University-Industry Cooperations: Ensuring Mutually Rewarding Partnerships

Klaus Müller
F. Hoffmann-La Roche Ltd
Basel,Switzerland

Round-Table Discussion, IASOC, Ischia, September 22, 2006

close ties between industry

and academia

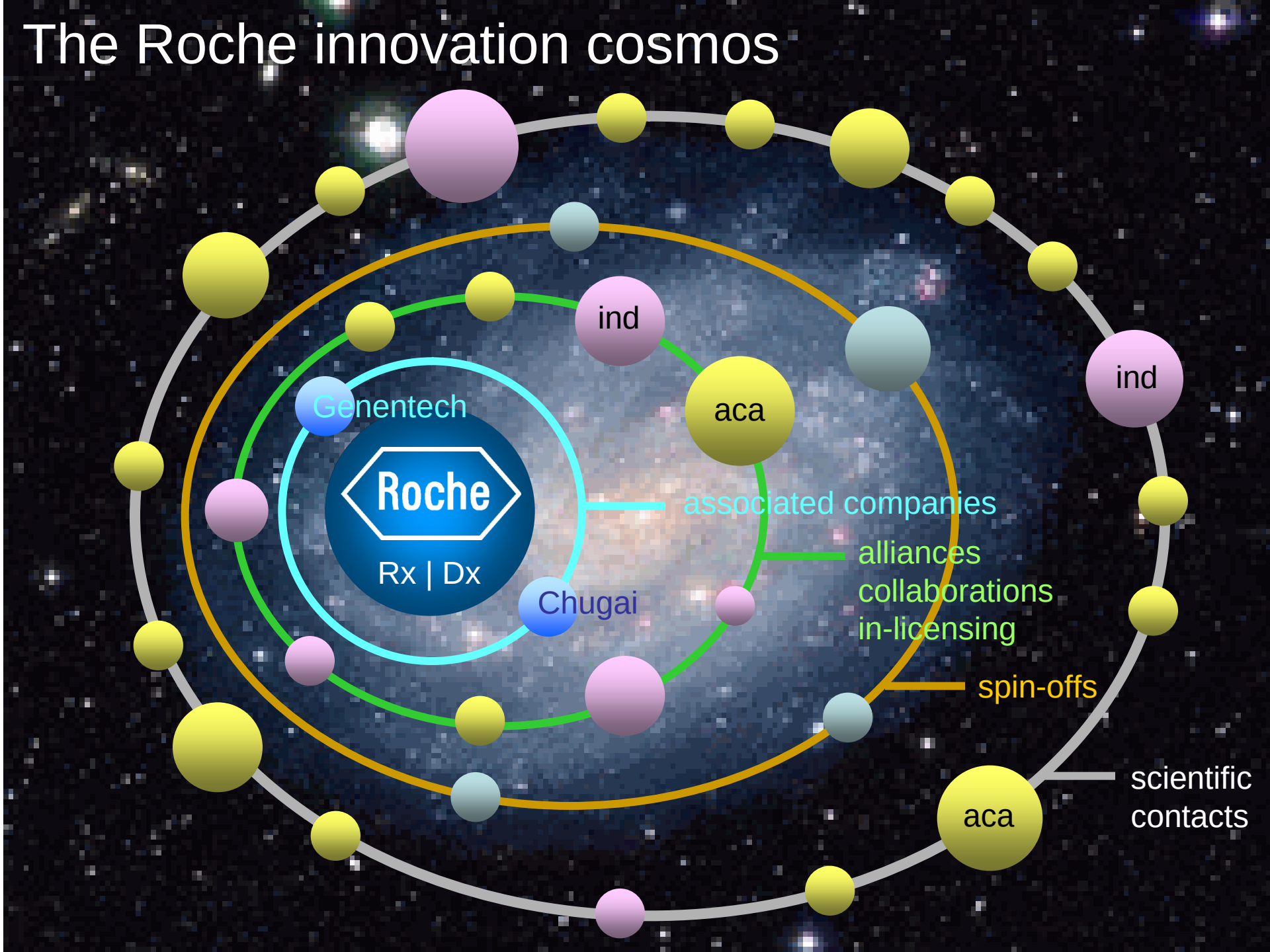
essential in the past

essential today

essential in the future

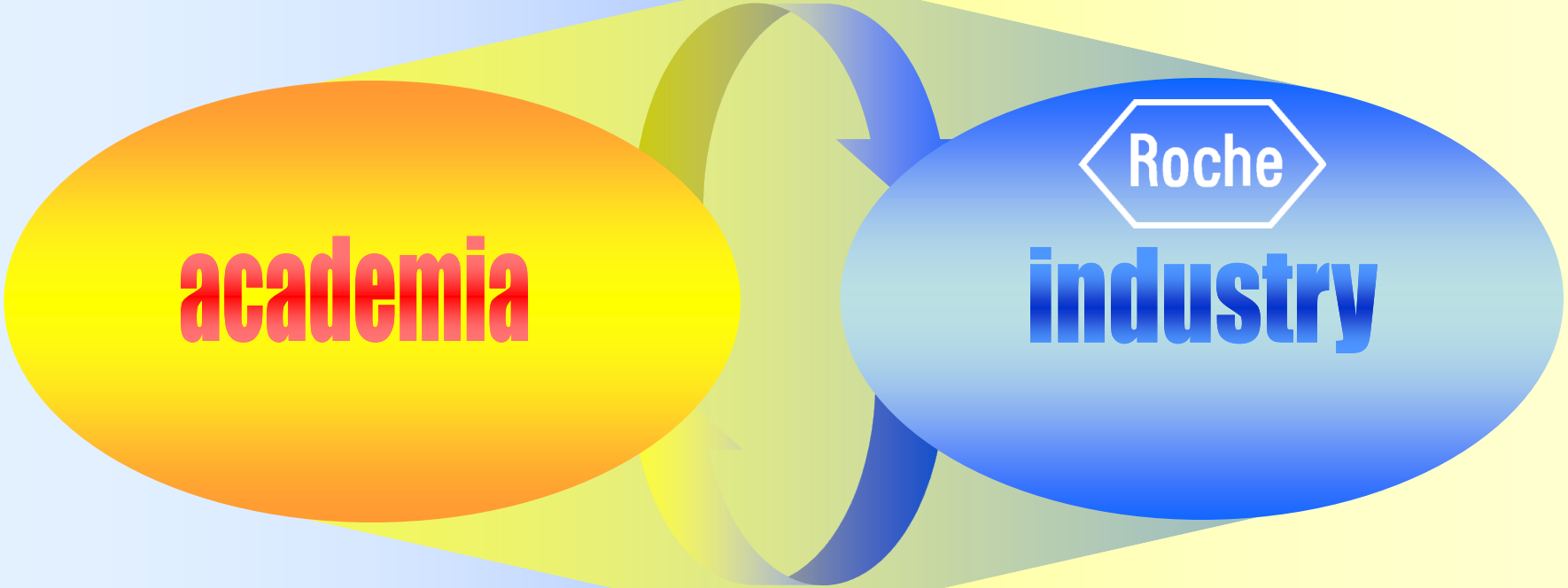

while much innovation is created within Roche
the Roche cosmos of innovation is much larger

The Roche innovation cosmos



a classical misconception

research
typically in the
interface between
basic and applied science



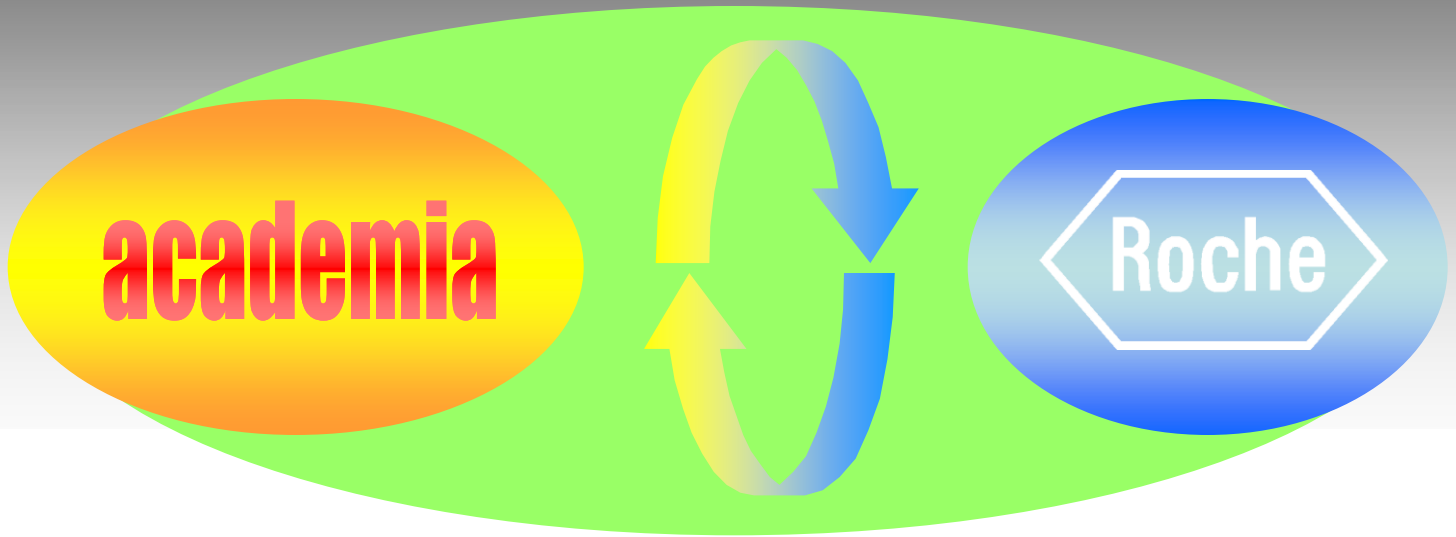
basic research

applied research

raising basic questions

leading to innovative applications

many opportunities for excellent collaborations

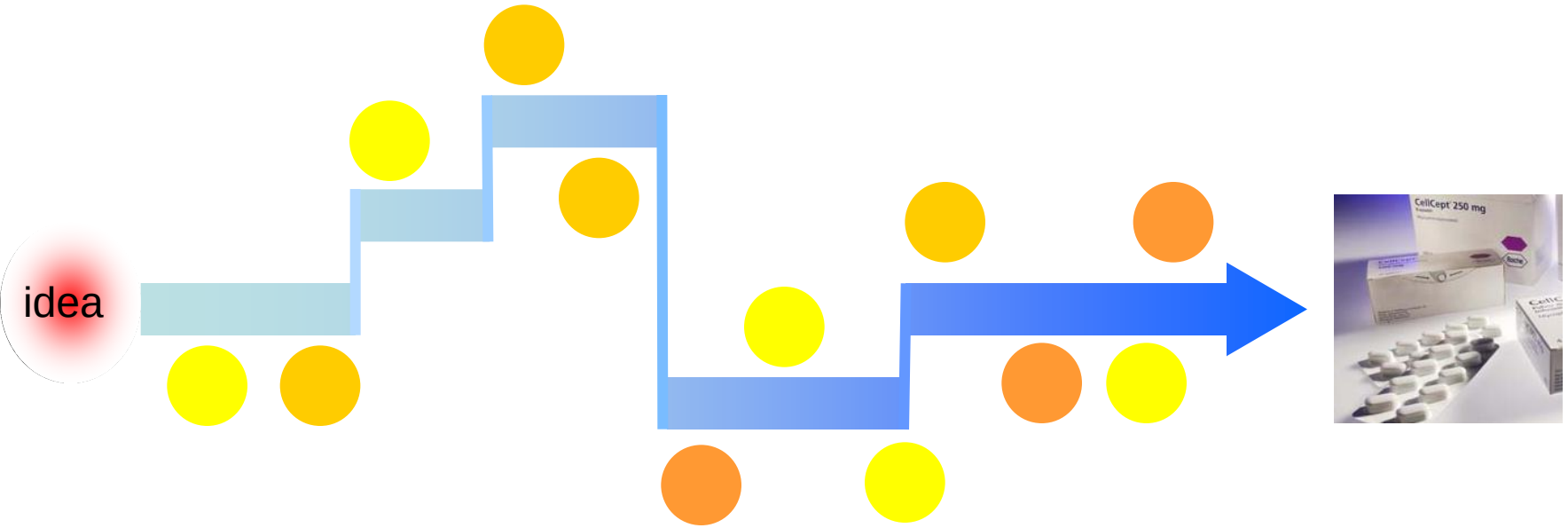


novel ideas brought to therapeutic innovation

fundamental aspects triggered by applied research

novel methods confronted with real application needs

projects hardly ever develop in a straight manner

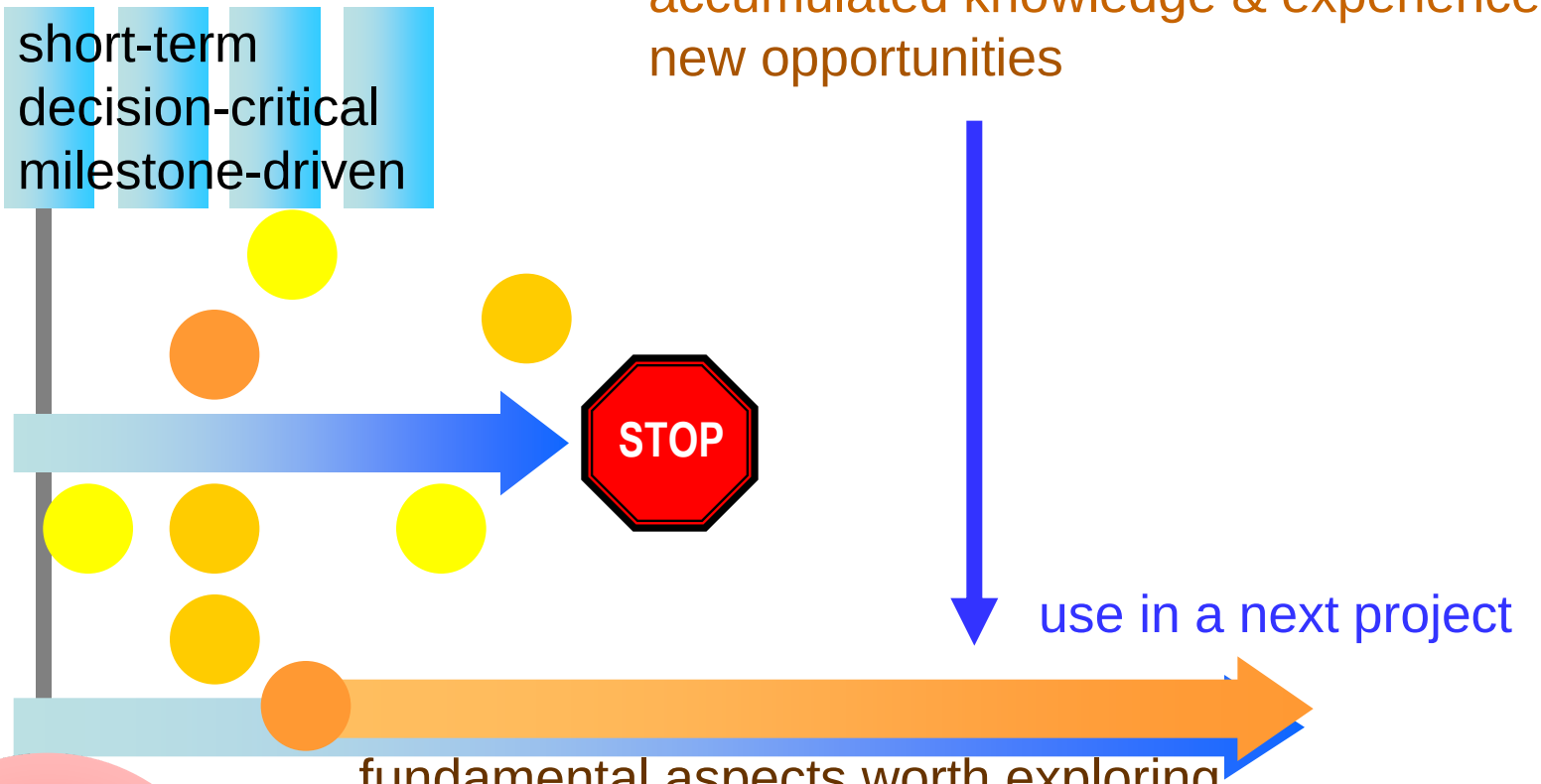


along the project:

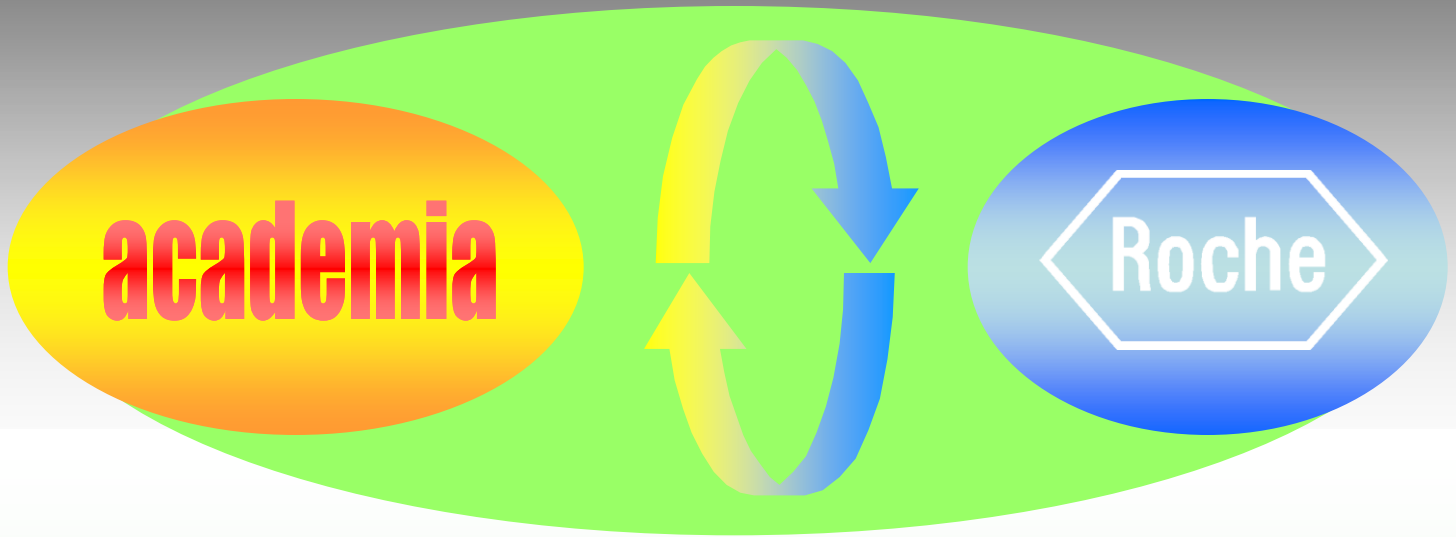
discoveries
novel insights
lessons learned
accumulated knowledge & experience
new opportunities

the same for projects
that have to be stopped:

discoveries
novel insights
lessons learned
accumulated knowledge & experience
new opportunities



many opportunities for excellent collaborations



novel ideas brought to therapeutic innovation

fundamental aspects triggered by applied research

novel methods confronted with real application needs

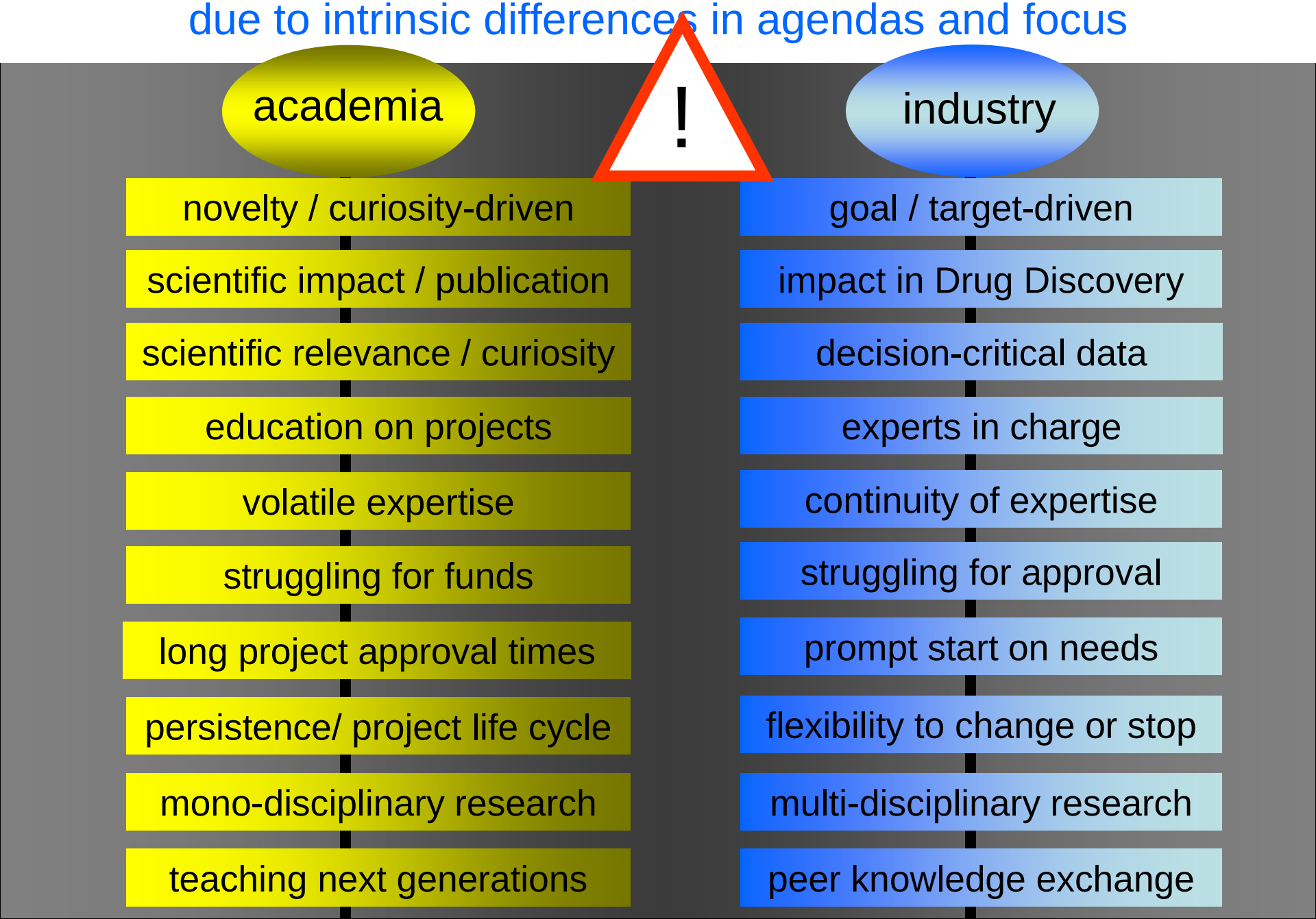
building on complementary focus

mutual stimulation in science and technologies

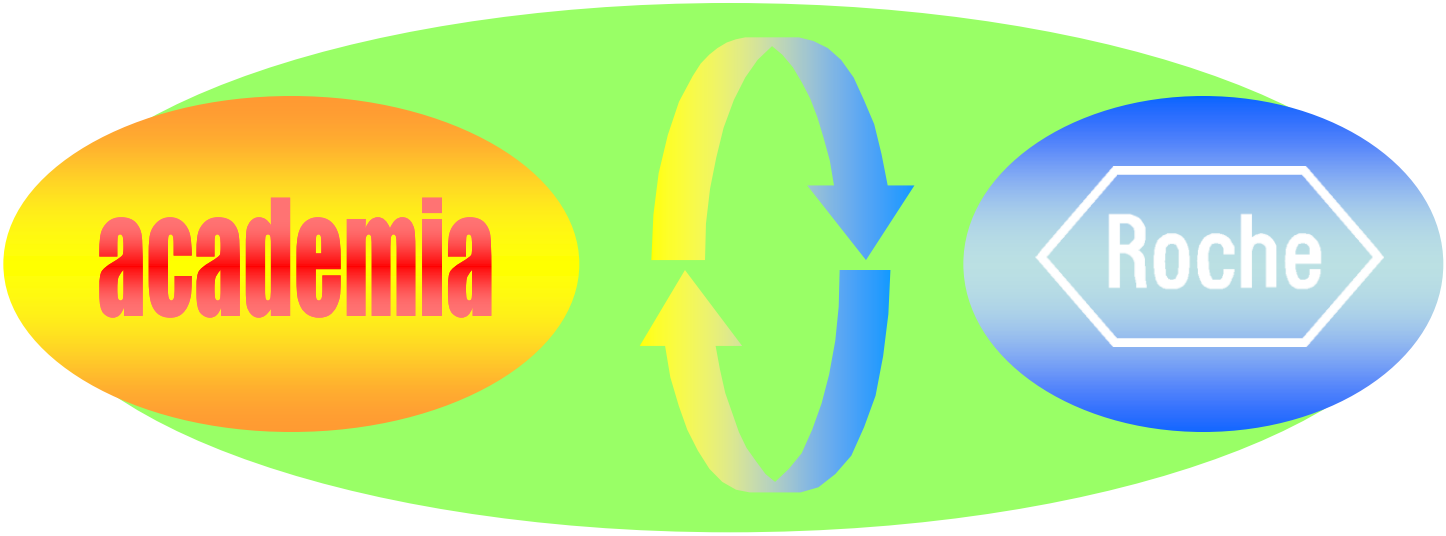
continuous mutual learning and discovery

some key differences between academic and industrial research

due to intrinsic differences in agendas and focus



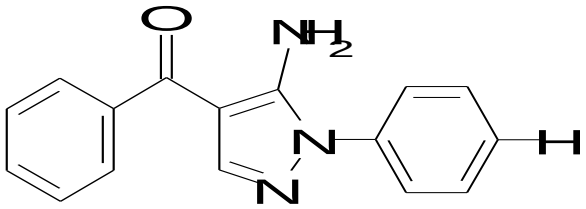
Industry-University Collaborations

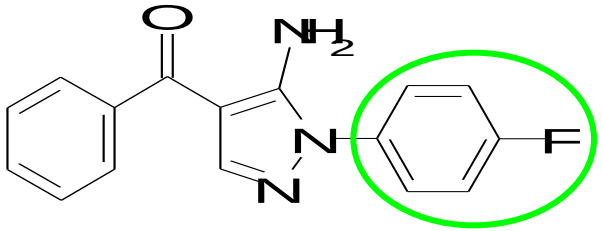


mutual respect

mutual trust

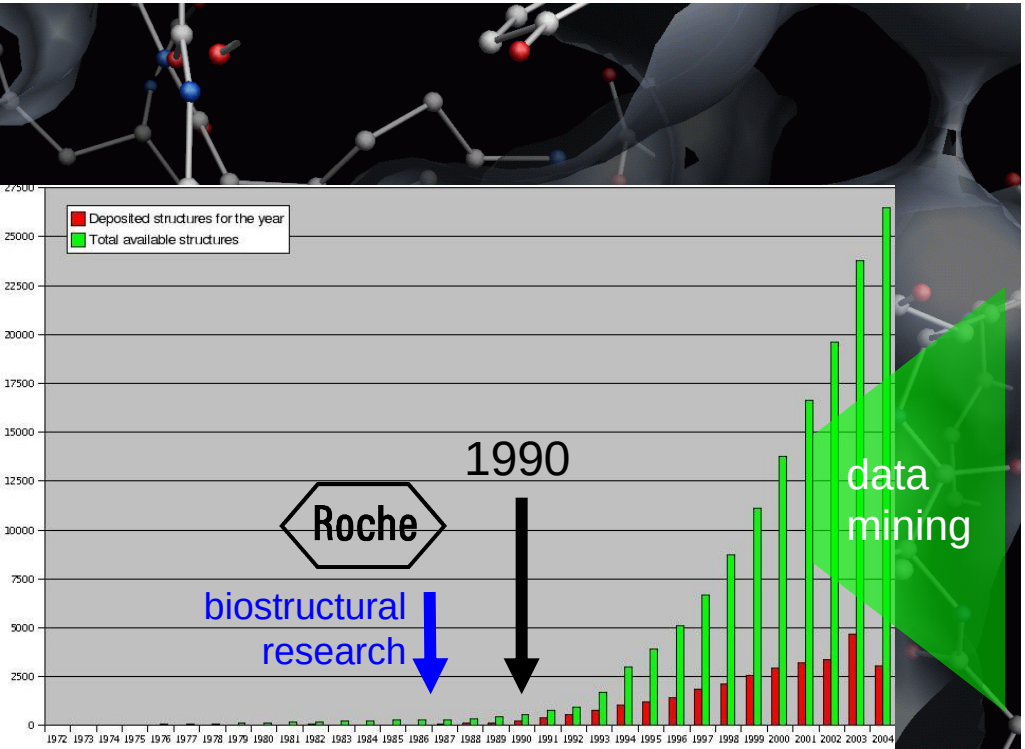
recognition of complementary focus

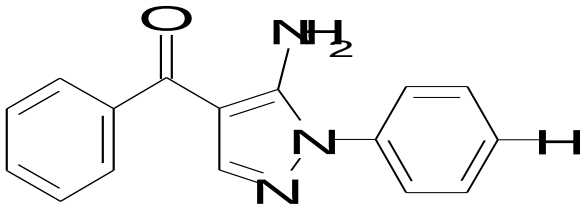


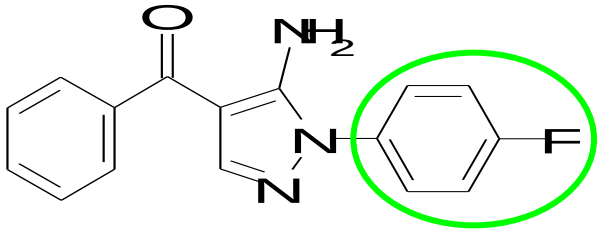


3-4 times more potent

PDB – Protein Structure Database







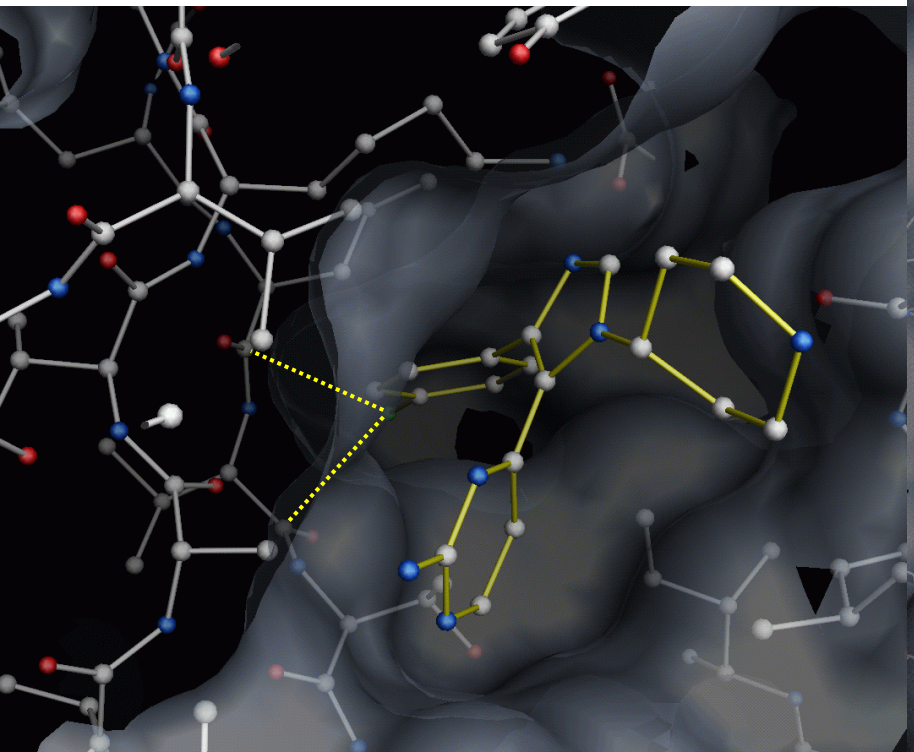
3-4 times more potent

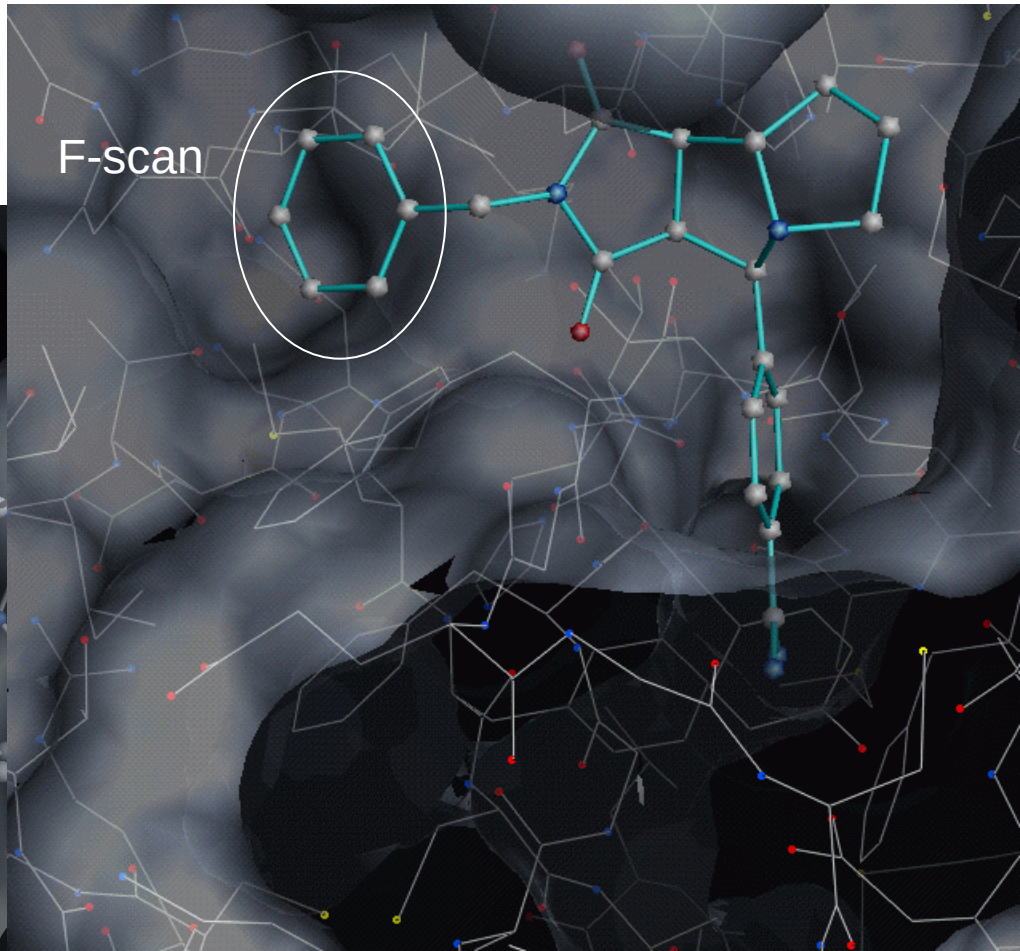
Collaboration with Prof F Diederich, ETHZ

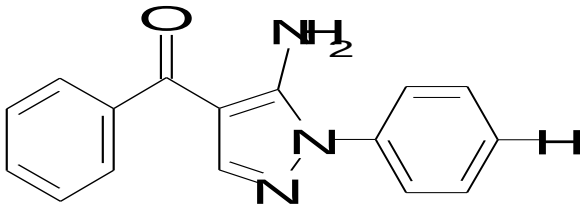
design of thrombin inhibitors
substantial know-how – Roche, ETHZ
assay, X-ray structures – Roche

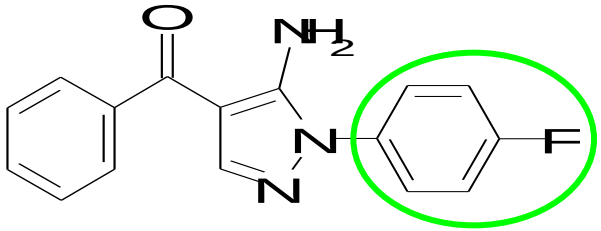
probing F interactions

PDB – Protein Structure Database









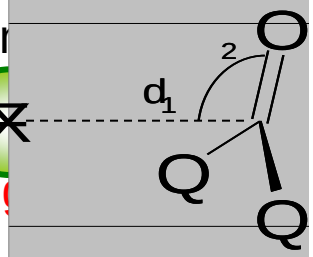
3-4 times more potent

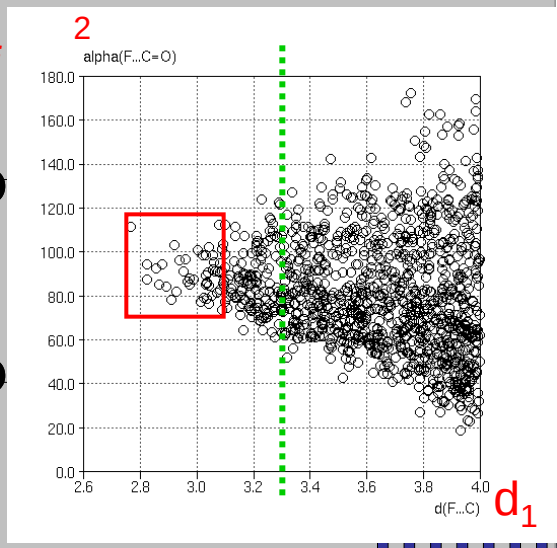
Collabo

design
substar
assa

probing

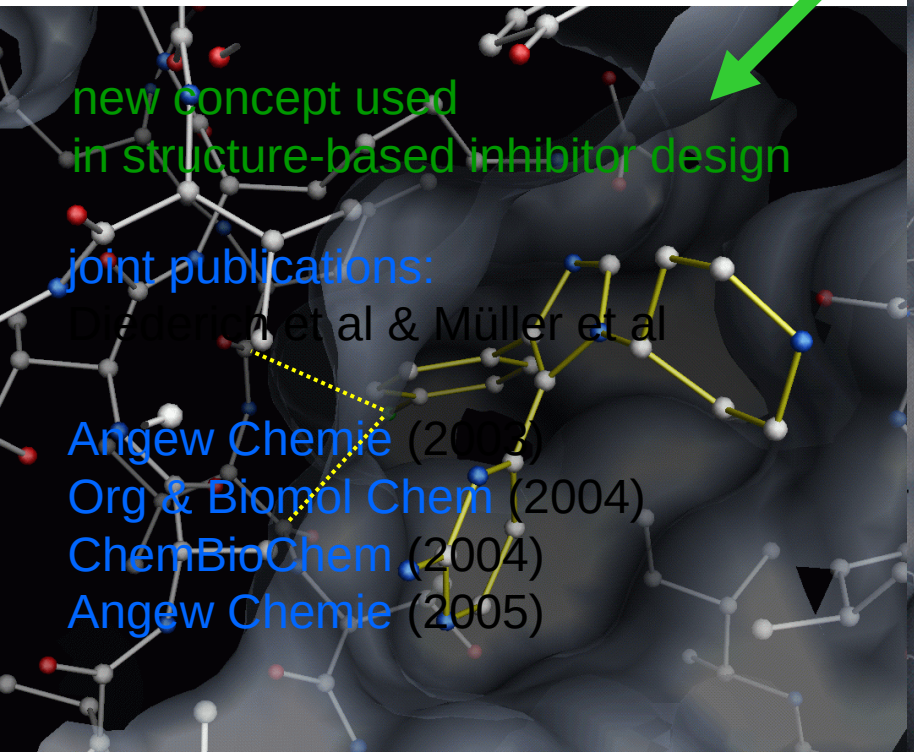
new structural motif





a general new ligand design motif

PDB – Protein Structure Database



new concept used
in structure-based inhibitor design

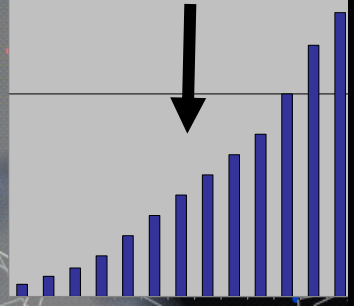
joint publications:
Diederich et al & Müller et al

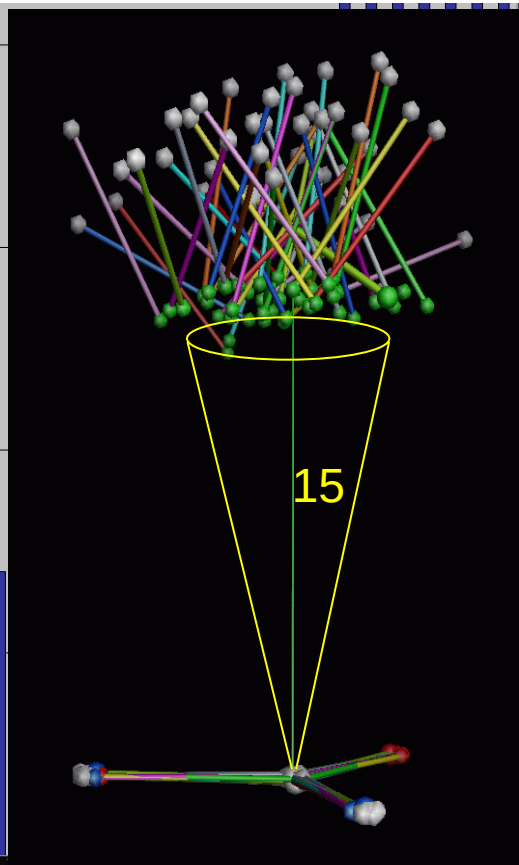
Angew Chemie (2003)
Org & Biomol Chem (2004)
ChemBioChem (2004)
Angew Chemie (2005)

CSD
Cambridge
Structural
Database

Roche

CAMM
1982





drug discovery

new scaffolds

privileged structures

novel design principles
structure design

new building blocks

novel design principles
property design

liponeutral bulk increase
neutral amines
conformational locks
solubility enhancers
amphiphilicity breakers
metabolism blockers

innovative building blocks and lead structures

high-quality clinical candidates

synthetic challenges

fundamental research in structure-property relations

synthetic challenges of modular building block design

education in aspects of modern medicinal chemistry

synthetic methods
basic aspects of
structure ↔ properties
novel molecular entities

drug discovery

innovative lead structures
novel building blocks
improved clinical candidates

new scaffolds

focus on relevant properties
extensive data bases

fundamental aspects of
molecular properties

new building blocks

new concepts applied in design of
desired building blocks

new concepts explored
by prototypic molecules

focus on building blocks
for ready use in medicinal chemistry

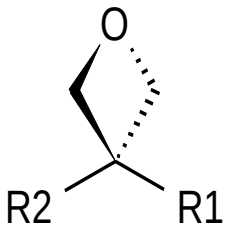
prototypic building blocks
novel synthetic access routes

experimental measurements
BB incorporation strategies

scientific exploration
synthetic scope & limitations

project-specific applications
proprietary know-how

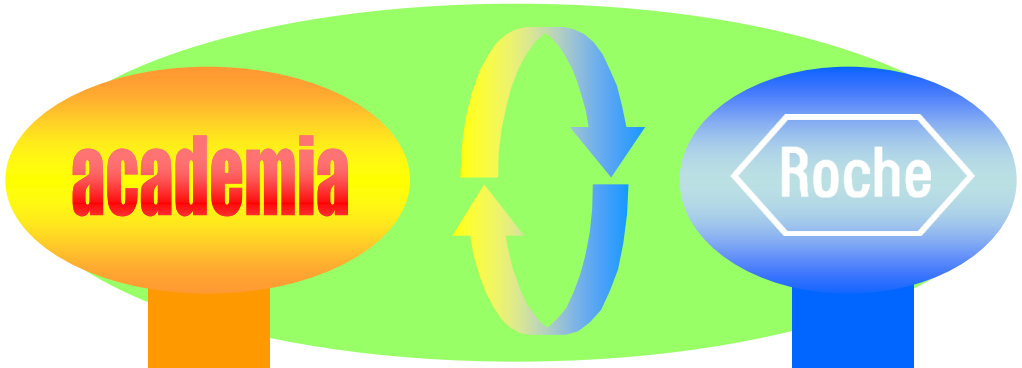
exemplary applications
in the public domain



fundamental understanding of structure-property relations

new synthetic methods – new buidling blocks – new concepts

Industry-University Collaborations



frontier science and technology: a permanent priority of public funding	best competent groups selected for collaboration
avoidance of research competition to industry	collaboration on the basis of research complementarity
no substitution of public funding by industrial collaborations	no subsidiary funding in domains of public responsibility

industry-university collaborations:
primarily a source of mutual scientific and technological benefit
secondarily a source of additional financial support