

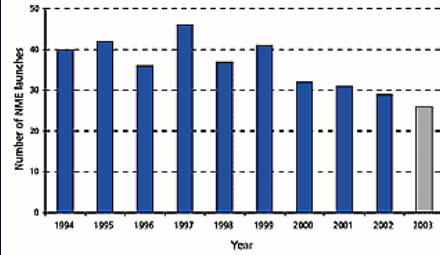
EFFICIENCY OF DRUG DEVELOPMENT

- 30,000 compounds synthesized
- 2000 (6.7%) enter preclinical development
- 200 (0.67%) enter phase I trials
- 40 (0.13%) enter phase II trials
- 12 (0.04%) enter phase III trials
- 8 (0.027%) are approved
- 1 (0.003%) makes satisfactory ROI

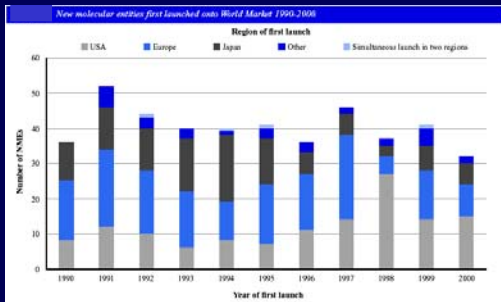
ROI= Return on investment for pharmaceutical industry

Drug Discovery Today 2001

Number of NMEs first launched onto the world market (1994-2003)



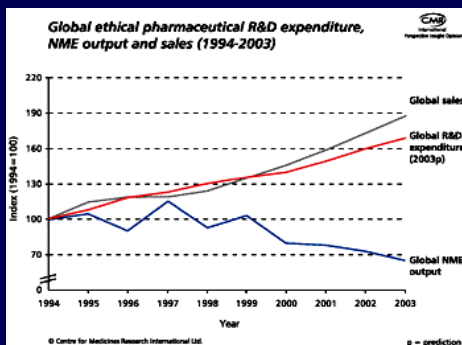
CMR 2004



CMR 2002

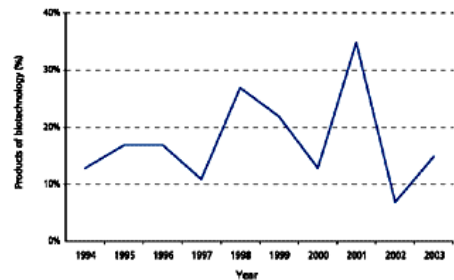


CMR 2002



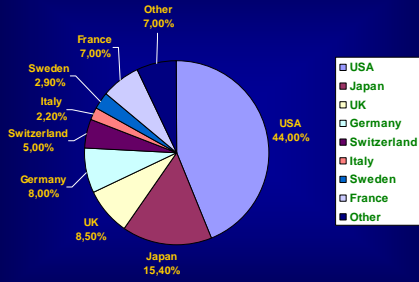
CMR 2004

Proportion of global first launches that are products of biotechnology (1994-2003)

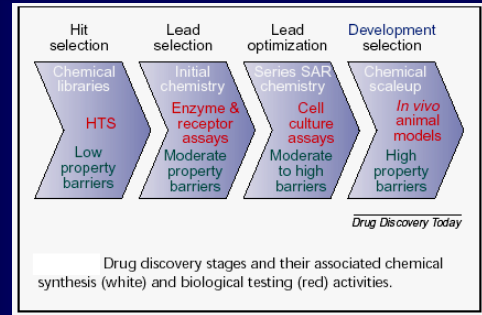


CMR 2004

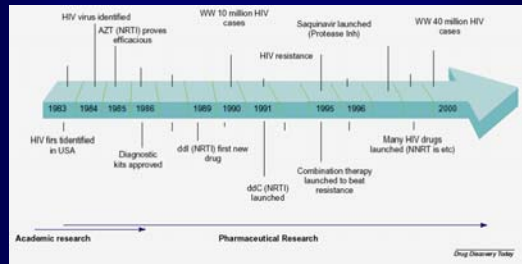
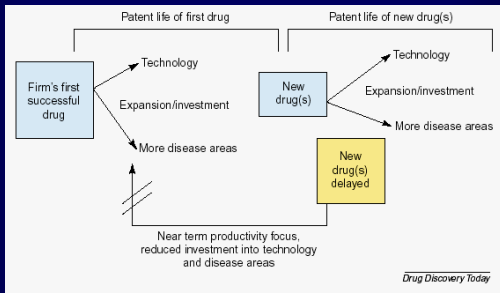
Global Pharmaceutical R&D Expenditure by Country



CMR International 2002



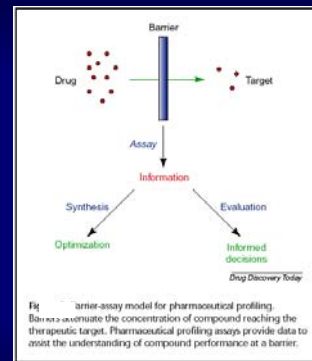
Drug Discovery Today 2003



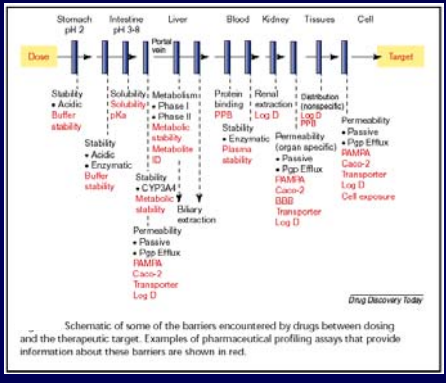
Parallel structure-activity relationships (SAR) and structure-property relationships (SPR) strategies both have *in vitro* and *in vivo* assay tactics

SAR	SPR
In vitro assays	In vitro assay
HTS	Integrity
Enzyme/receptor assays	Solubility
Cell-based assays	Permeability
	Lipophilicity
	pK _a
	Stability
	Metabolite screening
	Transporters
	CYP450 inhibition
	Cell exposure
	Plasma-protein binding
In vivo assays	In vivo assays
Animal model	PK/exposure

Drug Discovery Today 2003



Drug Discovery Today 2003



Schematic of some of the barriers encountered by drugs between dosing and the therapeutic target. Examples of pharmaceutical profiling assays that provide information about these barriers are shown in red.

Drug Discovery Today 2003