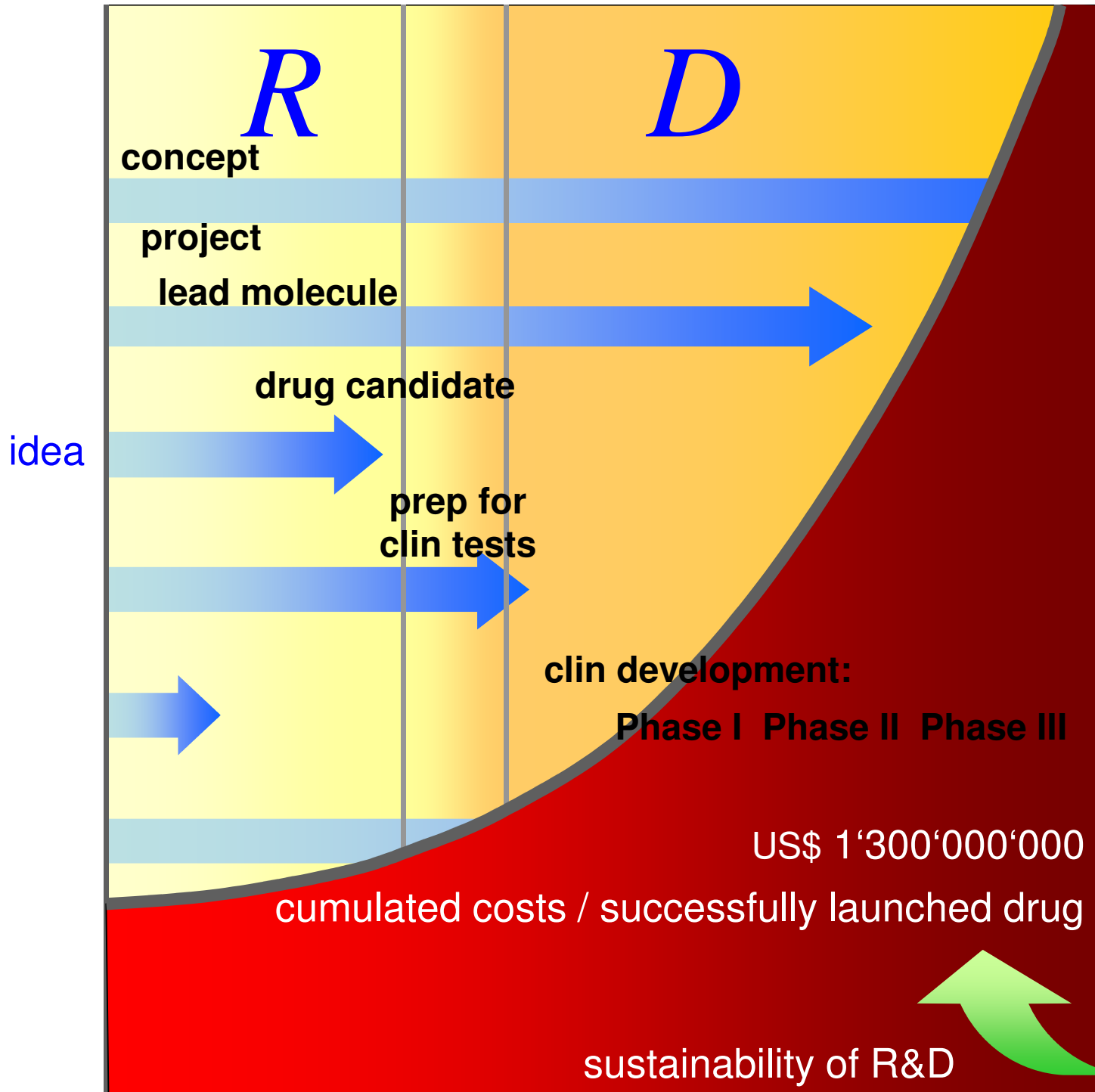


Pegasys



medical innovation



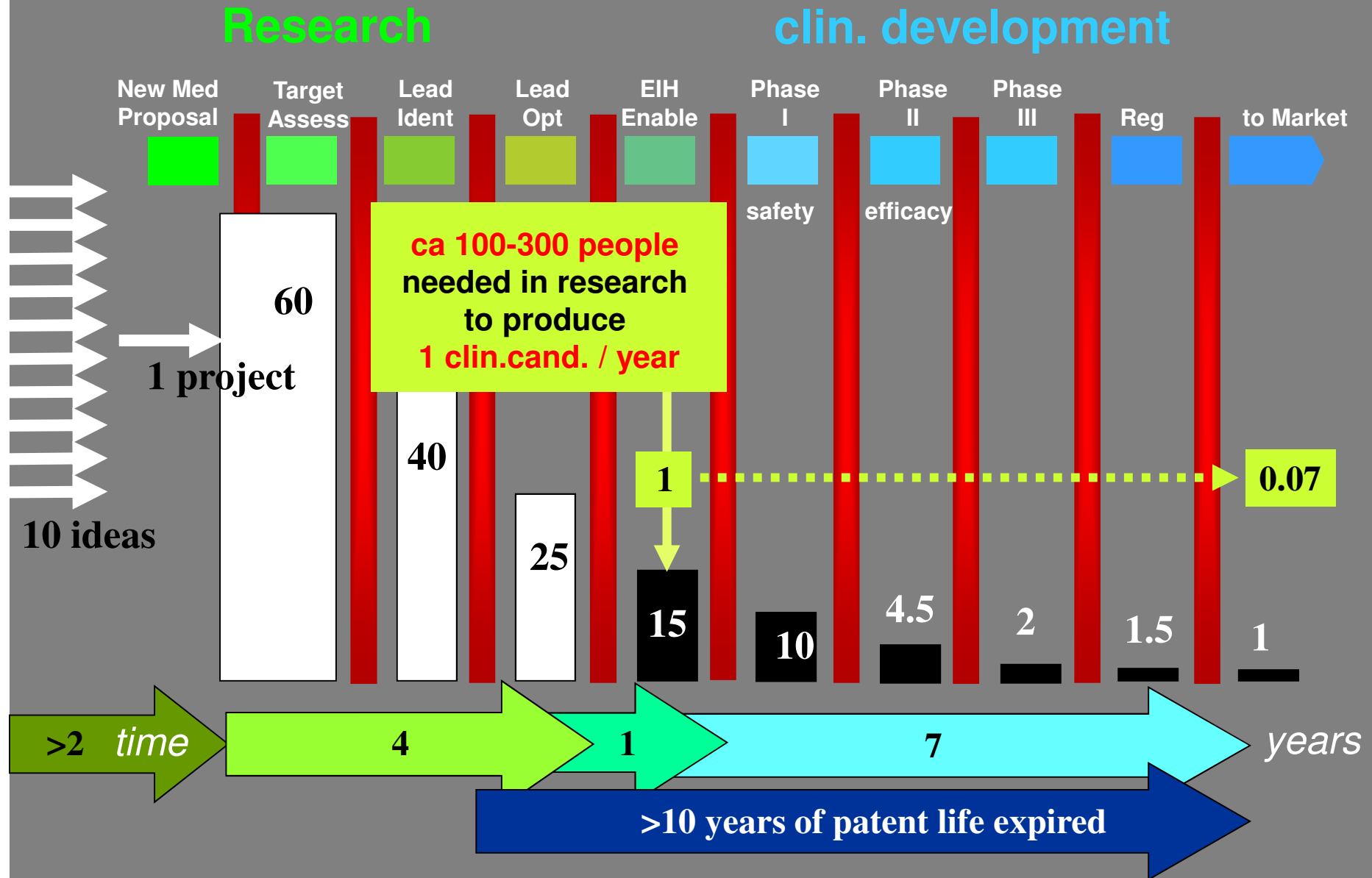


medical  
innovation

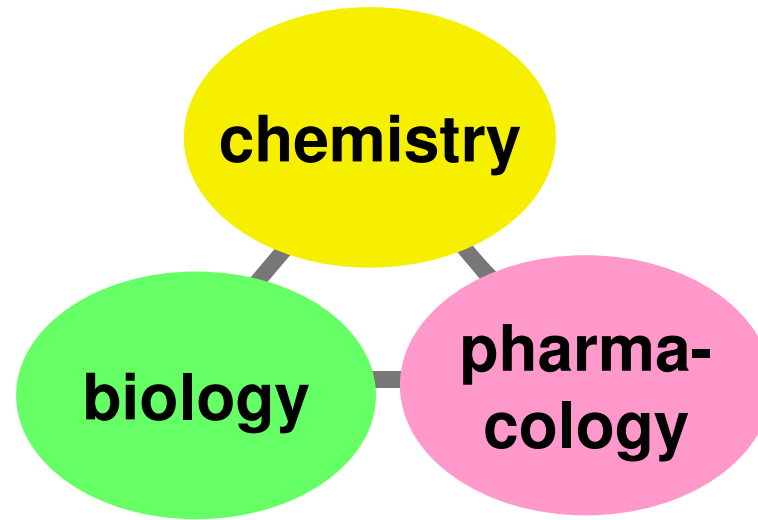




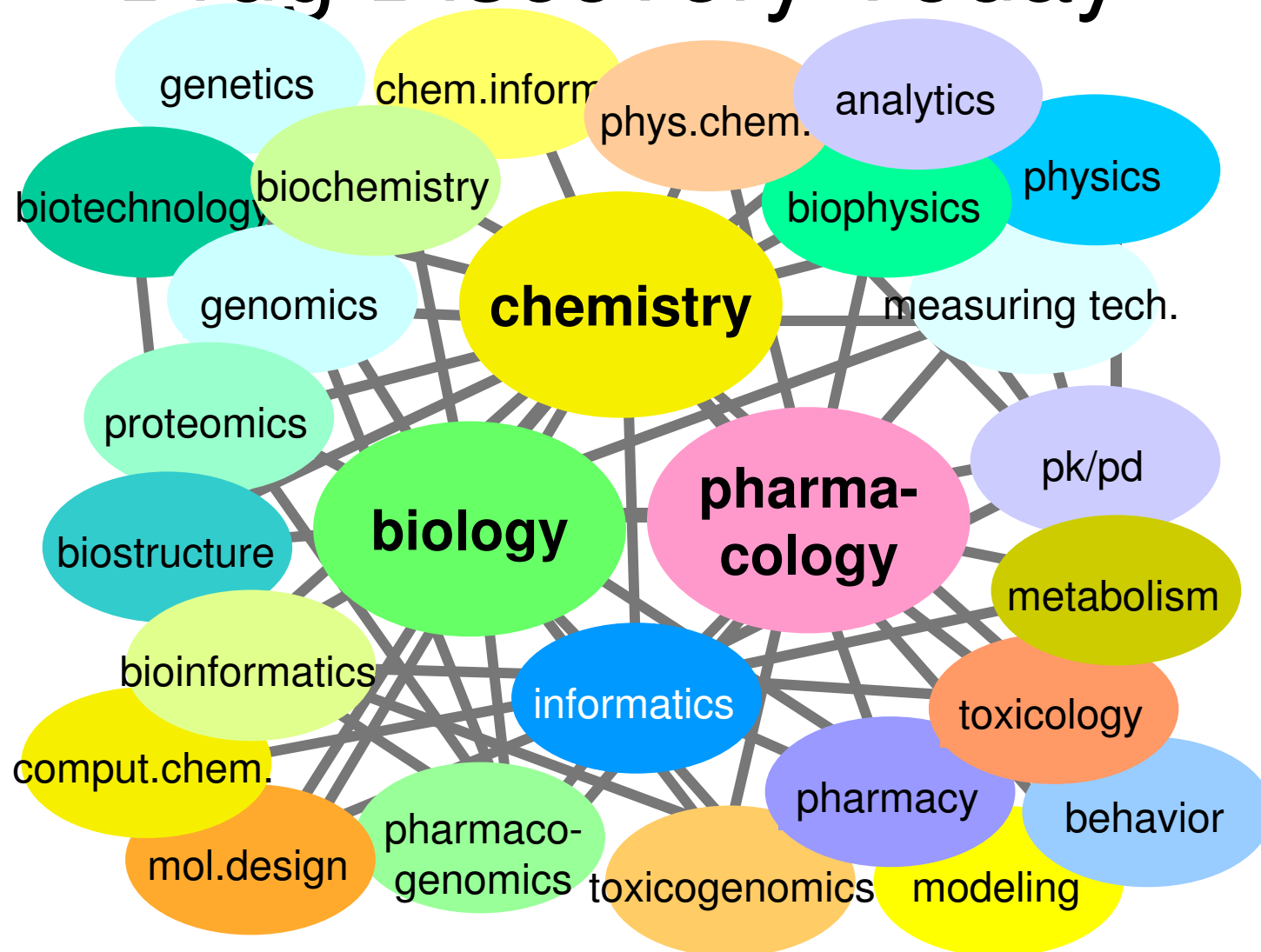
# Pharma R&D metrics of success



# The Classical Perception of Drug Discovery



# Drug Discovery Today



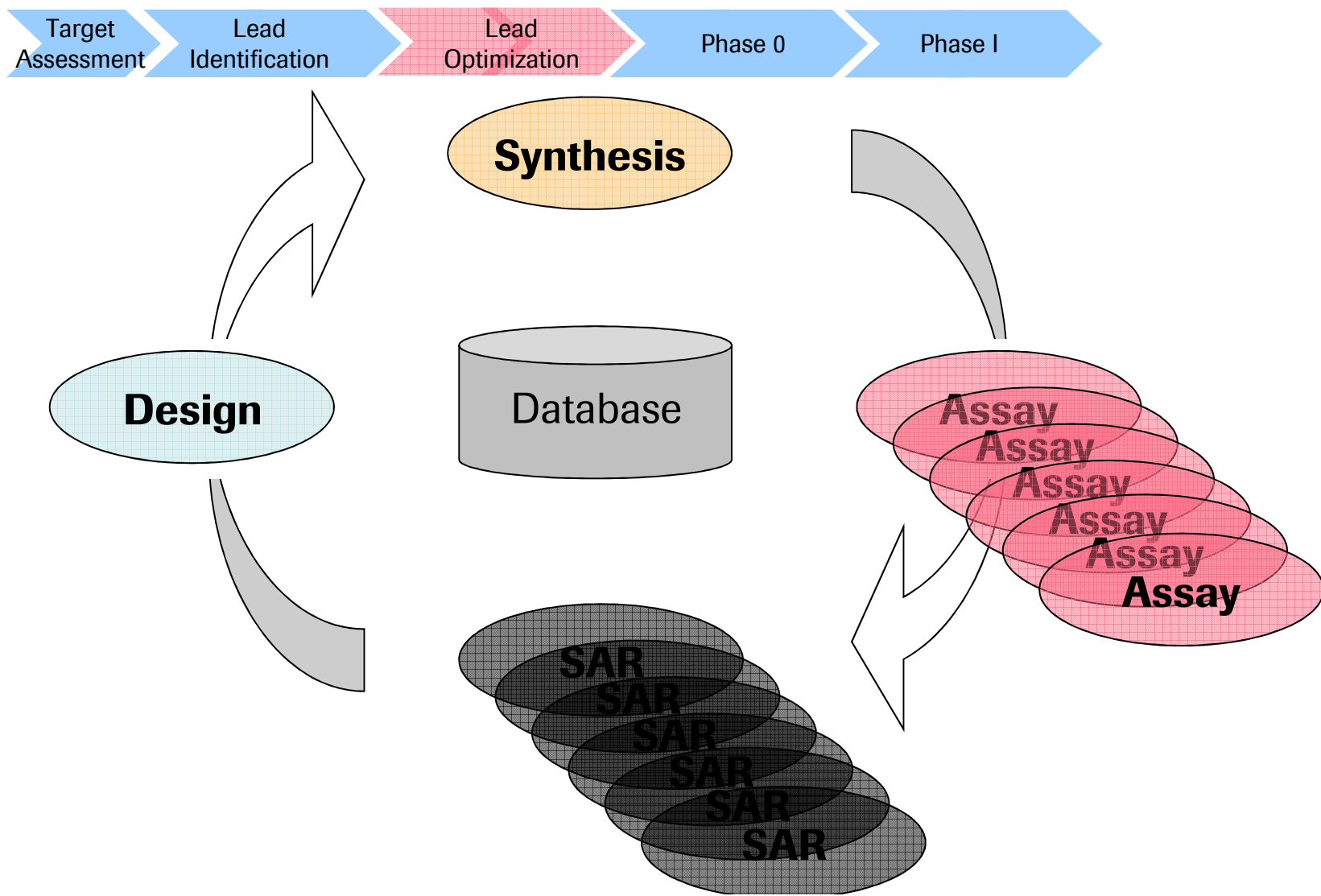
⇒ **A highly networked multi-disciplinary environment!**

# Drug Discovery Today



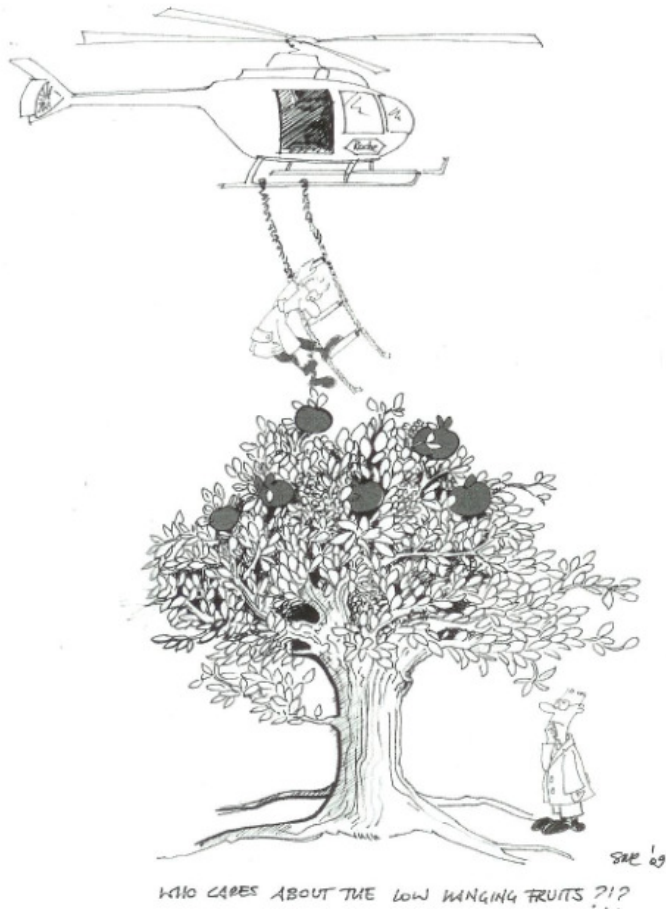
⇒ **A multitude of cost intensive technologies!**

# Additional Complexity: Multidimensional Optimization





# Why so complex? Why these high costs?



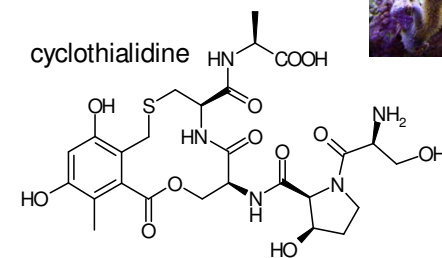
“**Low hanging fruits are gone**” – technologies, translational approaches to overcome

## Increasing demands:

e.g. T2D: need to demonstrate not just glucose lowering, but benefit on mortality and morbidity.  
⇒ longer studies, more patients, higher costs

## Natural products:

- Scientifically of value
- Complex optimization required!!  
(oral bioavailability, PK, selectivity, ...)
- Complex synthesis!!
- Reliability of supply



# Pharmaceutical R&D: Summary

**Still many unmet medical needs - complex - frontier science - high-tech - expensive - high-risk**

**<1/60** • **Less than 1 out of 60 research projects** started will deliver a drug to the market.

**<1/10** • **Less than 1 out of 10 molecules** starting in clinical trials makes it to the market.

**>10 yrs** • **More than 10 years** from project start to entering the market.

**<10 yrs** • Period of patent protection for a drug entering the market: **less than 10 years**.

**1.3 bil USD** • The costs for bringing 1 new drug to the market: **USD 1'300'000'000**.

THANK YOU!

