## Supplementary Methods

### Convection, Diffusion, Pore Theory

Diffusion and blood flow are modelled by discretizing the sinusoid and Disse space in small volumes with the transport between neighbouring volumes governed by one-dimensional diffusion and convection equations (analogue to ([Konig, et al., 2013](#_ENREF_1))). The periportal (pp) and perivenous (pv) blood compartment are located adjacent to the first and last sinusoidal volume, respectively. A single sinusoidal unit consists of  hepatocytes with each cell having a single associated sinusoid and Disse volume (). Concentrations of the modelled compounds  in pp and pv are denoted  and , the concentrations in the sinusoidal and Disse space  and (). The diffusion coefficients are denoted within the sinusoid and space of Disse and between sinusoid and space of Disse (Supplementary Table 5). With the sinusoidal blood flow velocity , the sinusoidal radius, the width of space of Disse  and the discretization along the sinusoidal axis and the exchange areas between adjacent space sinusoidal volumes, between adjacent space of Disse volumes and  between adjacent sinusoid and space of Disse volumes, the rates of transport are given by

#### Blood flow in sinusoid ()

 

  

 

 

#### Diffusion in sinusoid and space of Disse ()

 

  

 

  

  

### Analysis dilution curves

The area under the curve (AUC), mean transit time (MTT), and variance of the transit time (VTT) were calculated directly from the dilution curves using the following equations ([Warren, et al., 2008](#_ENREF_2)):







The catheter and nonexchangable vessel transit time () was estimated from the time of first appearance of radioactivity above background levels in the experimental dilution curves.

## ****References****

Konig, M., Holzhutter, H.G. and Berndt, N. (2013) Metabolic gradients as key regulators in zonation of tumor energy metabolism: A tissue-scale model-based study, *Biotechnology journal*, **8**, 1058-1069.

Warren, A.*, et al.* (2008) Effects of old age on vascular complexity and dispersion of the hepatic sinusoidal network, *Microcirculation*, **15**, 191-202.