

What Does Personalized Medicine  
Mean For You?

*ISCTM, Fall Meeting  
October 2009*



## Personalized Medicine – Fashion or Substance?

*High interest and expectations from the public*



Pille nach  
Mass

*Massenware war gestern. Die Zukunft gehört der massgefertigten Pille*



*Is personalized medicine finally arriving?*

**FINANCIAL TIMES**

*Personalised medicine - Keeping us alive is good business*

THE **IN VIVO** BLOG

*The Hope and Challenge of Personalized HealthCare*

**THE TIMES**

*Novel diabetes therapy paves way for personalised medicine*

Katie Couric's Notebook: Pharmacogenomics



## Personalized Medicine: Where are we Today?

### Personalized Medicine

Practice

*Personalized*

Science

*Population based*

Areas where medicine is personalized are where we have an understanding of the phenomenology and the pathophysiology

## Surgery: Practice and Science were personalized in the antiquity

### Edwin Smith Papyrus (16<sup>th</sup> century BC)

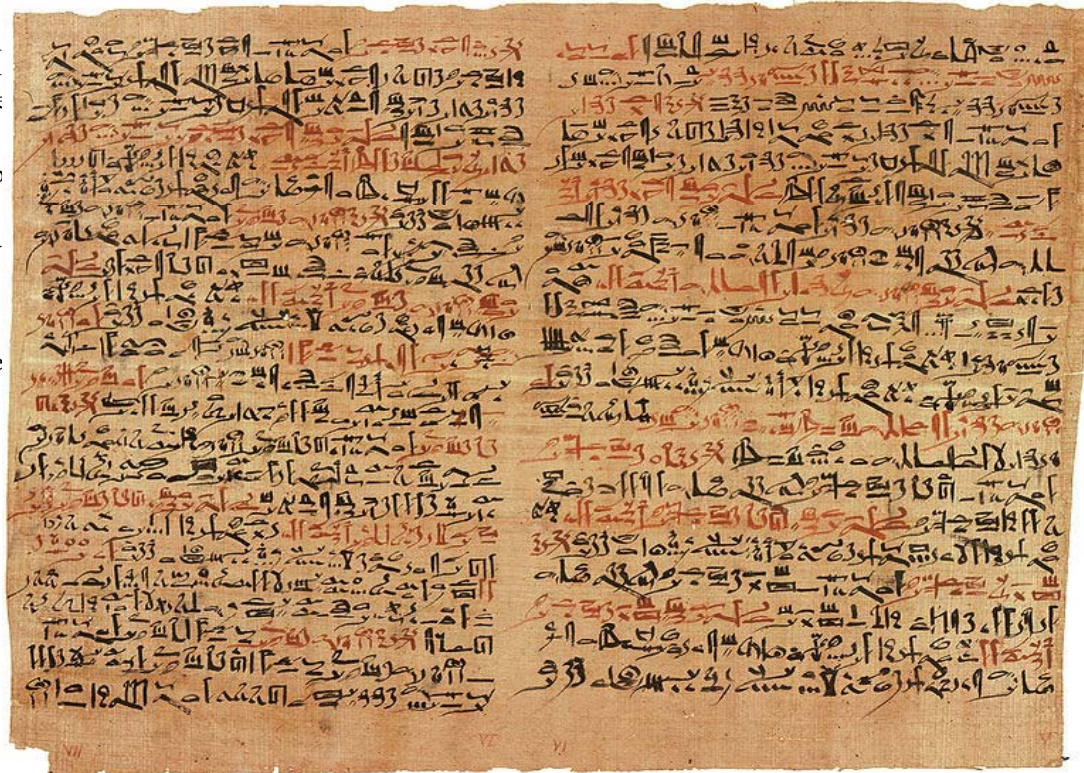
- **Case Two: Instructions concerning a [gaping] wound [in his head], penetrating to the bone.**

- **Examination:** If thou examinest a man having a [gaping] wound [shouldst] pal[pate hi]s [wound]. If thou findest his skull [uninjure

- **Diagnosis:** Thou shouldst say regarding [him]: "One having a gap

- **Treatment:** [Thou] shouldst bind [fresh meat upon it the first day (and) lin]t every day until he recovers.

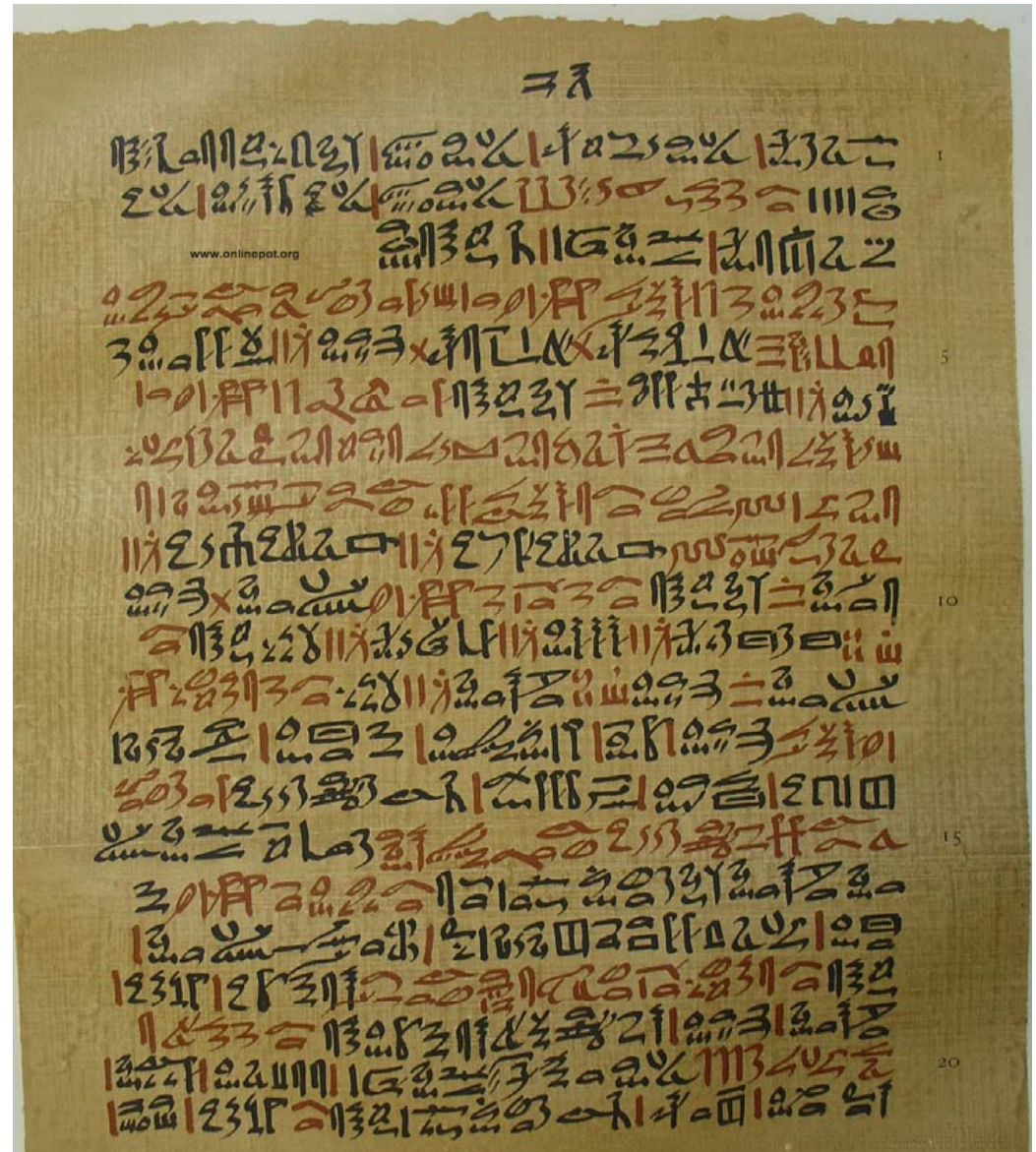
- **Gloss:** As for: "Two strips of linen," [it means] two bands [of line join] to the other.



## Internal Medicine in the antiquity: more empirical approach

### Ebers Papyrus (1550 BC)

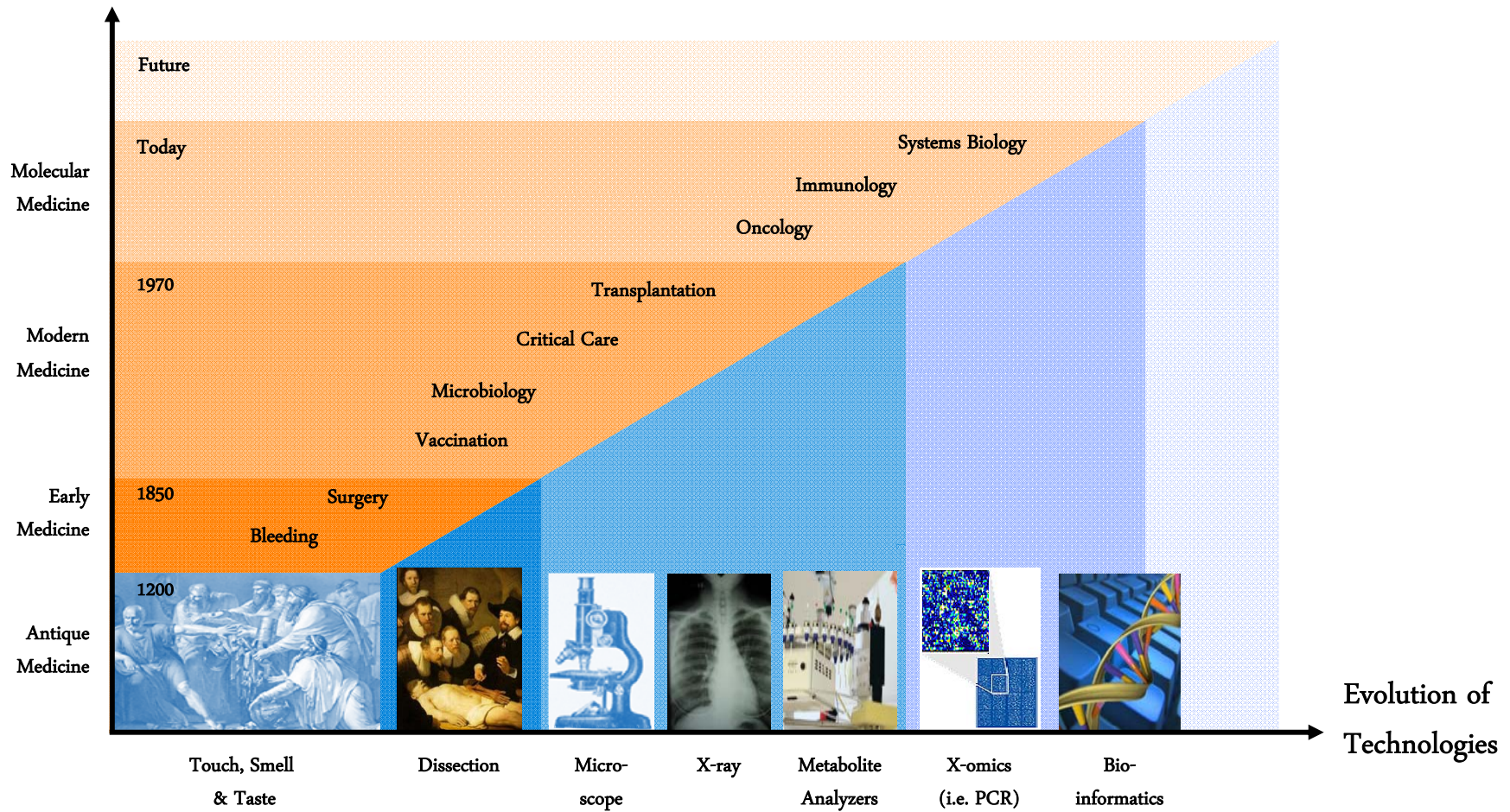
- If you examine someone mortally ill (and) his body is shrunken with disease *in extremis*; if you examine him (and) you do not find disease in his body except for the surface of the ribs, the members of which protrude like pills; you should then recite (a spell against) this disease in your house; you should (also) then prepare for him ingredients for treating it: blood stone of Elephantine, ground; red grain; carob; cook in oil (and) honey; it should be eaten by him over four mornings for the suppression of his thirst and for curing his mortal illness.



# Evolution of Medicine . . . and PHC

## *Progress in therapy driven by new technologies*

### Evolution of Medicine

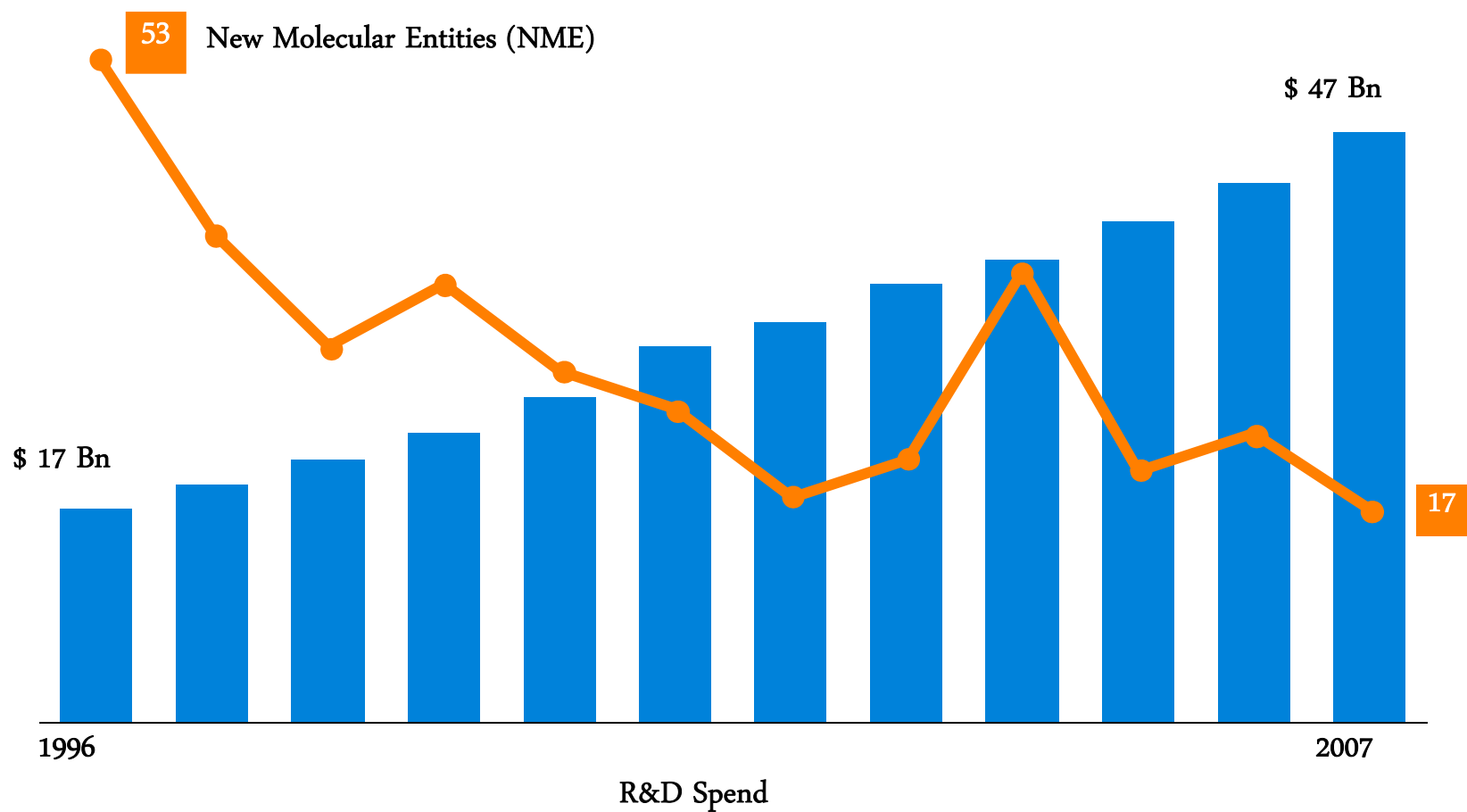
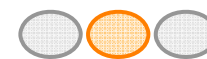


Why Personalized Medicine?

The Drivers for change

# Key Drivers of moving towards PM

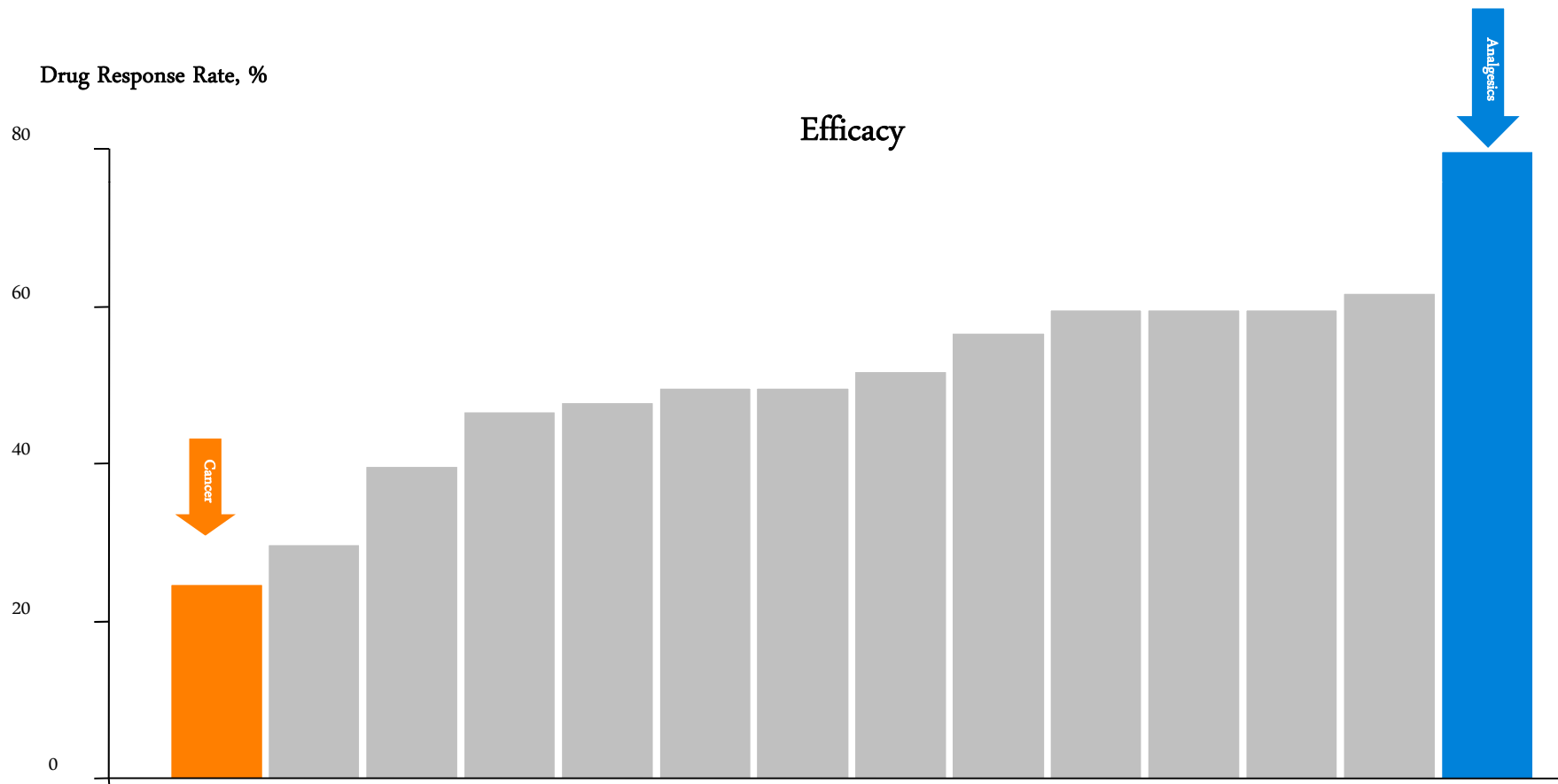
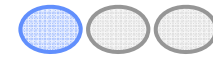
## *Step-change needed in drug development*



Sources: FDA/CDER Data, PhRMA data, Price Waterhouse Coopers analysis, Pharma 2020

# Why Personalized Medicine?

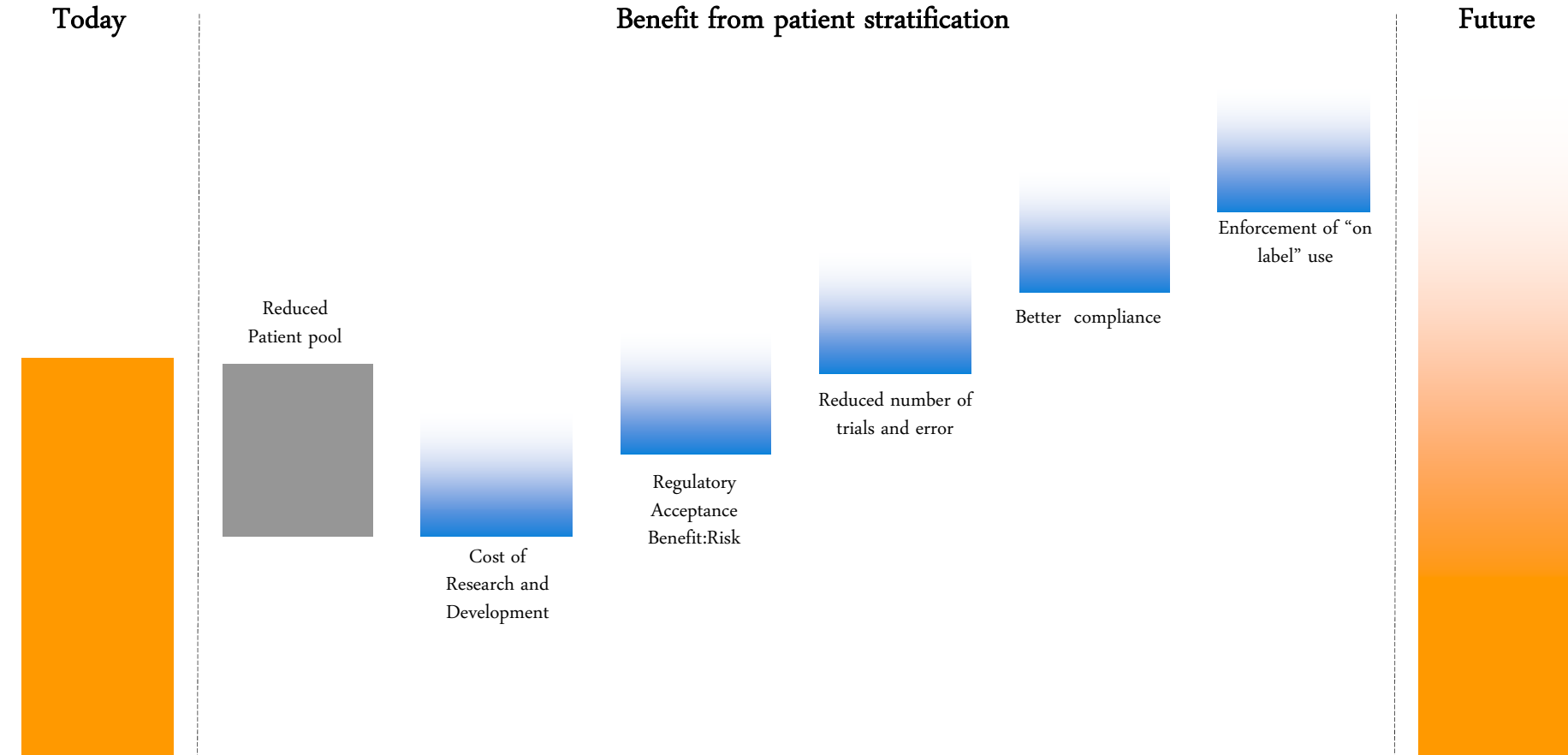
*A call for more effective and safer drugs*



1 Spears et al., Trends Mol Med, 2001; 2 Lazarou et al., JAMA, 1998

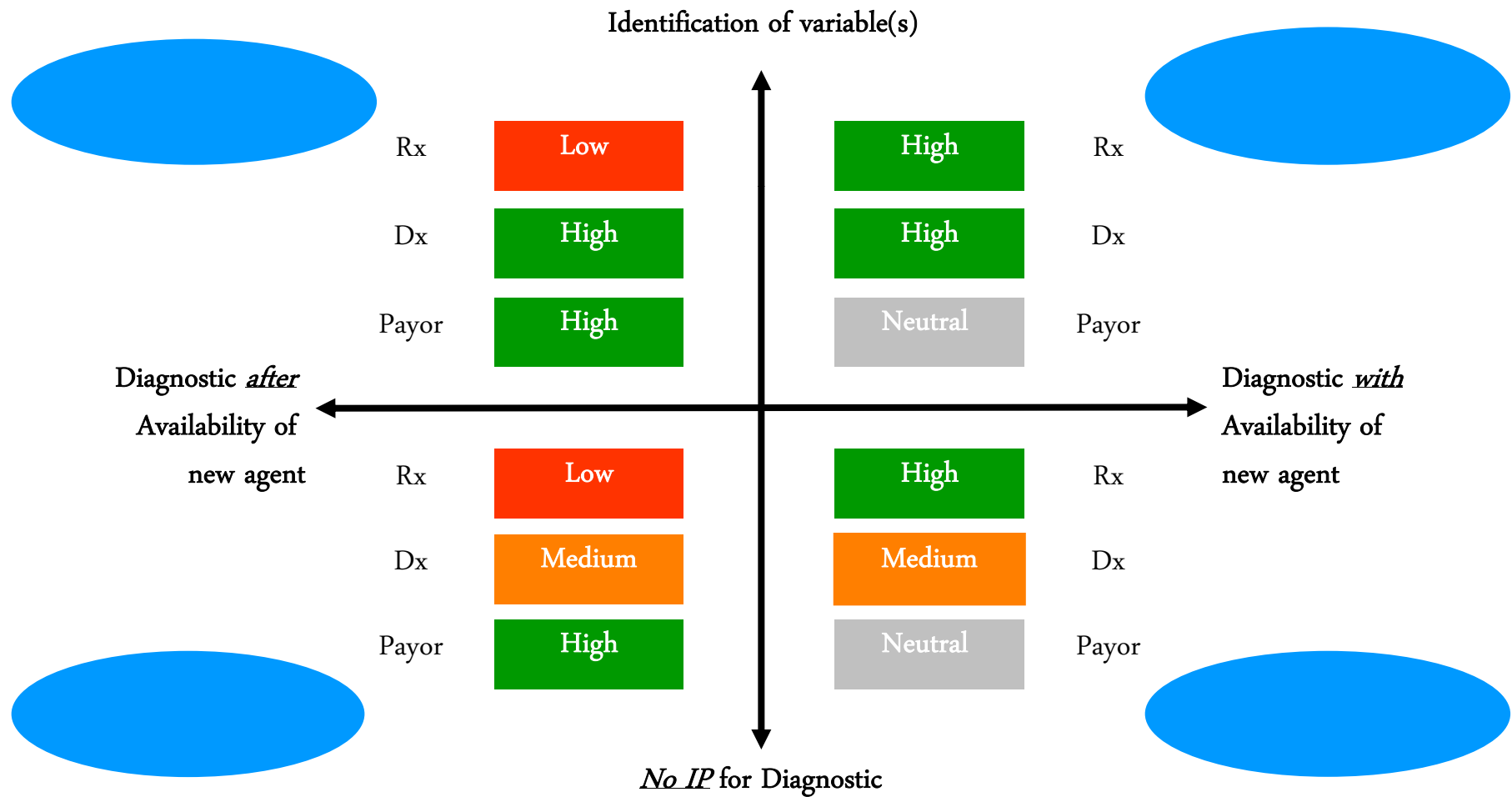
# Pharmacoeconomics of Therapeutic Stratification

## *Building on an improved Therapeutic Index*

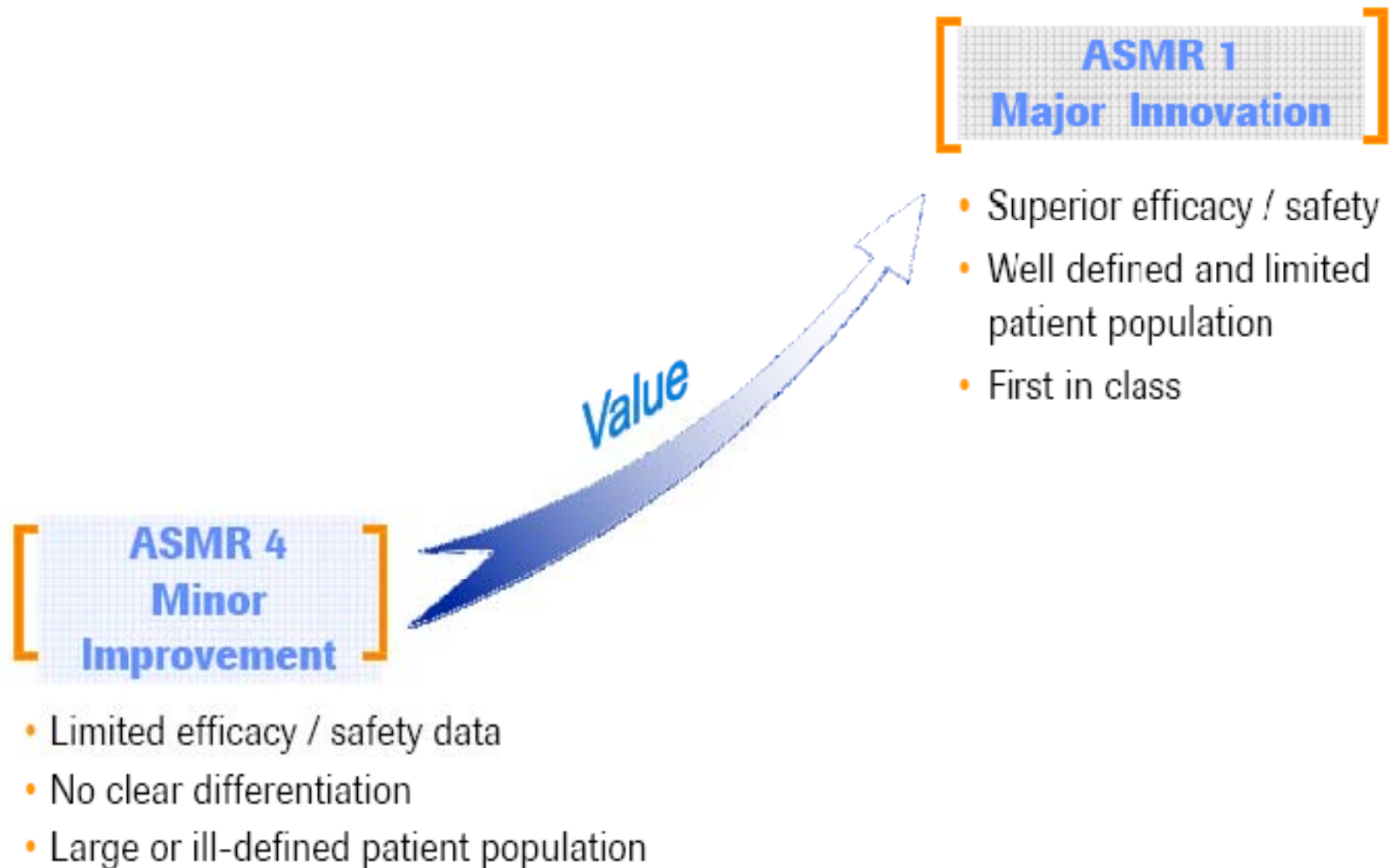


It is all about the timing: Early identification of PM is key

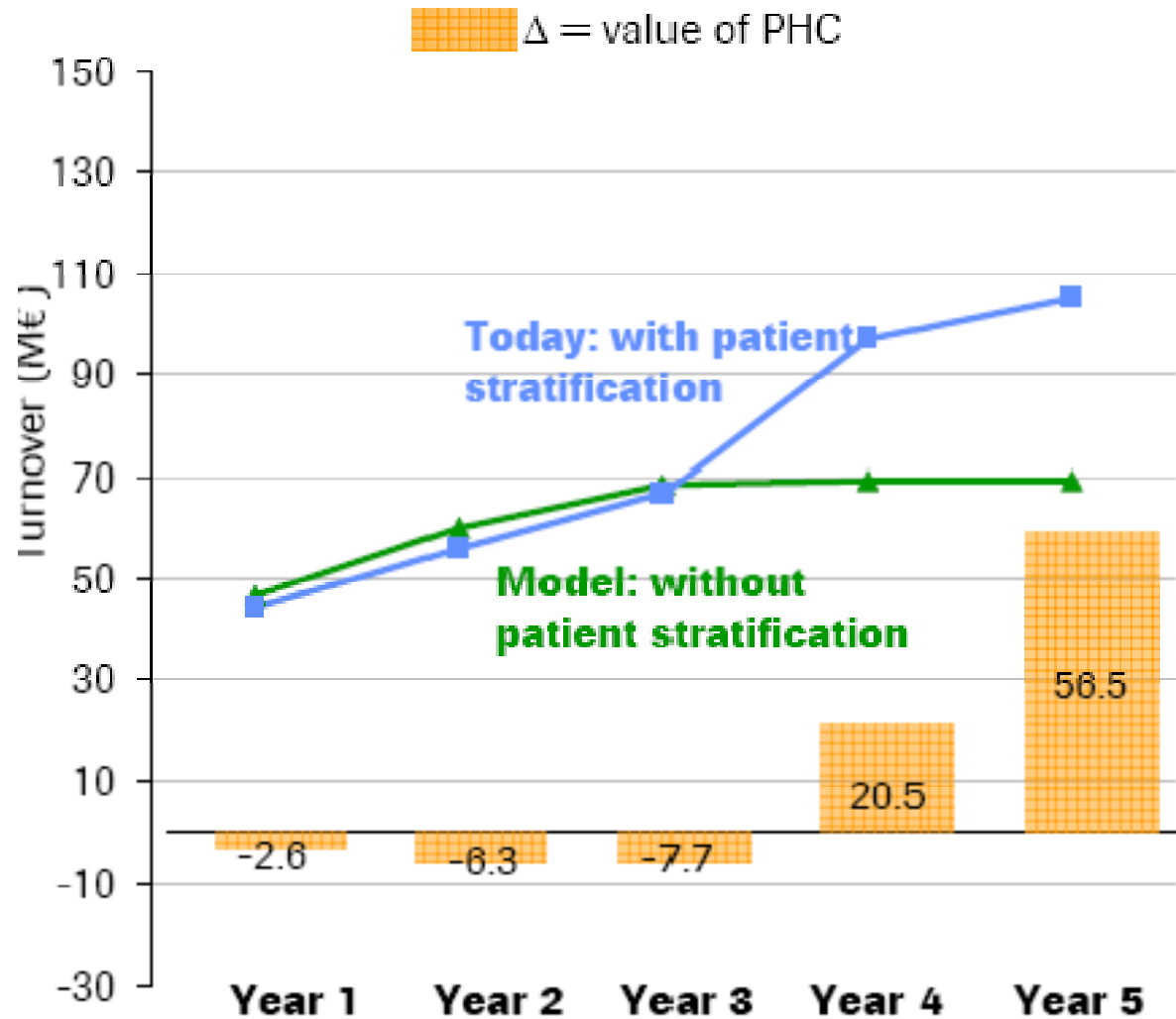
*Value captured by different stakeholders depending on IP and timing of diagnostic*



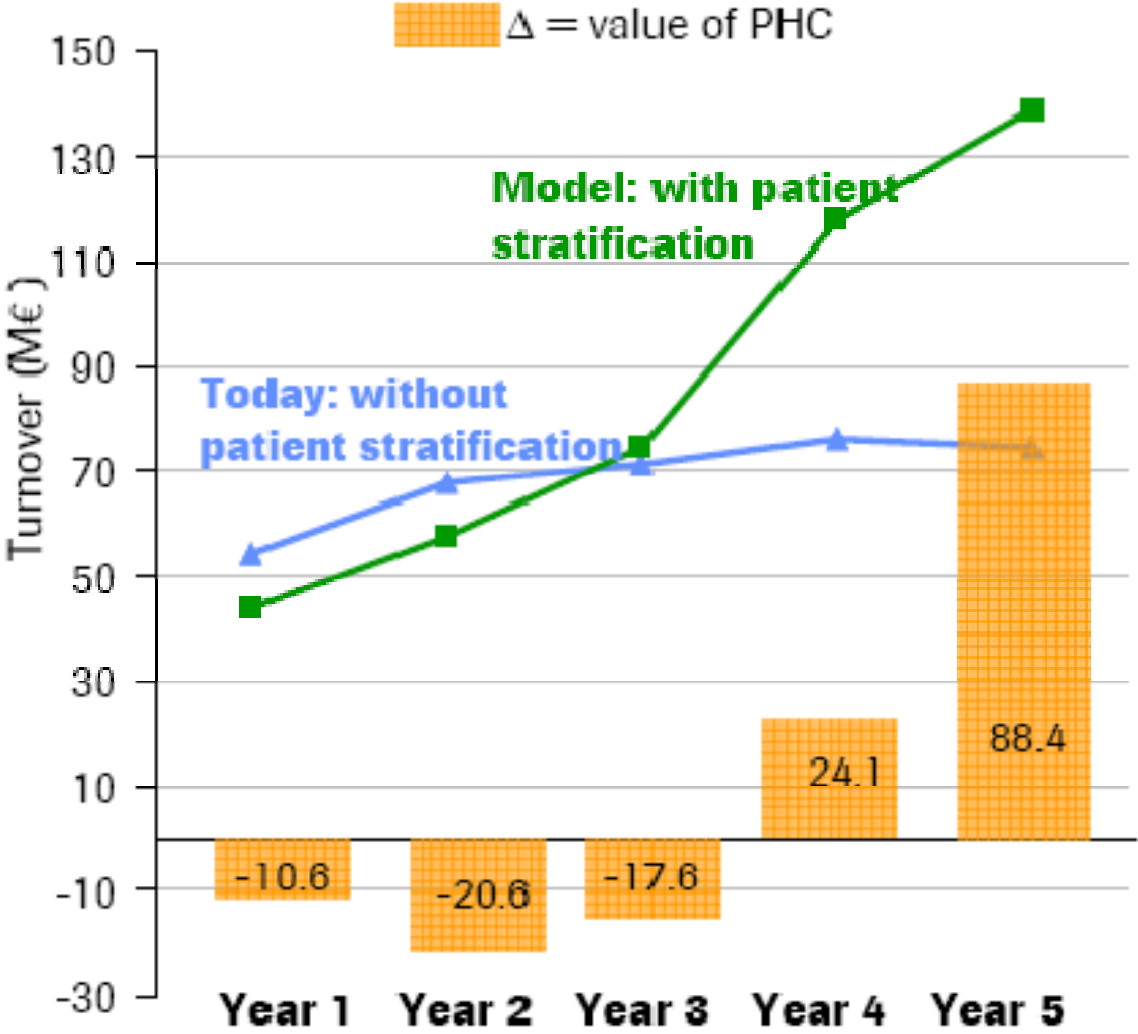
# Determining the Value of Therapeutic Intervention, The French Economic Model



# Use of Personalized Medicine as a Driver for Added Value – *A business rationale while enhancing the therapeutic index*



# Potential Added Value of Personalized Medicine



# Research Approaches to PM in CNS

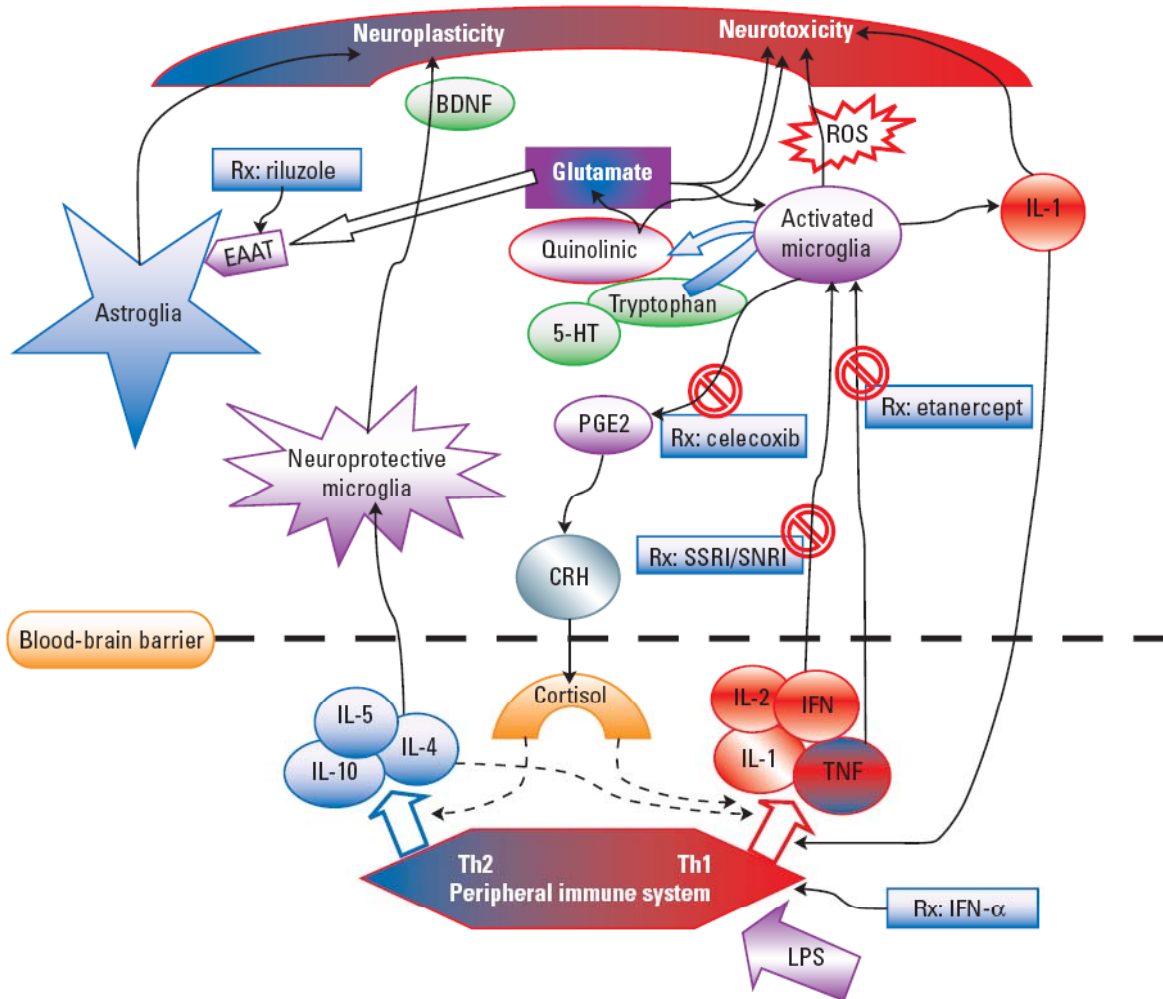
Use of any variable to enhance therapeutic index

- Phenotyping
  - Demographics
  - Symptom clustering - Schizophrenia with predominant negative symptoms
  - Diagnostic – Schizoaffective disorder, atypical depression
  - History of treatment – Treatment Resistant Depression, TRS
- Biomarkers
  - Inflammation in depression
  - Genetics (Fx and FAD)

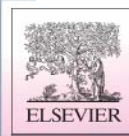
# Inflammation, glutamate and glia in depression

## *Moving closer to Personalized Medicine in CNS*

### Neurotoxic and neurotrophic actions of microglia and astrocytes



- Excess inflammation occurs in a subpopulation of patients with MDD
- High incidence of depression in chronic inflammatory diseases
  - Potential to understand depression and its pathophysiology
- Inflammatory mediators are influenced by genetic polymorphism
  - Potential pathway to develop targeted treatment for endophenotypes and genotypes



**TRENDS** in  
**Immunology**  
FORMERLY IMMUNOLOGY TODAY

*Trends Immunol.* January 2006 Vol. 27 No. 1, pp. 1–56 ISSN 1471-4906



## Cytokines sing the blues

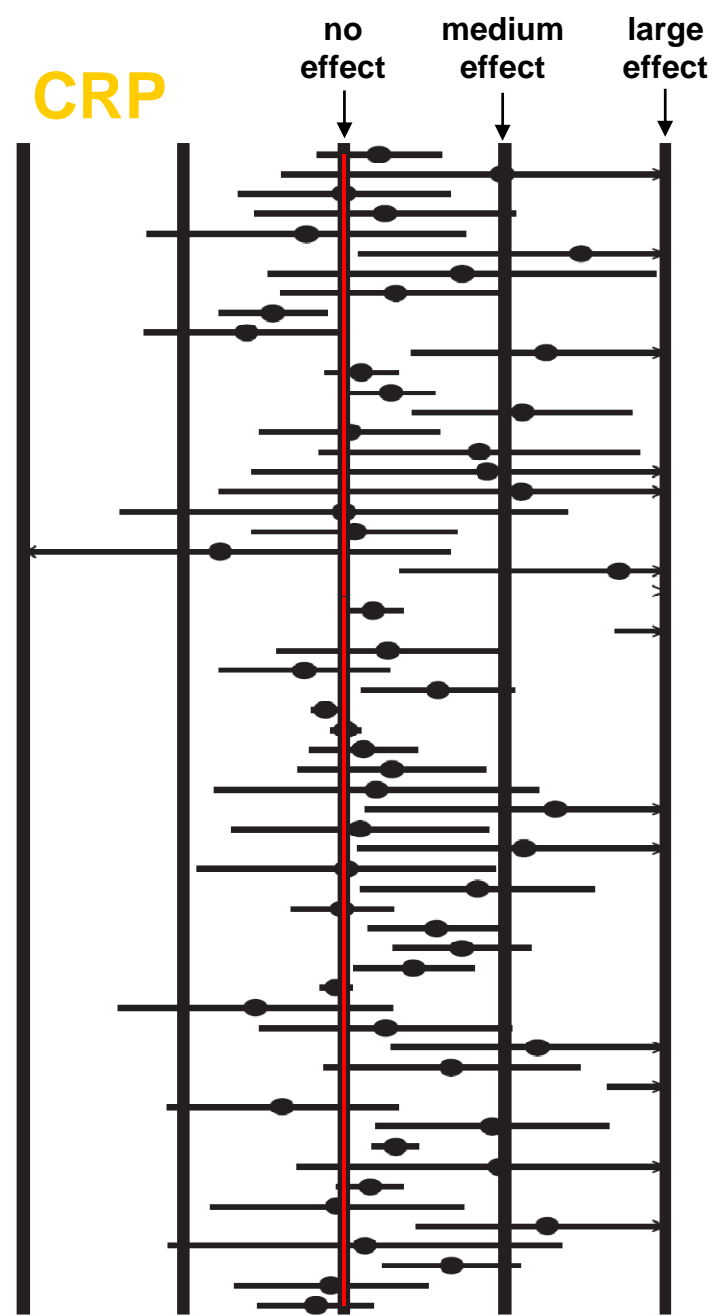
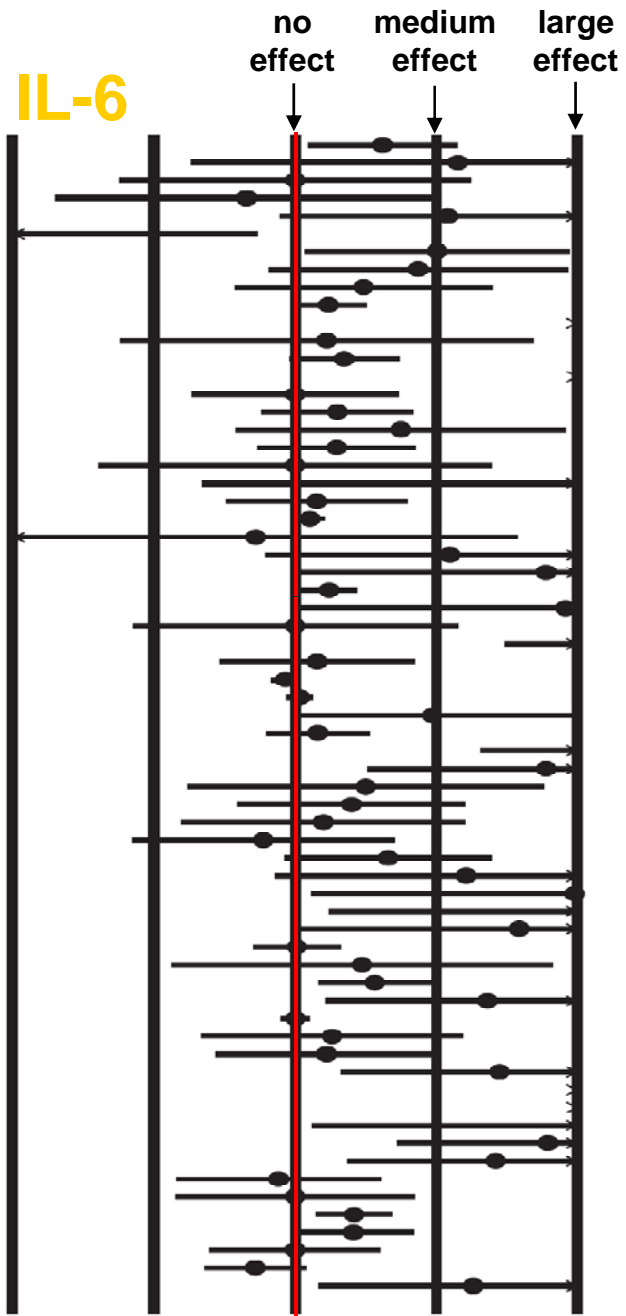
**MAP3Ks and innate immunity**

**CTL epitopes – length is important**

**A boost for vaccine responses by TLR signalling**

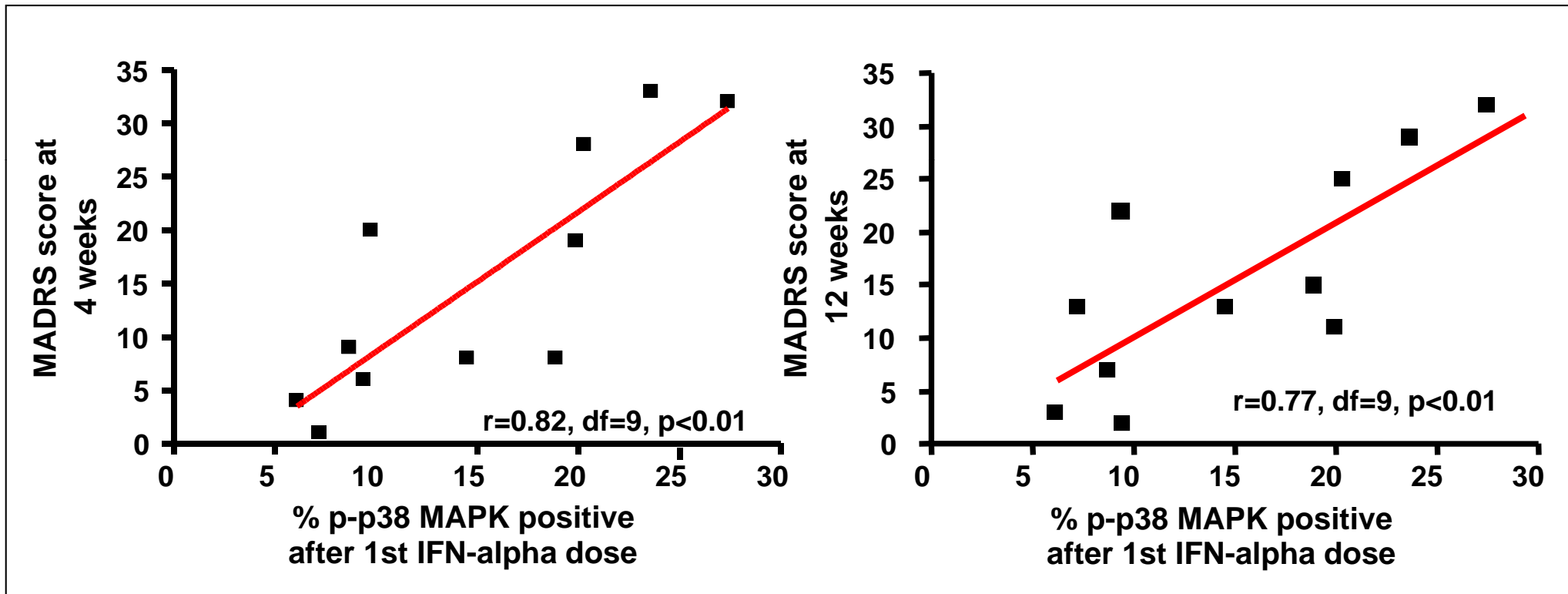


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Howren et al. *Psychosomatic Med*, 71:171-186, 2009.

# Maximal % p-p38 positive after the First IFN-alpha Dose and MADRS Score at 4 weeks of IFN-alpha Therapy



## Conclusions

- Personalized Medicine presents an opportunity for patients, payors and sponsors.
- Multiple opportunities for the application of PM in CNS are in evaluation.
- Better understanding of the pathophysiology is the basis of the new wave of PM therapeutics.
- Early identification of patient population with an improved therapeutic index is key for a successful Personalized Medicine approach