Prevention of Pandemic-associated Pathology Munich

P^3M

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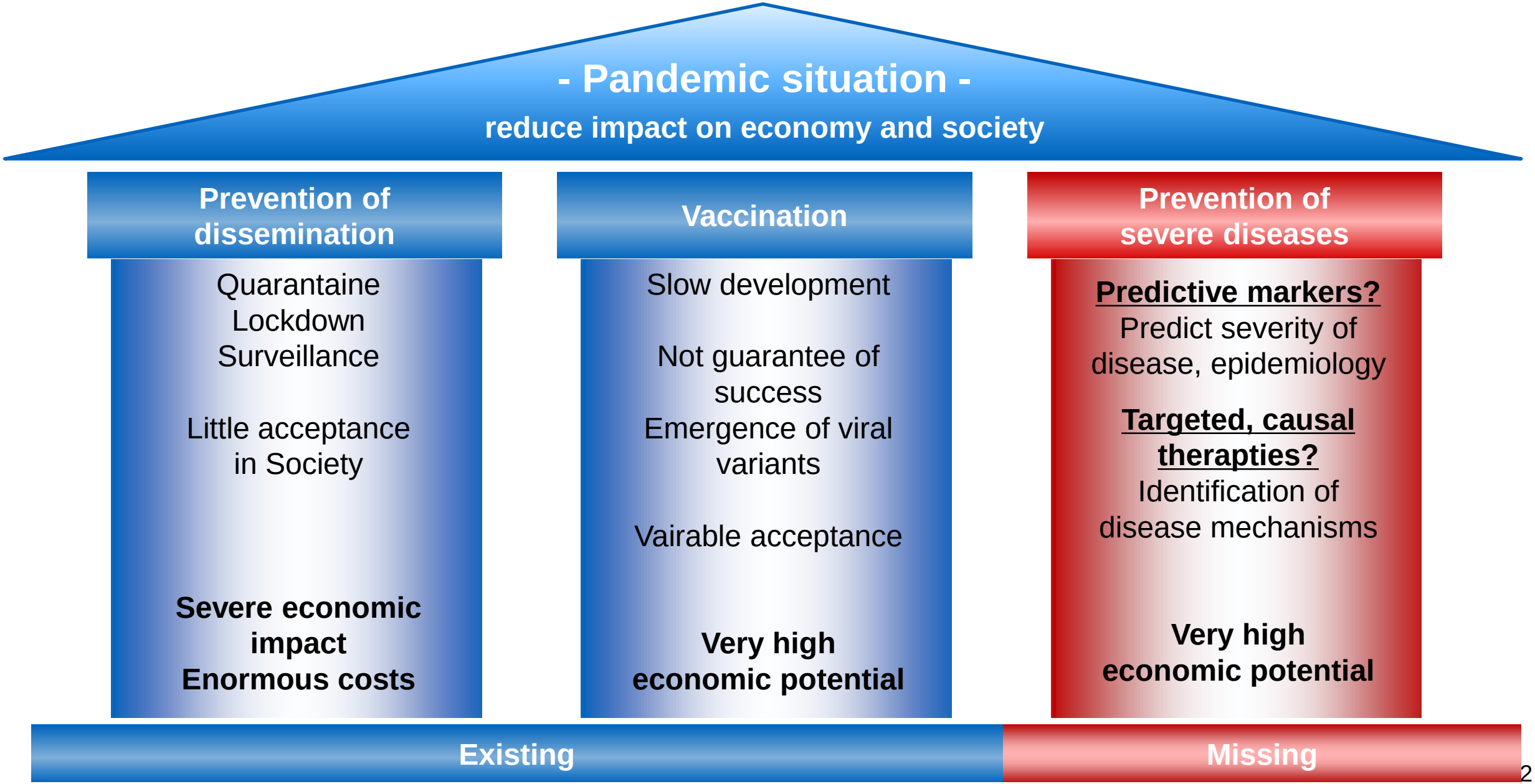
Fighting a pandemic requires three pillars



„One Munich strategy“

Prevention of Pandemic-associated Pathology Munich

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One Munich Strategy

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Research foucs Areas

- Pathogenicity driven by virus
- Pathogenicity elicited by the host
- Development of AI-based disease models

3

P³M - Targeted programs based on synergies of experts

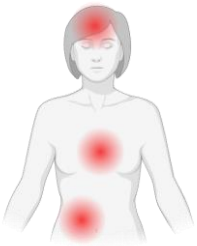
Prevention of Pandemic-associated Pathology Munich

I.

Viral pathogenicity

Which cells are infected?
Which organs are affected?
What are the hallmarks of infection,
how can infection be prevented?

II.



Immunopathogenicity

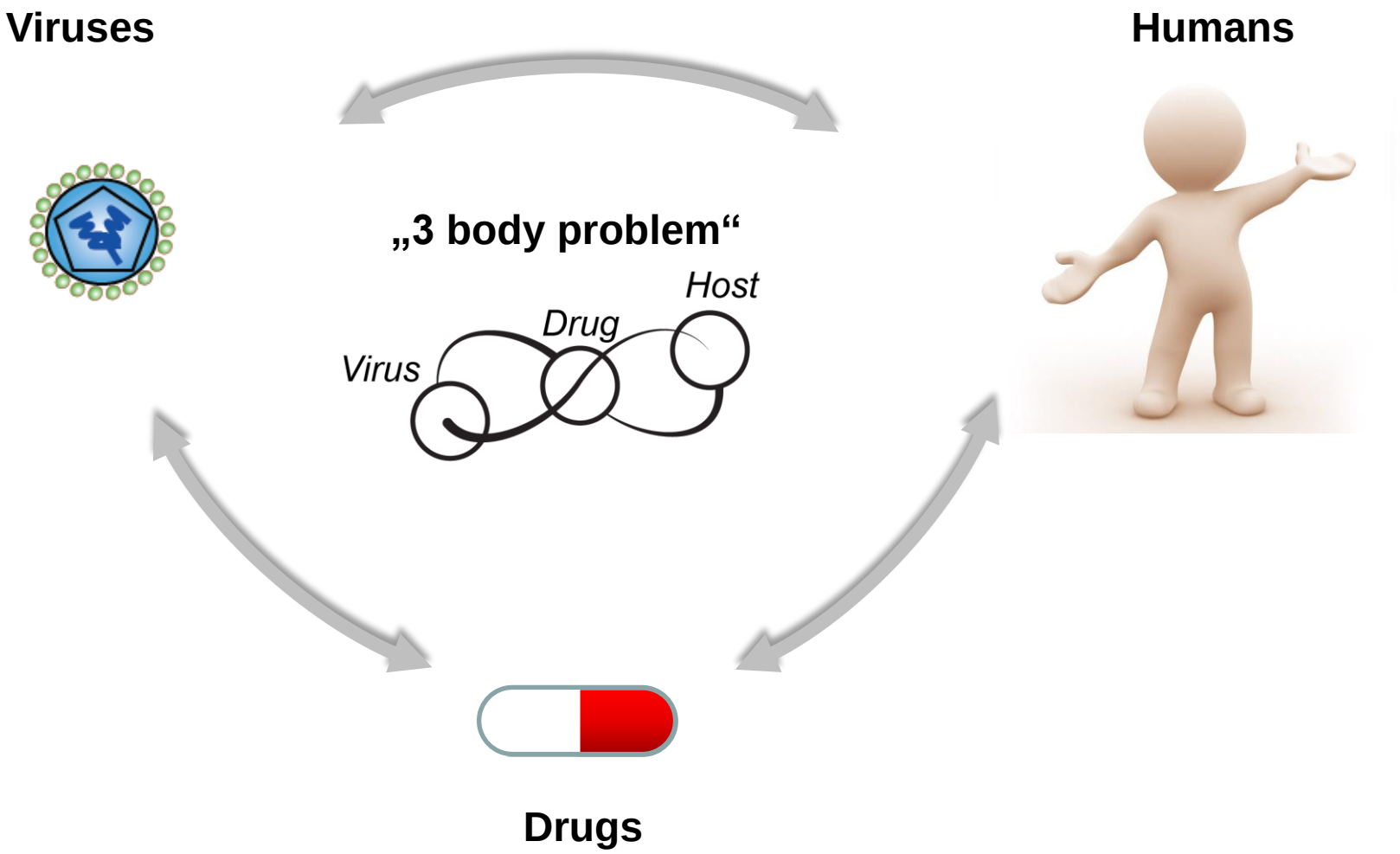
Which immune reactions protect,
Which ones are damaging?
How to discriminate protective from
damaging immune responses?
how can infection be prevented?

III.

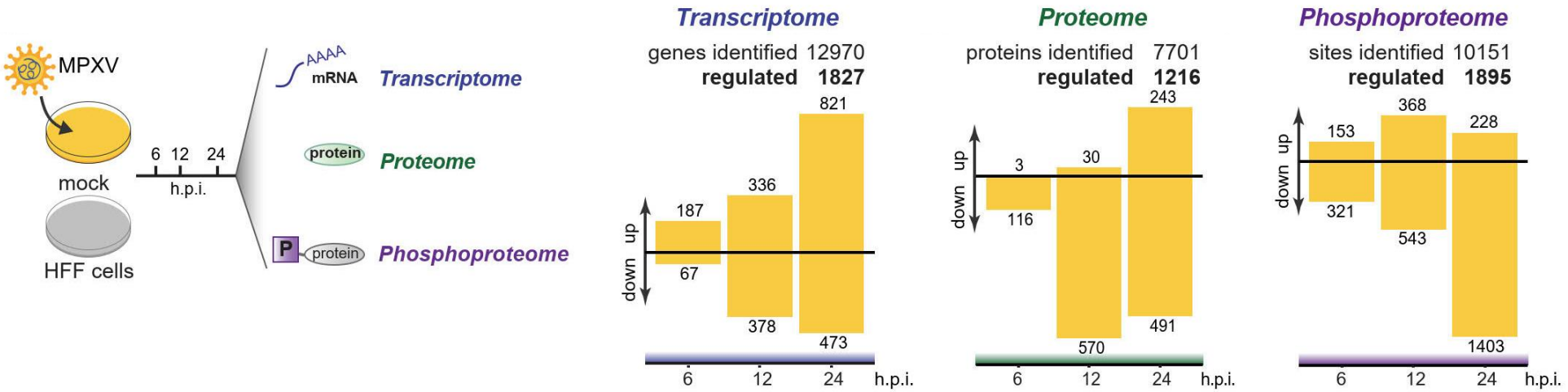
Systems analysis (predicitive models)

Which cellular signalling networks are affected
How can data be used as guidance for

Predictive activities of drugs (or genes)?



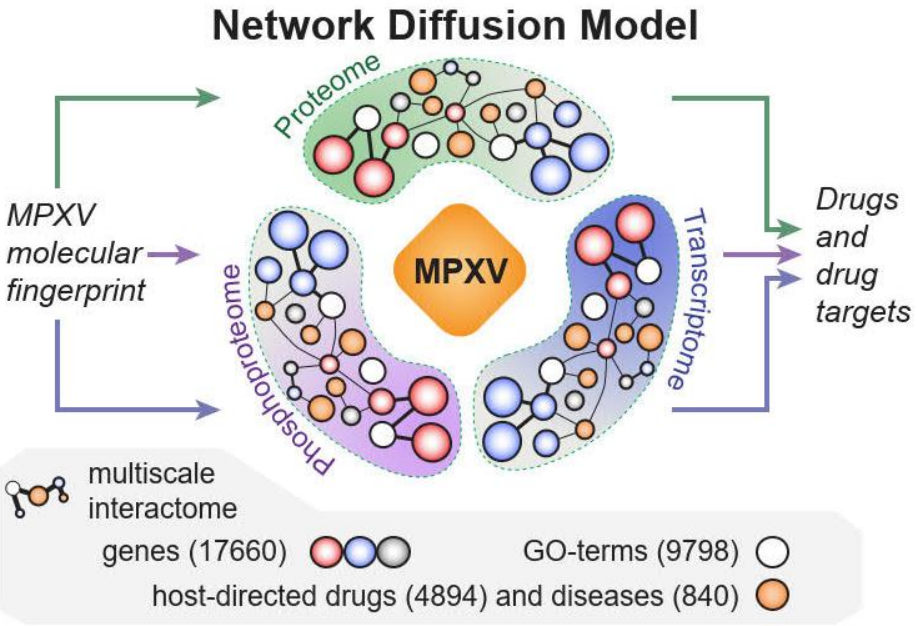
Multi-omics approach to study MPXV

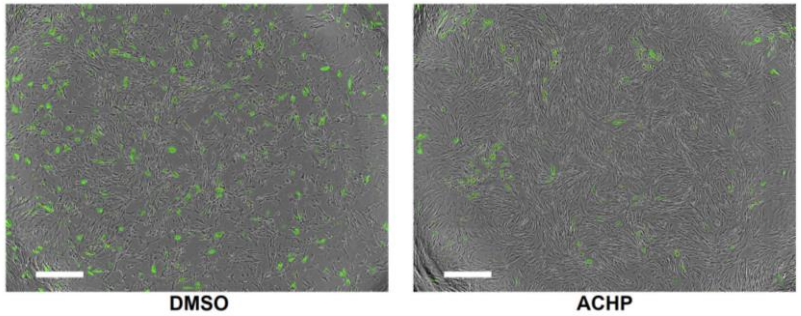


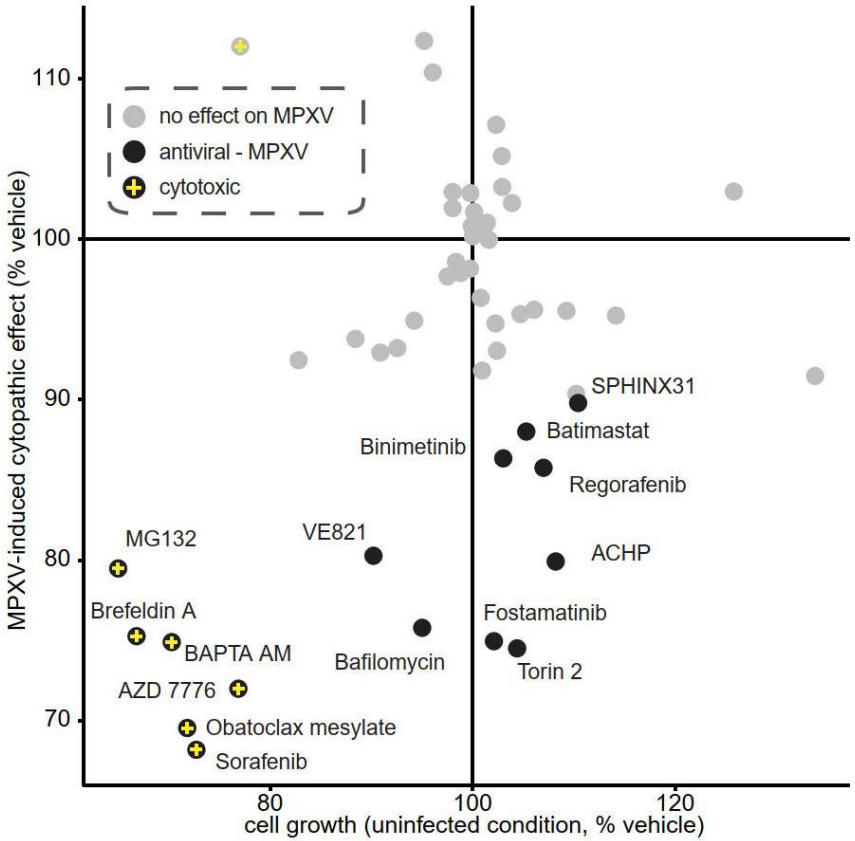
- **Identification of MPXV-driven perturbations on the host**
- **Identification of kinases that are differentially active in MPXV-infected cells**
- **Identification of potential drug targets and drugs that are activte against poxviruses**

Huang et al, in revision
With Gerd Sutter, Ulla Protzer

Interactome and effects of individual viral proteins



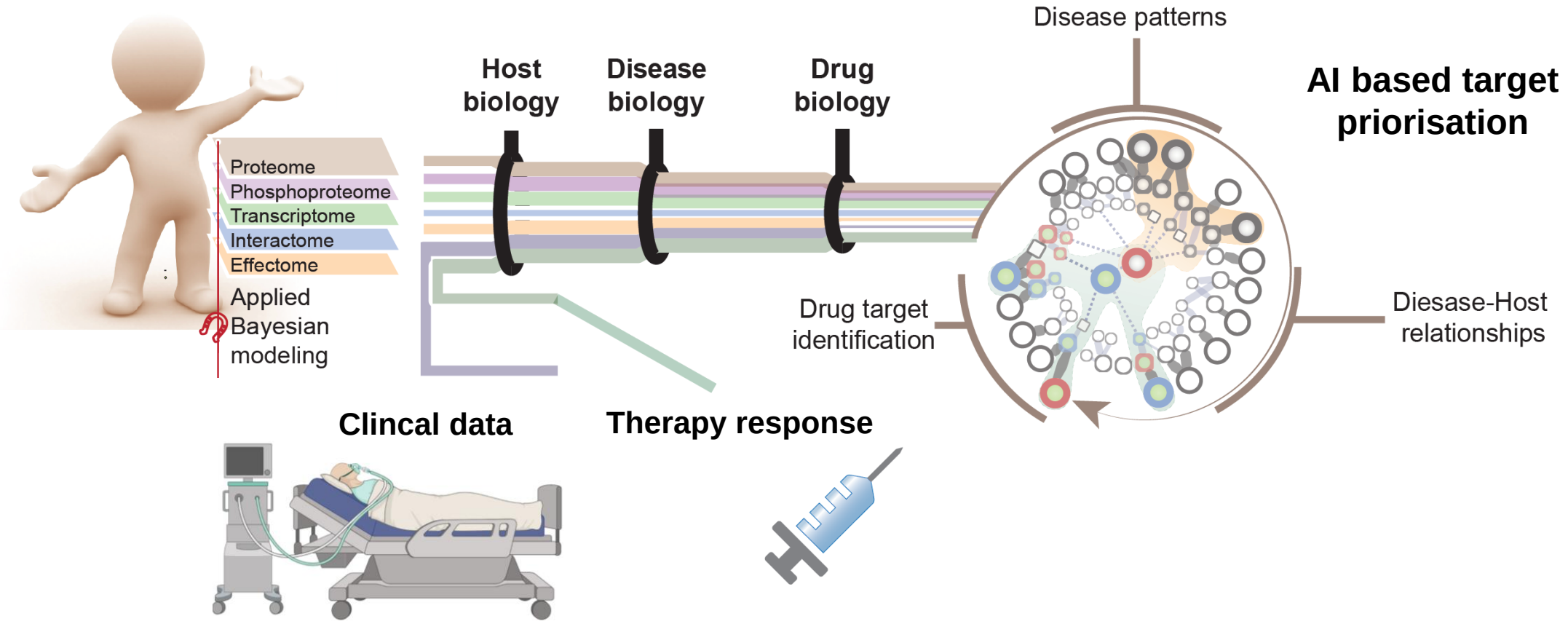




Stukalov et al., Nature 2021
Scaturro et al., Nature 2018
Bergant et al., EMBO J, 2022
Bergant et al., Nat Comms, 2023
Huang et al., in revision

Huang et al, in revision
With Gerd Sutter, Ulla Protzer

Predictive multi-omics analysis of virus diseases



➔ Prediction of disease progression?

➔ Prediction of successful perturbation strategies?

Core elements of *P³M*

Goal: appropriate and fast countermeasures in case of a pandemic in cooperation with industry partners

- **Basic financing to set up neccessary scientific structures**
- **Step-wise establishment of an academic network based on core competences and collaborations with pharma and biotech partners**
- **Sustainable development of pharma/biotech collaborations in Munich, enforcing bavaria being a strong location for pharma with international connections**

Bottlenecks

- **Data storage capacity, computational infrastructure**

P³M - Prevention of Pandemic-associated Pathology Munich

Innovative diagnostics and therapies through predictive markers

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Identification of patients at risk

Roche

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Personalized treatment of patients at risk

Data base of infection-associated perturbations based on model systems and defined clinical data

AI based analysis of multi-omics data

Identification of predictive biomarkers and therapies