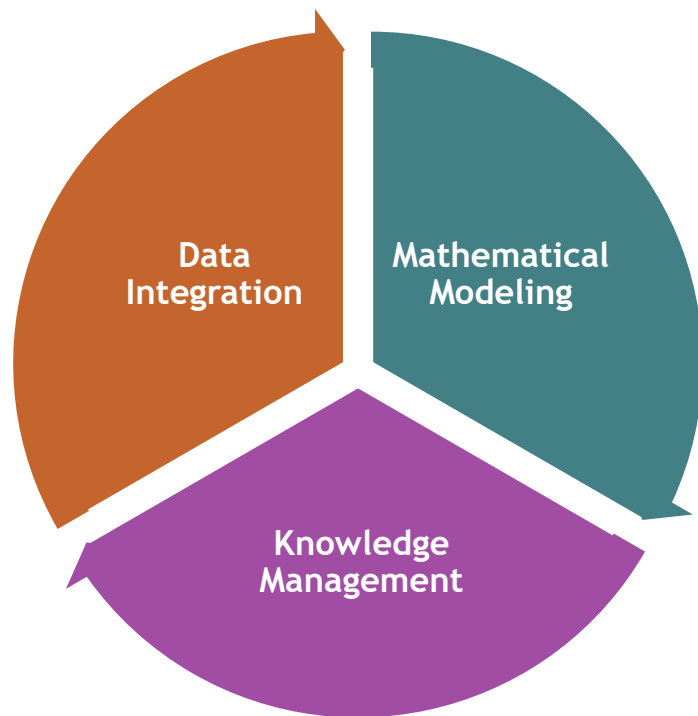




**Solid as new paradigm for patient centered
solutions**

Juan G. Diaz Ochoa

1st German Solid Symposium



Mathematical Modelling

- Systems Biology / Medicine
- Pharmacology
- Industry

Contact Partner

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CTO



Dr. Juan Diaz Ochoa
Chief Scientist



Dr. Elena Ramírez
Innovation
Manager



Partners - Industry



Partners - Research



Universität Stuttgart

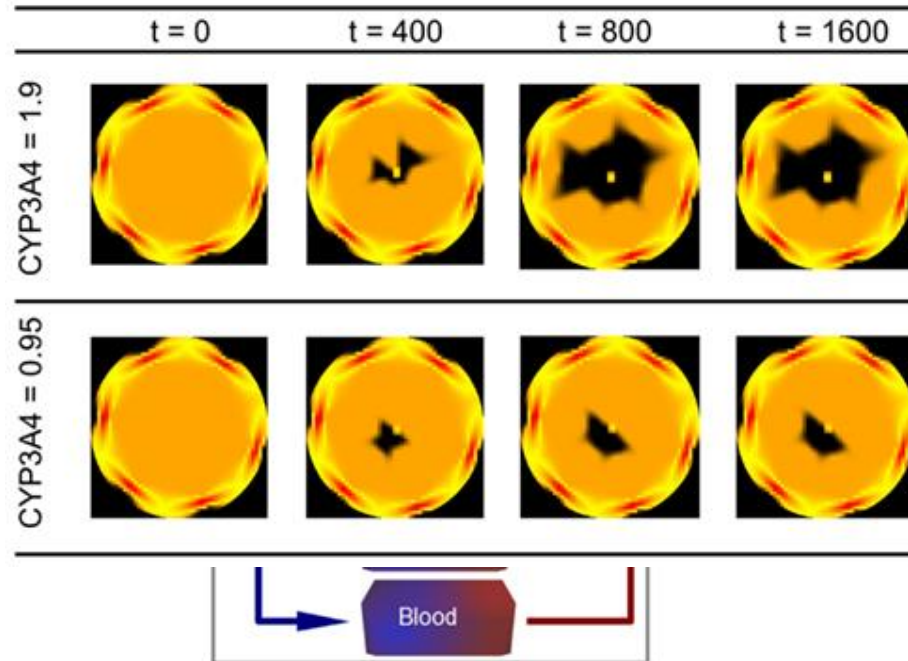
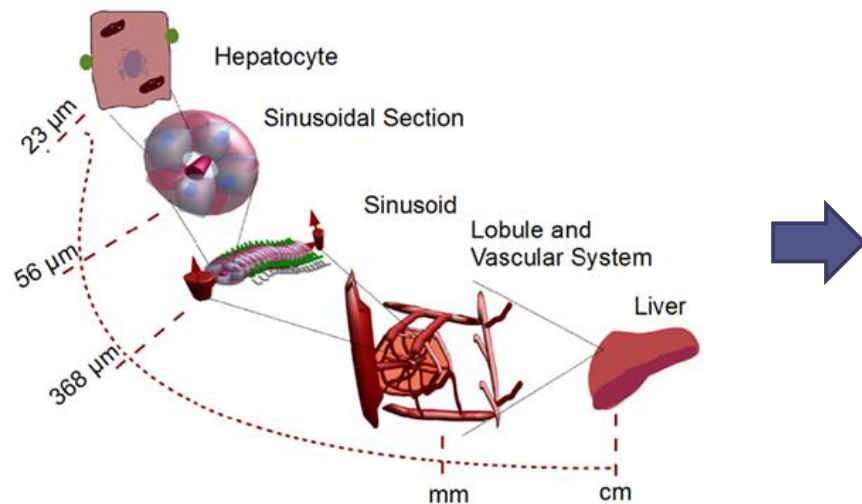
In Vivo models and therapies



Epistemic / ethical questions:

- Are animal models reliable to understand pharmacological/toxic effects?
- Is it ethical to use animal models?

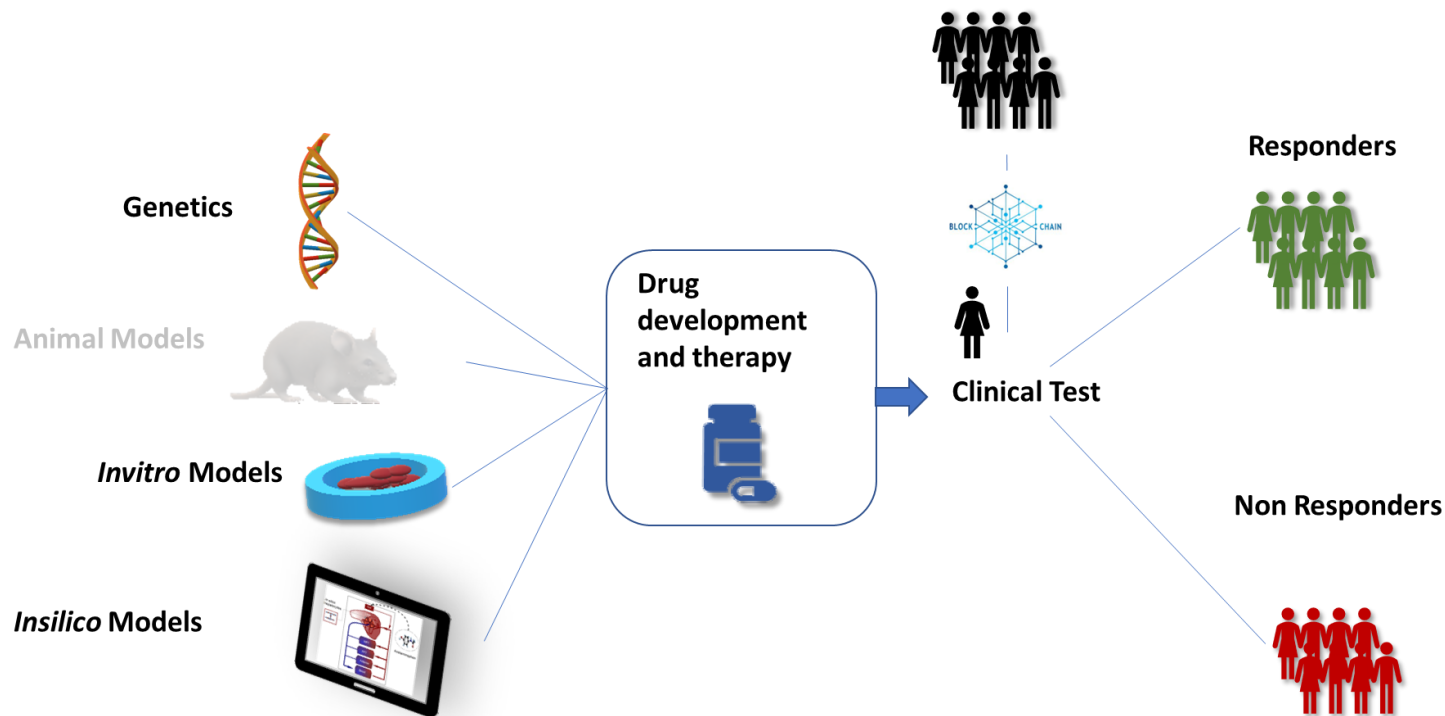
Insilico Models



Integration of metabolic networks in whole-body models. Based on individual enzyme concentrations, an example of cell viability after a single dose intake of 393 mg/Kg of APAP.

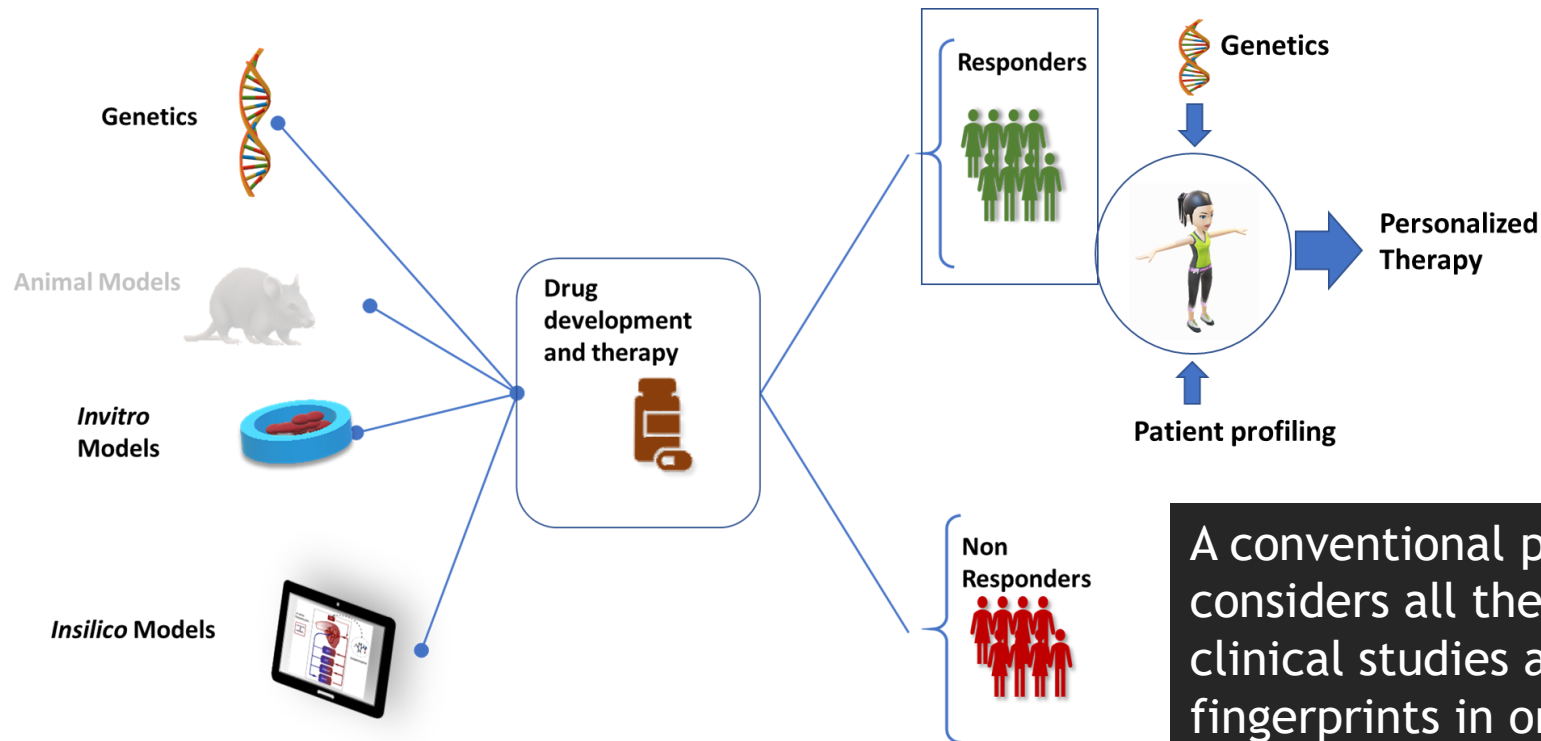
<https://www.frontiersin.org/articles/10.3389/fphar.2012.00204/full>

Drug development pipeline and therapies



Hopefully, pipelines will rely less on animal models and more on in vitro and in silico approaches.

From Therapy to Personalization



A conventional pipeline considers all the data from clinical studies and genetic fingerprints in order to decide on a personalized treatment plan.

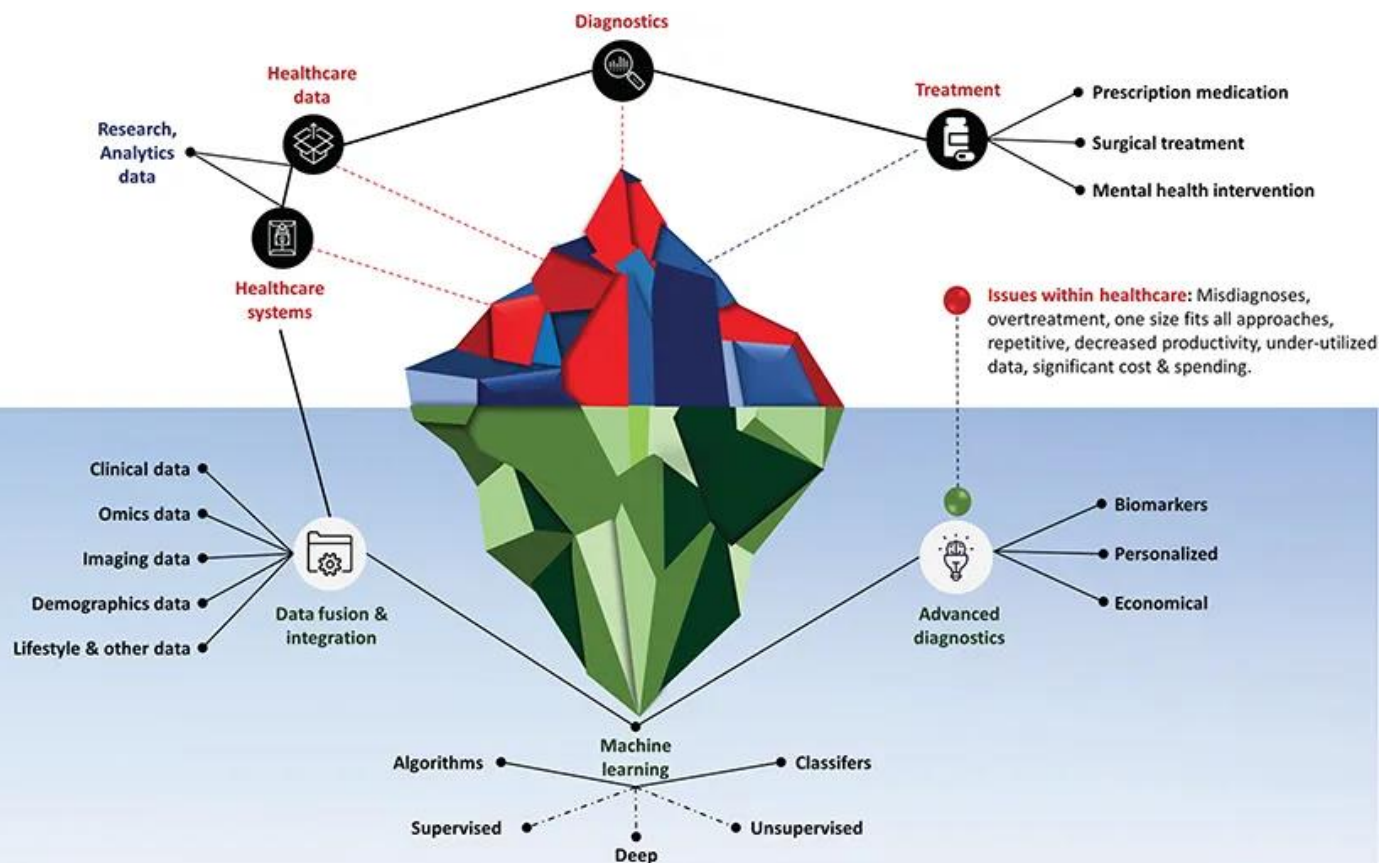
The universal solution to every problem?



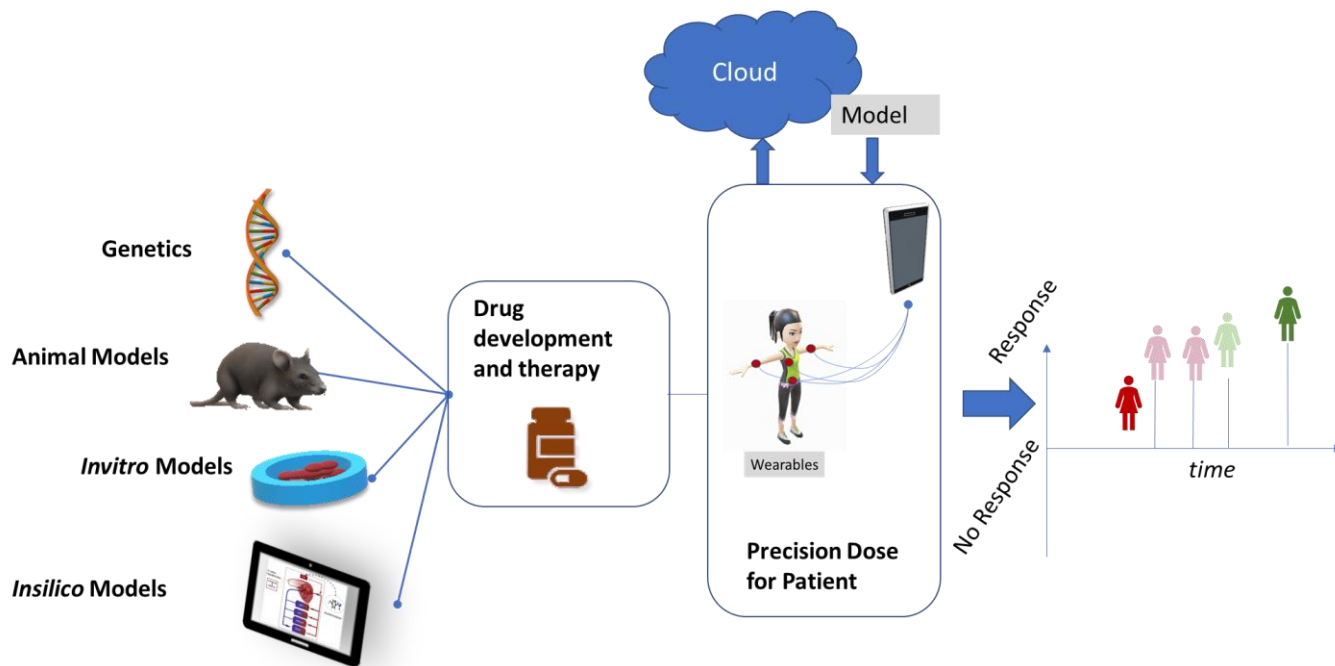
Perhaps not: *invivo* and *insilico* data, combined with genomics, are insufficient to understand micro-macro complexity!

TRADITIONAL HEALTHCARE DATA ANALYTICS

ARTIFICIAL INTELLIGENCE IN PRECISION MEDICINE



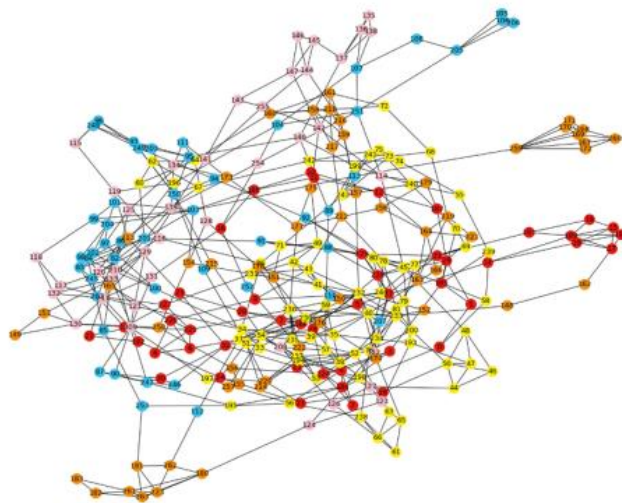
Data driven Therapy



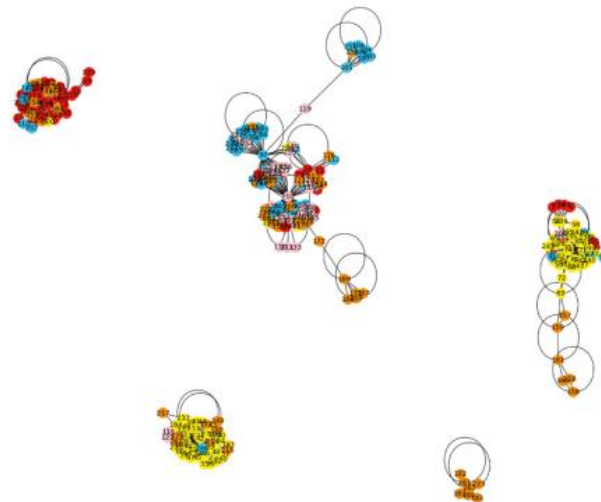
Data-driven toxicology offers the unique opportunity to track a substance's effect in real time. The implementation of IoT allows us to observe the eventual transition from non-responders to responders.

Data driven Therapy

A.



B.



As an example, predicting and stratifying therapies based on the comparison of similar patients with similar diagnoses can be achieved.



Contents lists available at [ScienceDirect](#)

Artificial Intelligence In Medicine

journal homepage: www.elsevier.com/locate/artmed

Graph neural network modelling as a potentially effective method for predicting and analyzing procedures based on patients' diagnoses

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Digital twins: Ill defined Hype other a real option?

A model without a physical counterpart is simply a general (and abstract) attempt to predict or classify specific states.

Even personalized models fall within this case

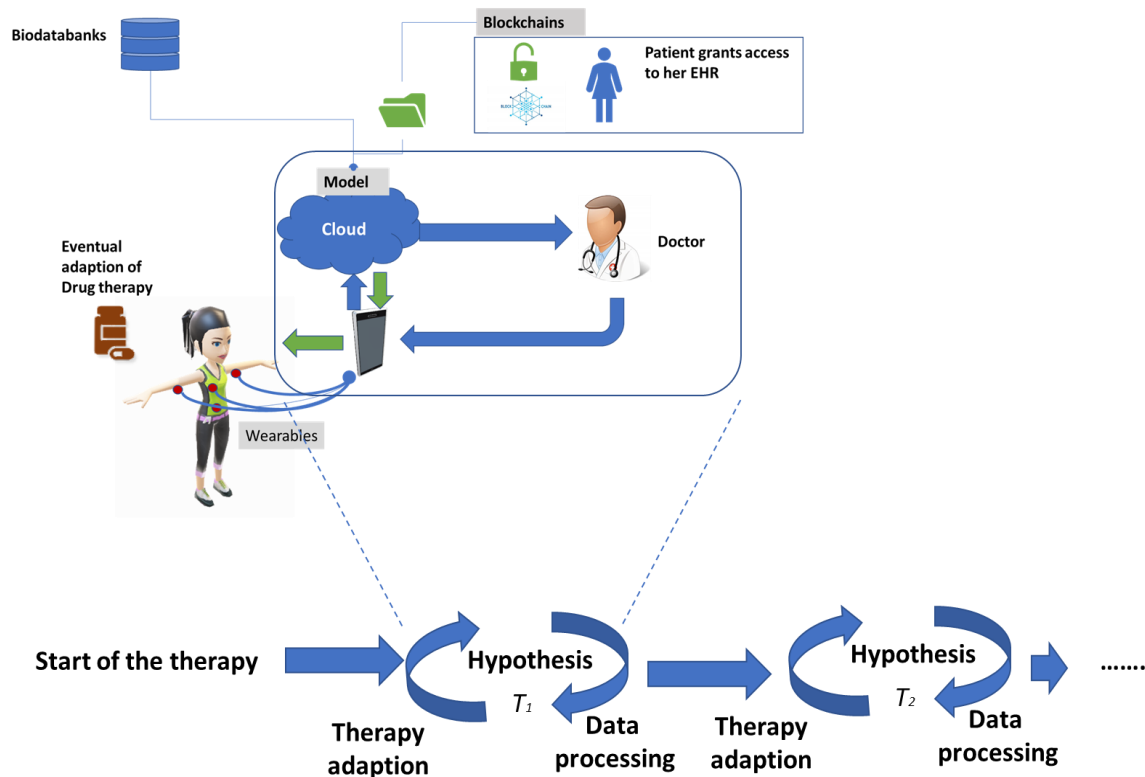


Next step: coupling models with their physical counterparts, continuously adapting based on the flow of data.

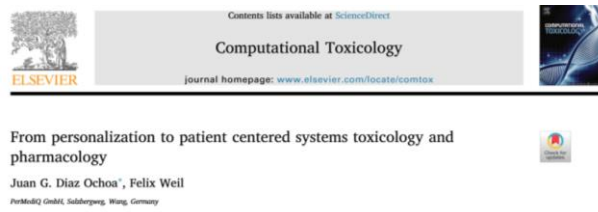
<https://www.ansys.com/blog/will-digital-twins-improve-healthcare-real-world-counterparts>

Wright and Madison, Adv. Model. And Simul. Sci. (2020), 7:13

Hypothesis driven pharmacology / toxicology

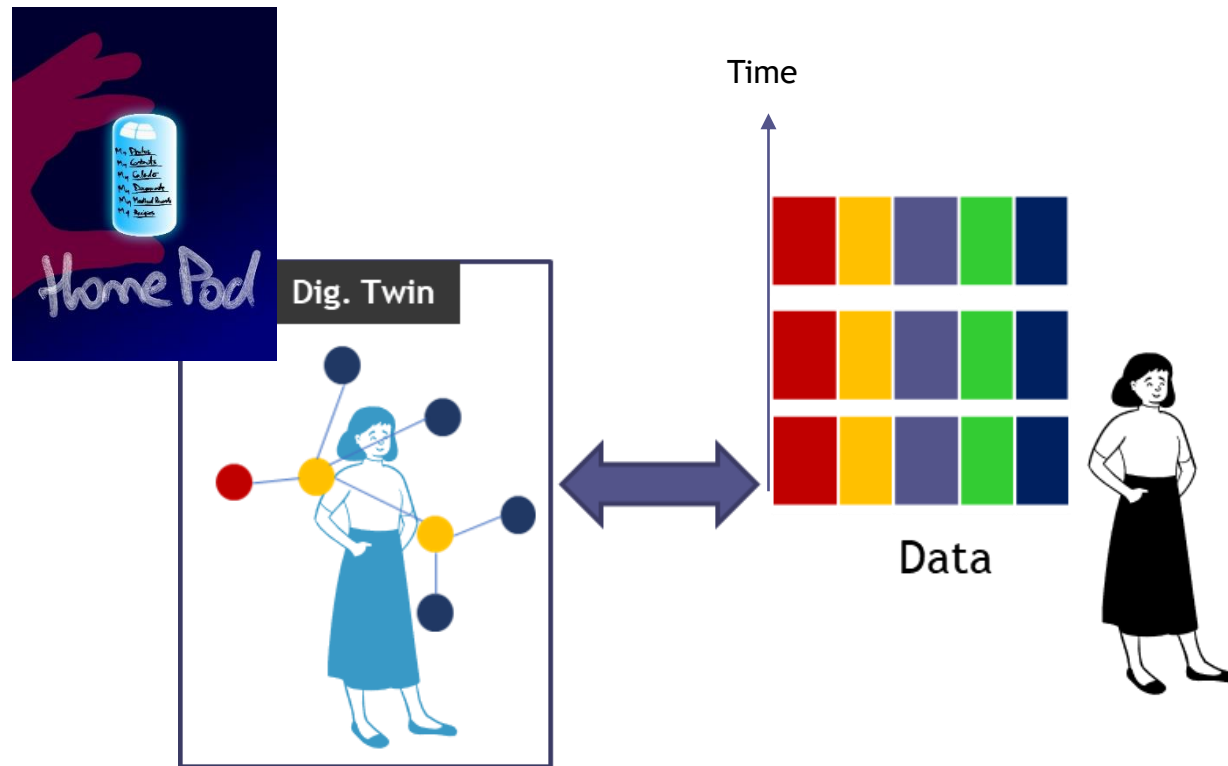


Through the productive use of patient data, hypotheses related to treatment can be tested and improved in a systematic manner





SOLID and digital twins?



From these definitions there are three key parts to the digital twin of an object:

1. A model of the object.
2. An evolving set of data relating to the object, and
3. A method for dynamically updating or adjusting a model (at the edge) as data changes.

SOLID and digital twins?



Ensure data sovereignty by providing patient-centered solutions - data is not stored in silos and belongs to the patient.

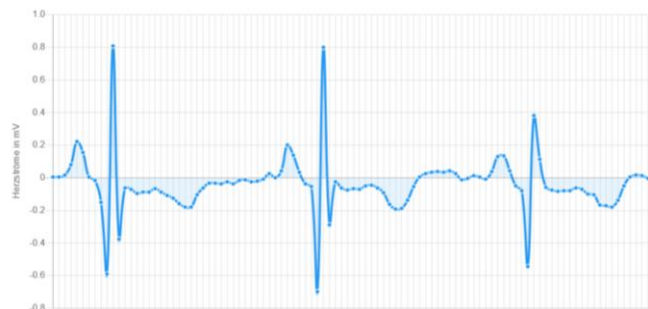


Interoperability of data: the ability to integrate different models and applications.

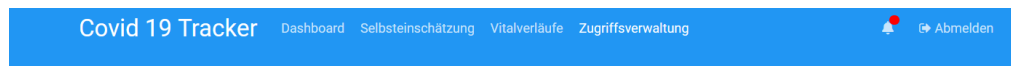
<https://solidproject.org/about>



EKG Verlauf



Use case: Patient centered COVID App



Pods mit Zugriff:

WebID

<https://rki.solid.community/profile/card#me>

Aktionen

[Zugriff entfernen](#)

Mögliche Institutionen zum Hinzufügen:

- [Robert Koch Institut](#)

Neue WebID hinzufügen (z.B. https://alice.solid-provider.com/profile/card#me)

HINZUFÜGEN

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Relevant: who has right to access the data?

PerMediQ

Personal Medical Quality

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