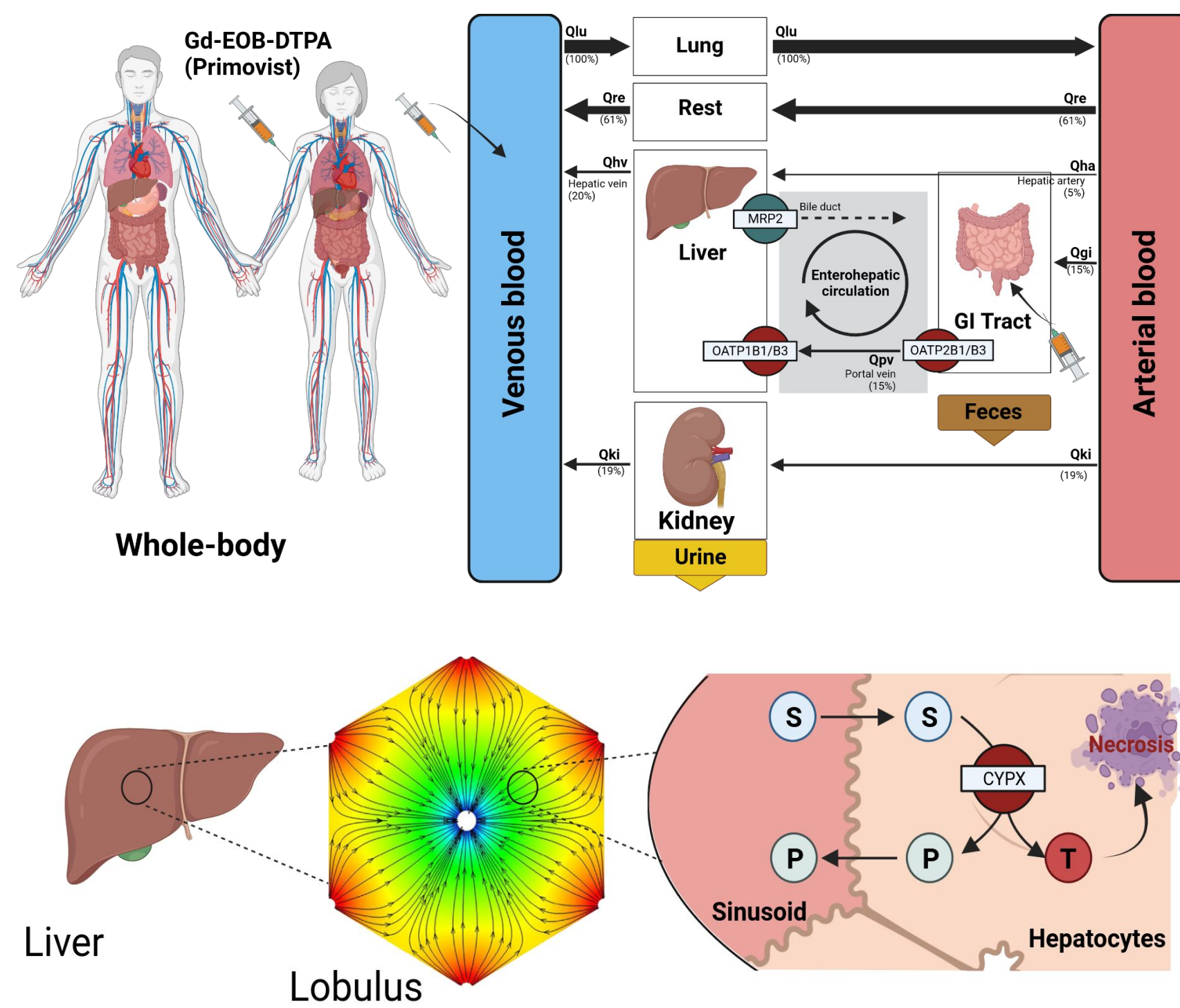


## Multi-scale Modelling of Liver Perfusion and Function

Matthias König, Humboldt Universität zu Berlin

### Previous Work

Pharmacokinetics database [1, 2].  
 Physiologically-based pharmacokinetics (PBPK) models of liver function tests [3, 4, 5, 6] (P9).  
 Kinetic models of hepatic metabolism [7, 8] (P7, P9).  
 Model coupling to porous media for steatosis and drug detoxification [7, 8] (P7, P2).  
 Standardization of computational models and workflows [9, 10, 11, 12, 13] (P5, P7).  
 Image analysis for zonation and fat quantification [14, 15] (P2, P9, P10).



### Hypothesis & Research Strategy

**Hypothesis:** Computational modelling of 3D spatial heterogeneity of perfusion & function will significantly improve functional assessment of the liver.

**Contribution:** A multi-scale model of liver 3D perfusion & function heterogeneity

Objectives

#### Understand

Deepen understanding of 3D liver perfusion & function

Improve our understanding of perfusion and function heterogeneity.

#### Reduce

Reduce computational & model complexity

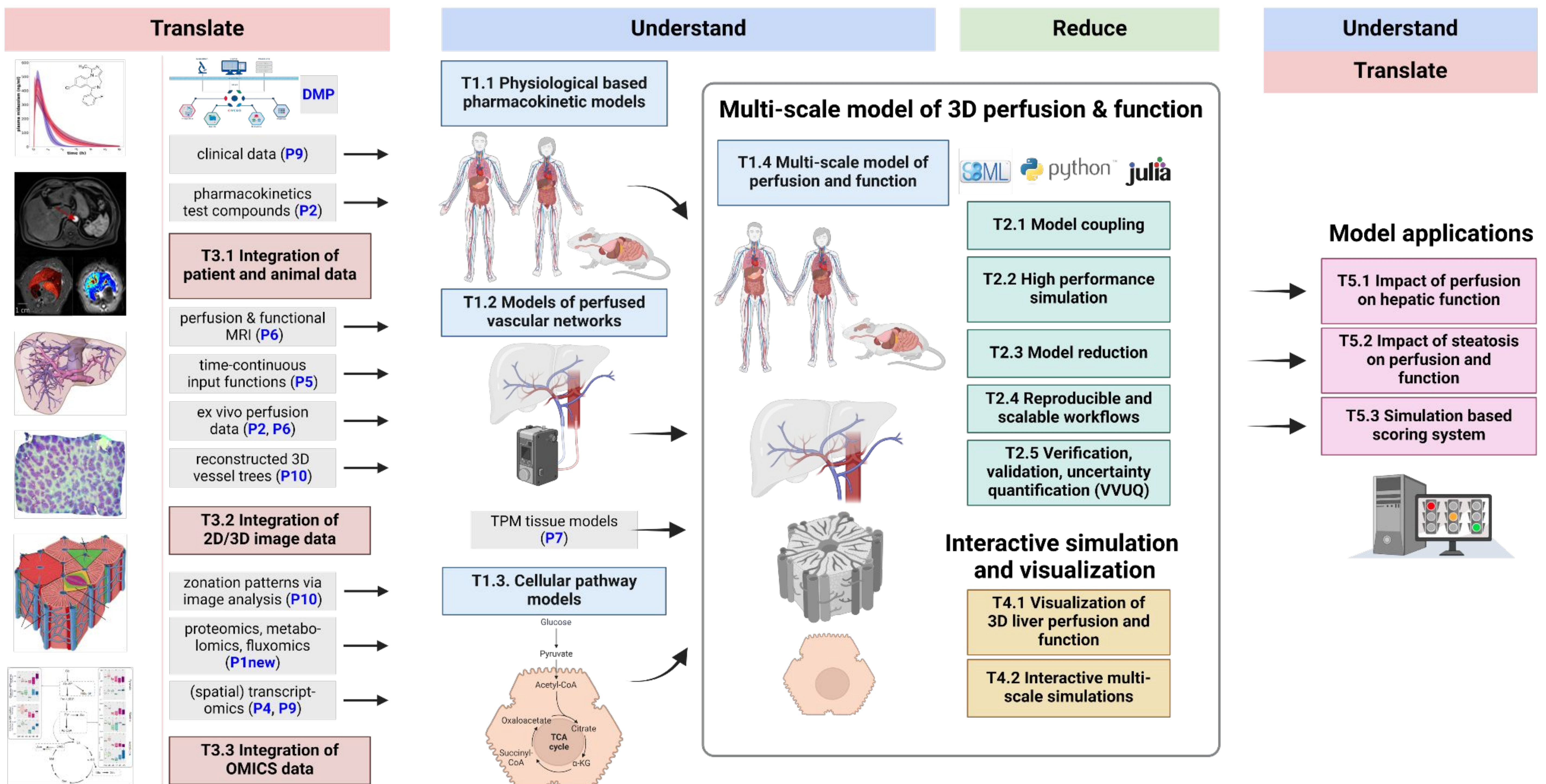
Establish modelling workflows and data integration to simplify 3D multi-scale models of the liver.

#### Translate

Translate computational models

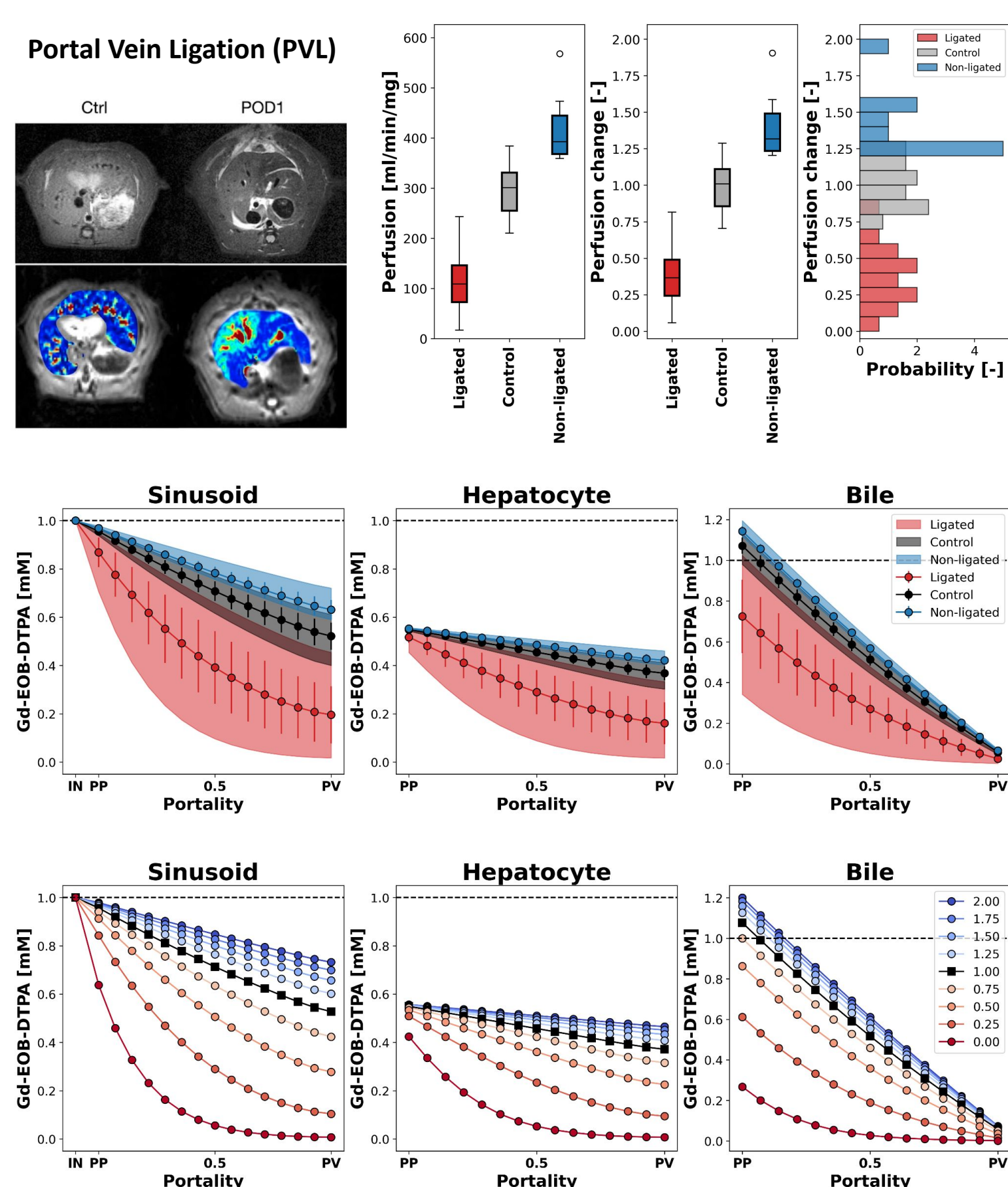
Develop a simulation-supported scoring system for surgical risk assessment.

## Tasks & Work Program & Embedding in QualiPerF 2.0

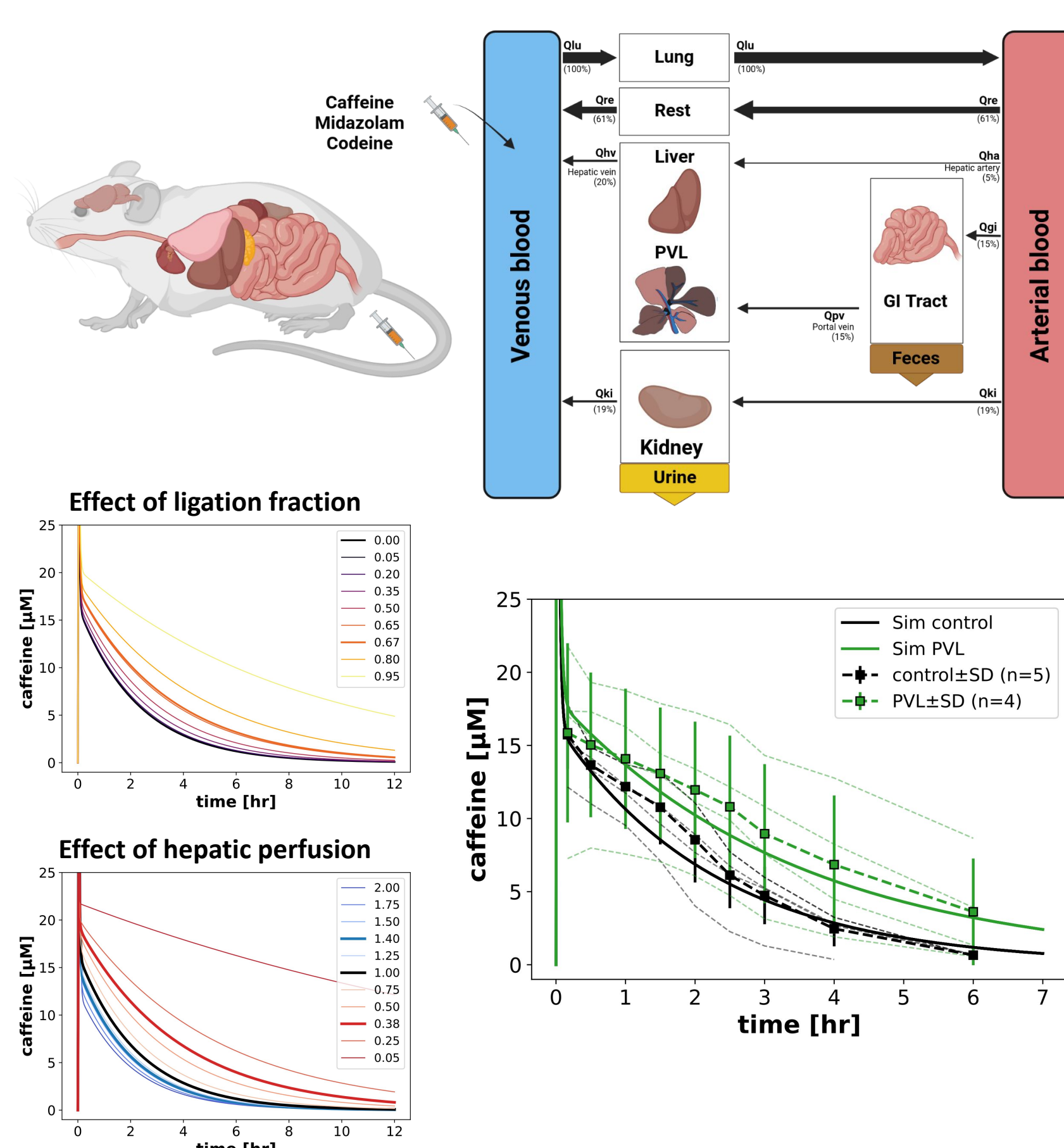


## Highlights

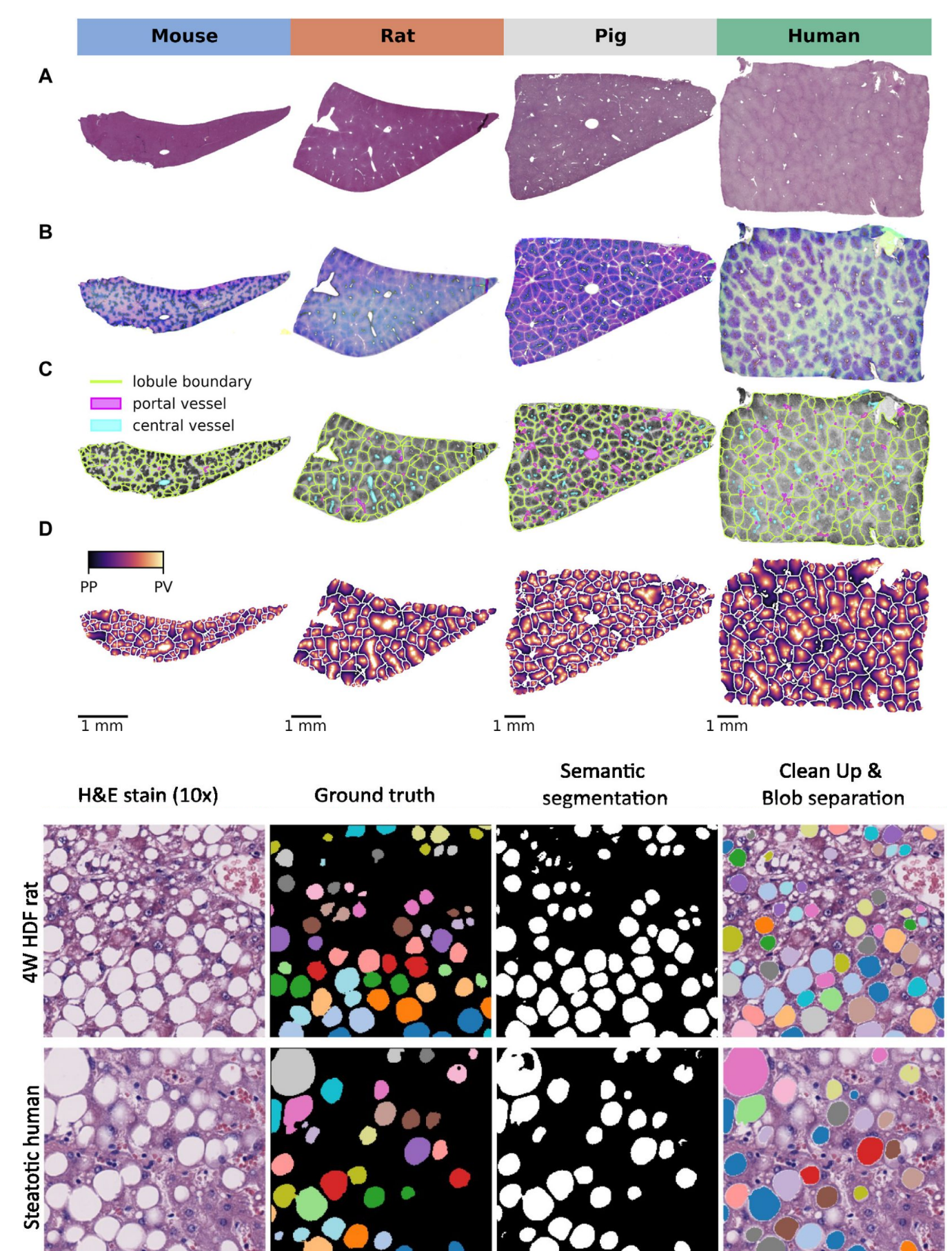
### Perfusion affects Gd-EOB-DTPA elimination (P2, P6, P7, P9)



### PVL affects pharmacokinetics (P2, P5, P6)



### Image analysis (P2, P9, P10)





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