The Innovative Medicines Initiative (IMI)

IMI Strategic Research Agenda as it Applies to Surrogate Endpoint Biomarkers

EMEA/EFPIA Workshop on Biomarkers
December 15th, 2006
Klaus Lindpaintner

The Drivers for a New R&D Model of Public-Private Partnership

- Important novel opportunities from genomics and related disciplines
- Timelines and cost of drug development
- The potential of increased cooperation among stakeholders

➔ Creation of IMI by EFPIA and the EC

The IMI Strategic Research Agenda

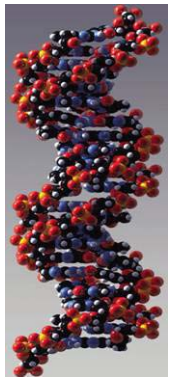
http://www.imi-europe.org

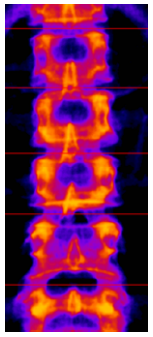
- Developed by over 350 stakeholders
- Identifies bottlenecks and associated pre-competitive opportunities in the R&D process
- Proposes recommendations to address this bottlenecks
- Proposes a new model of Public-Private collaborations to implement the recommendations

Science and technology advances present significant opportunities

Understanding human physiology

'-omics'





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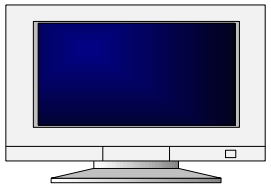


ICT

Public investment

Pre-competitive collaborative research

Private investment

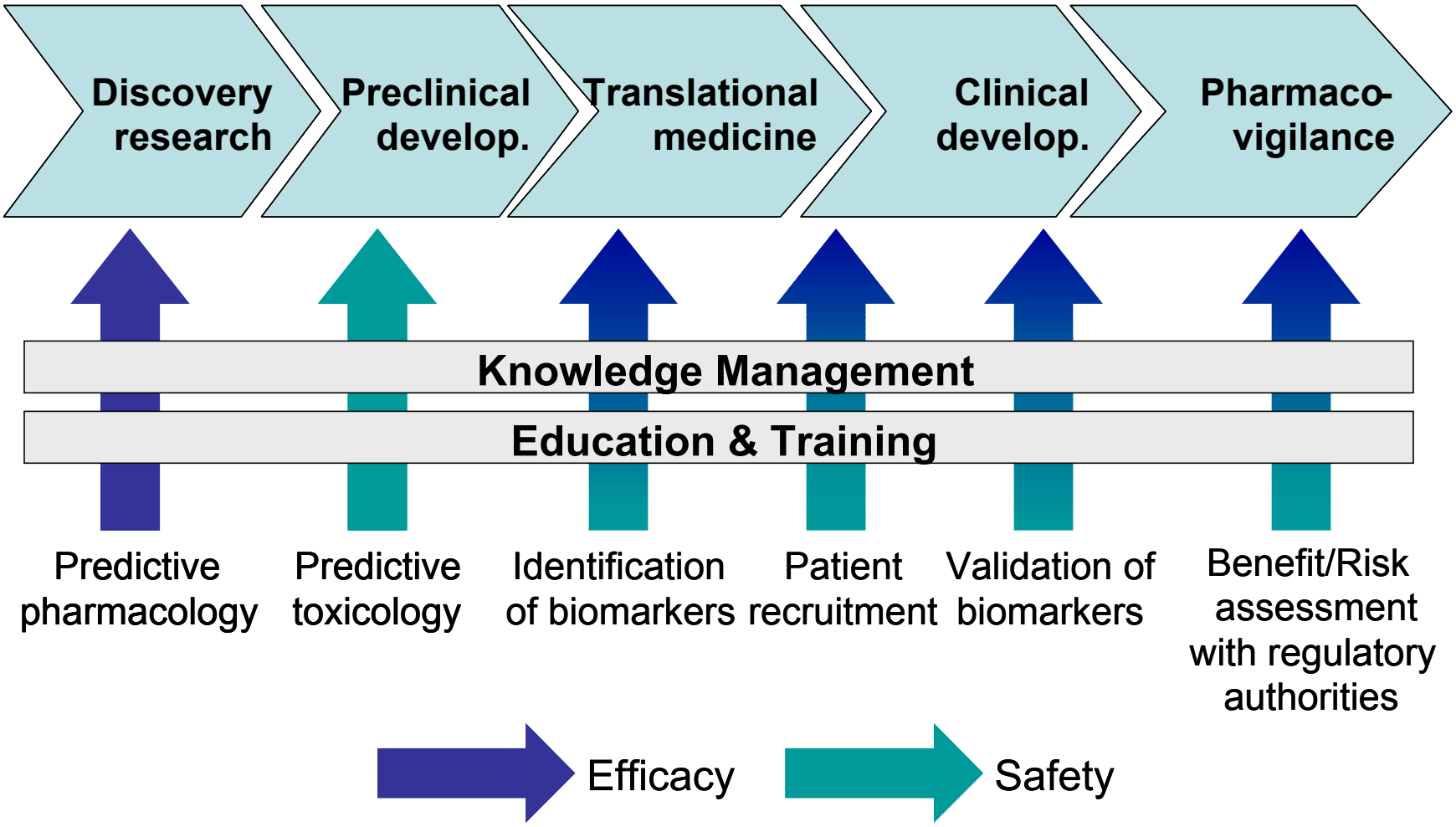
Better understanding of disease/drug mechanisms

More efficient drug discovery and development

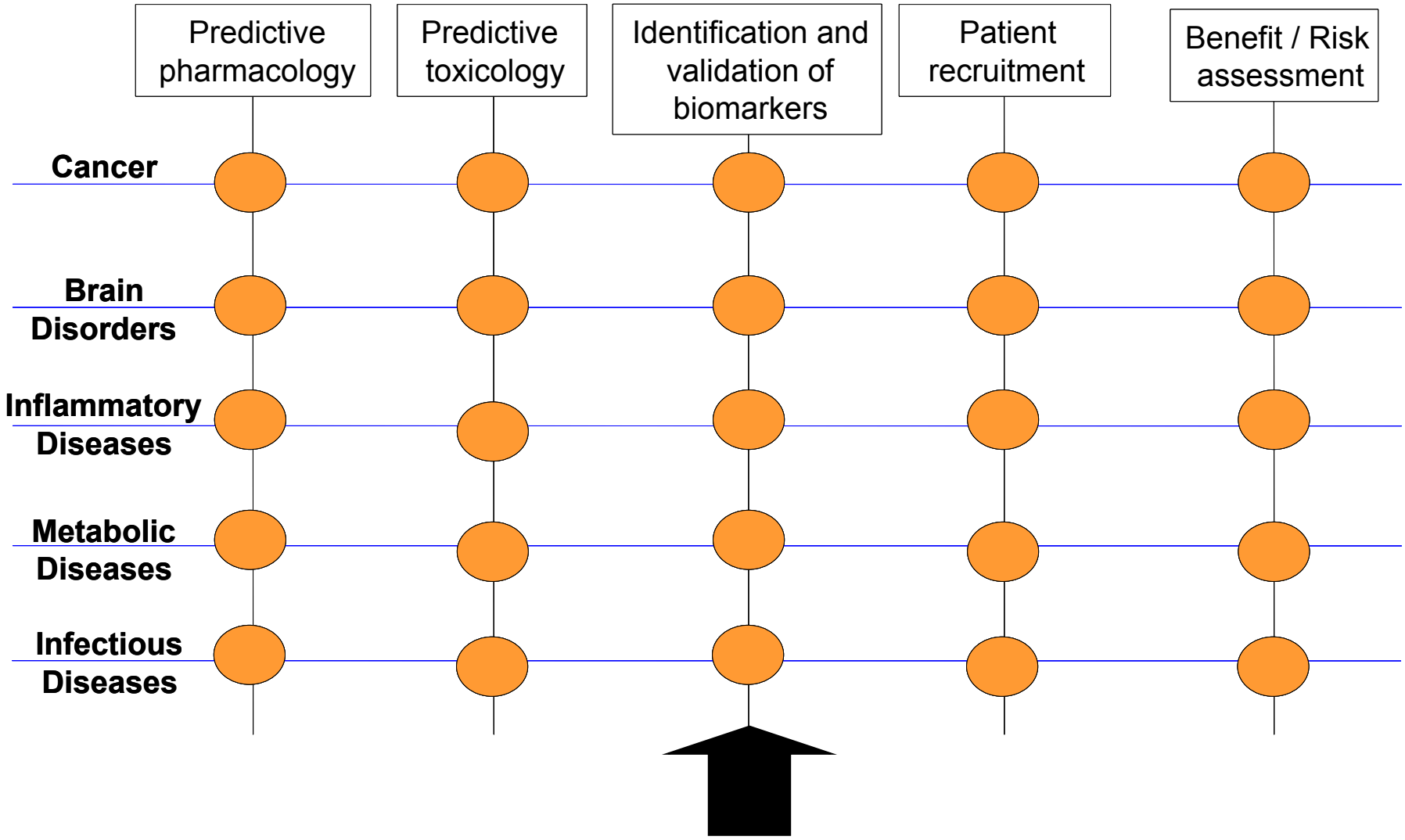
Better medicines, faster

Health benefits for patients

The Research Focus of IMI



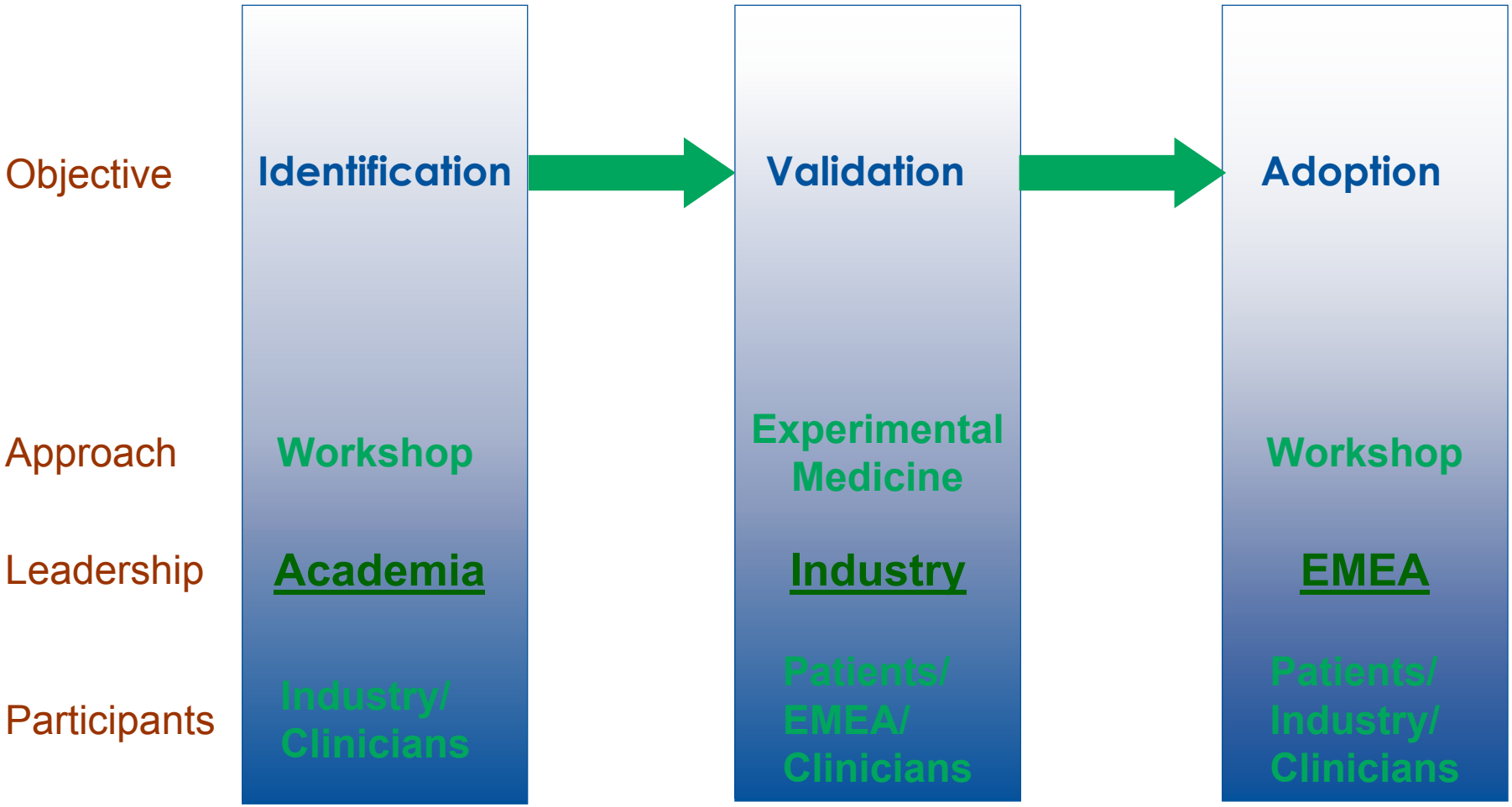
Disease Focus



IMI Recommendations concerning the identification and validation of biomarkers

- Create disease-specific imaging networks
- Develop systems biology approaches, i.e. disease mechanistic modelling and simulation
- Stimulate translational medicine in an integrated fashion incl. new ways and tools for conducting clinical trials
- Create Regional Biomarker Centres and Communities of Experts for the identification and validation of biomarkers and novel targets
- Develop biomarker database to underpin the validation process
- Develop partnership with regulators for innovative clinical trial design and acceptance of biomarkers, where appropriate

Example of a IMI Patient Centred Project: Validation of a New Biomarker



"Validation" of Biomarkers
Sampler form the Roche Experience

- Biomarkers for efficacy likely relevant/successful if identified early on
  - Example: trastuzumab and *HER2* expression test
- Biomarkers for efficacy in serious indications must deliver high information content lest they will result in inappropriate denial of treatment
  - Example: erlotinib and *EGFR* mutations
- Biomarker "Target Product Profile" important to define
  - Major dependencies on indication (serious vs. trivial) and use (ADR vs. efficacy)
  - Differentiated approach paramount

Biomarker Target Product Profile: *Primum non nocere*

- Trivial indications:
  nocere = inappropriate treatment
  - ADR: avoid at all cost (inappropriate withholding of drug o.k.)
    → high sensitivity, specificity less important
  - Efficacy: don't treat unless you are sure the drug will work
    → high specificity, sensitivity less important

- Life-threatening indications:
  nocere = inappropriate withholding of treatment
  - ADR: do not withhold drug inappropriately (only if very high risk of ADR)
    → high specificity, sensitivity less important (example Abacovir)
  - Efficacy: do not withhold drug inappropriately (only if very low odds of response)
    → high sensitivity, specificity less important (example Herceptin)

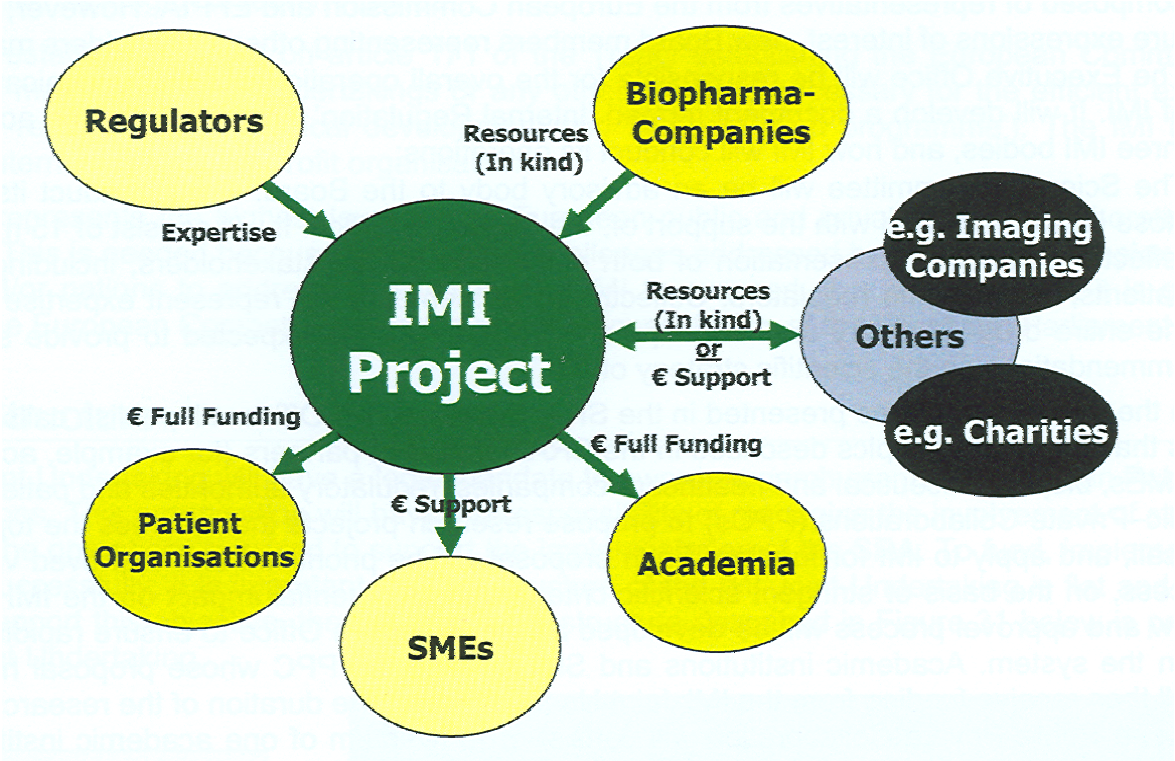
Benefits of IMI for Validation of Biomarkers

- Leverage pre-competitive knowledge that was previously out of reach
- Leverage trial data to reach requisite size for statistical power
- Earlier application of new technologies to regulatory practices
- Regulators to be involved earlier in the process
- Increased collaboration among all relevant stakeholders

➔ **More biomarkers, validated faster**

Resource strategy

- € 460M per year x 7 years in direct, *in-cash* funding to academia, patient organizations, and SMEs
- Contingent on matching funds *in-kind* from industry in collaborative, pre/pro-competitive projects
- A major opportunity for European science, as well as a tall challenge



Benefits of Increased Collaboration for All Stakeholders

- Access to pre-competitive knowledge that was previously out of reach
- Stimulation of creativity
- Achievement of critical mass
- Shared risk of failure
- Enhanced learning experience

➔**Generation of More Innovative Solutions**

The Ultimate Beneficiaries ...

… All EU citizens