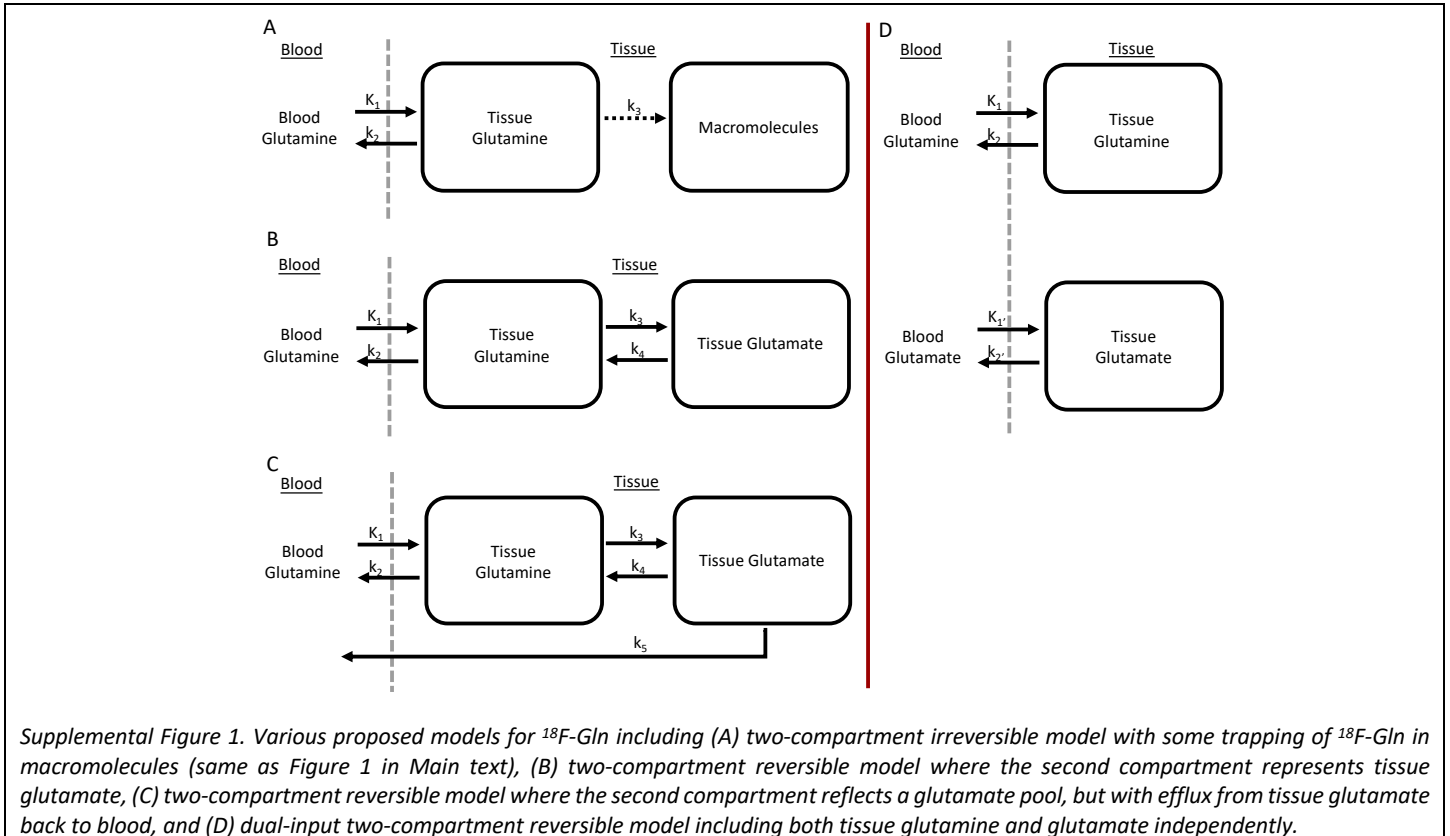


SUPPLEMENTAL METHODS



BIAS CALCULATION

Supplemental Equation 1. Bias and precision calculations for simulations

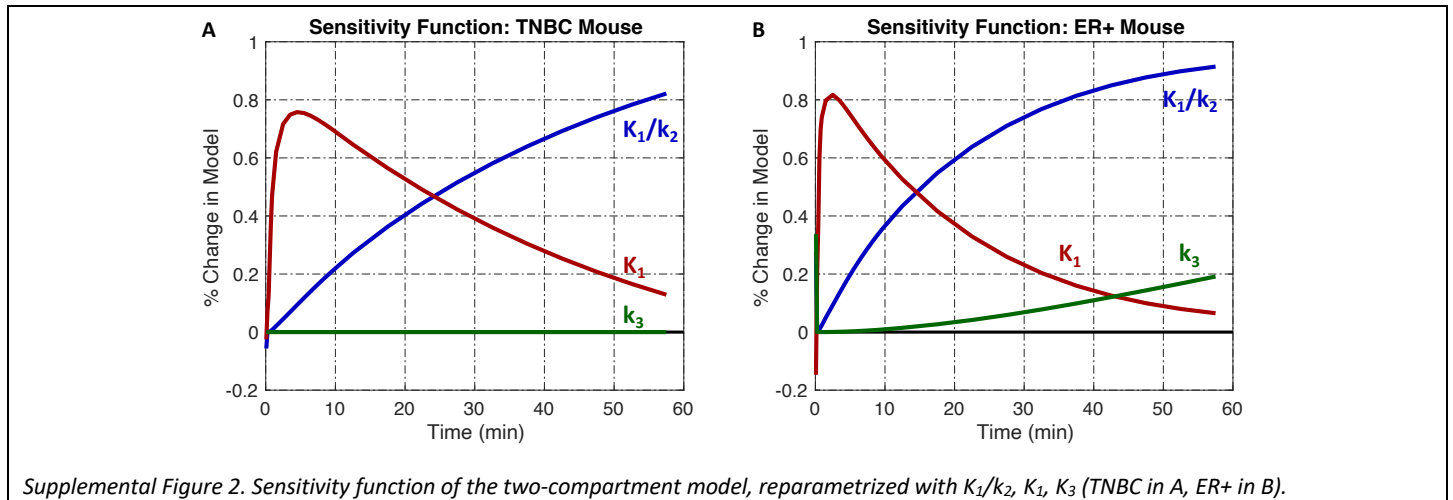
$$\text{bias} = 100\% * (x - \hat{x})/\hat{x}$$

$$\%SD = IQR/\hat{x}$$

where \hat{x} is the true value and x is the measured value.

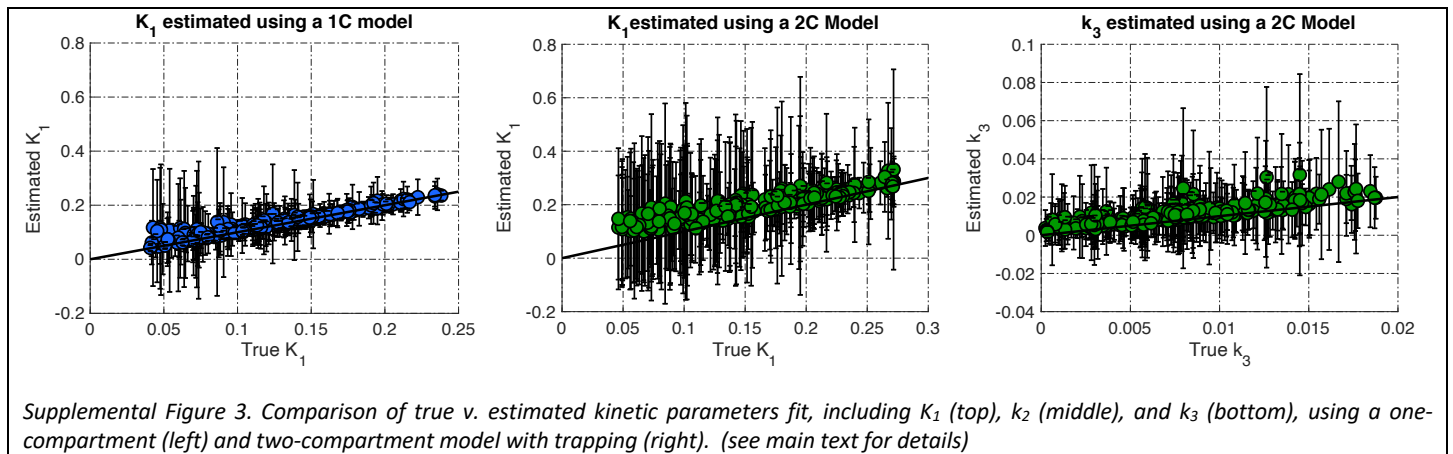
SUPPLEMENTAL RESULTS

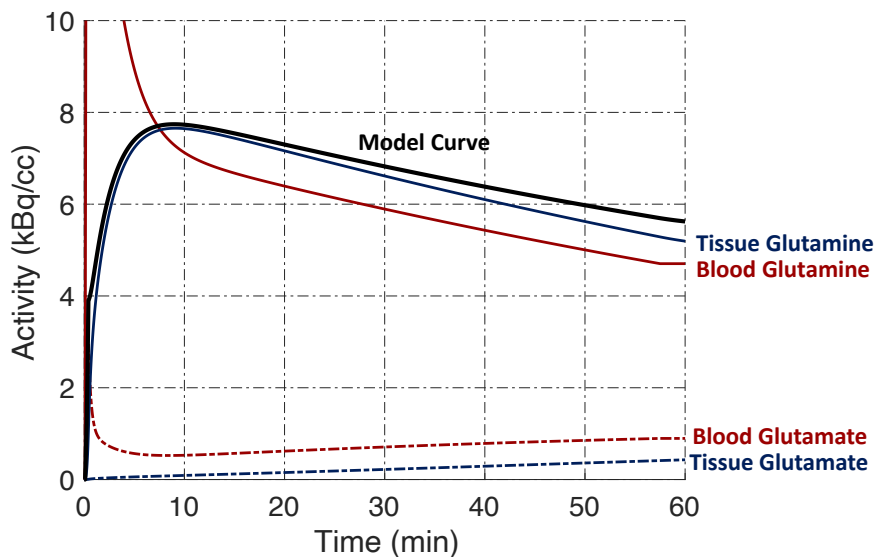
MODEL PARAMETERS SENSITIVITY AND IDENTIFIABILITY



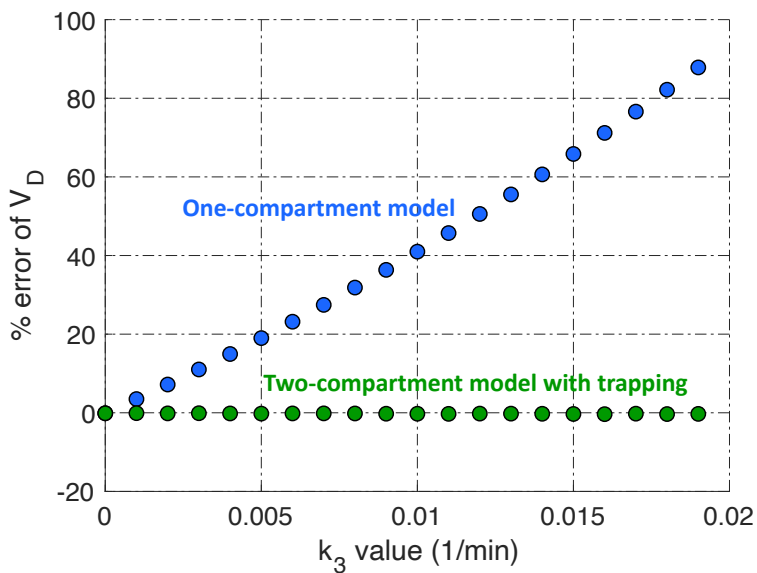
Supplemental Table I. Identifiability matrix of the two-compartment model, reparametrized with K_1/k_2 , K_1 , K_3 .

	TNBC				ER+		
	K_1	K_1/k_2	k_3		K_1	K_1/k_2	k_3
K_1	1.00	-0.80	0.71	K_1	1.00	-0.61	0.14
K_1/k_2	-0.80	1.00	-0.97	K_1/k_2	-0.61	1.00	-0.70
k_3	0.71	-0.97	1.00	k_3	0.14	-0.70	1.00



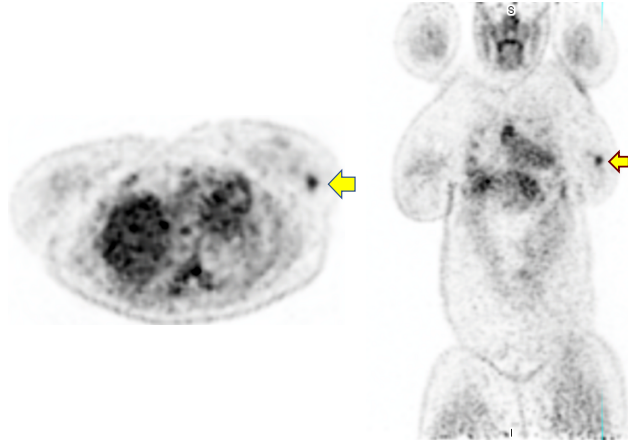


Supplemental Figure 4. TACs for dual-tracer two-compartment reversible model where K_1' and k_2' of glutamate is 10% that of glutamine.

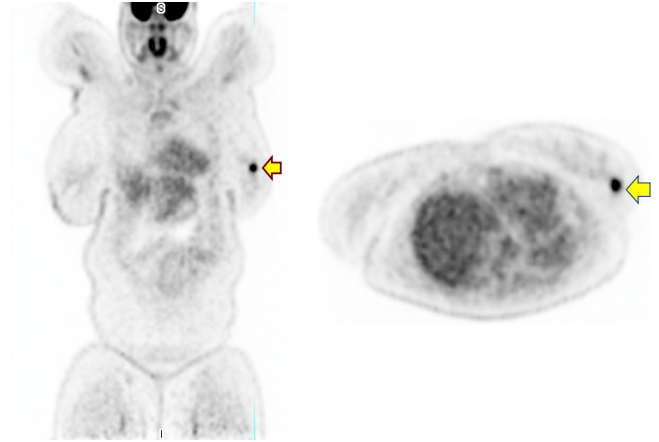


Supplemental Figure 5. Error of estimating V_D using a one-compartment and two-compartment model for k_3 values ranging from 0 min^{-1} to 0.019 min^{-1} , with K_1 fixed at $0.138 \text{ ml/cm}^3/\text{min}$ and k_2 fixed at 0.131 min^{-1} .

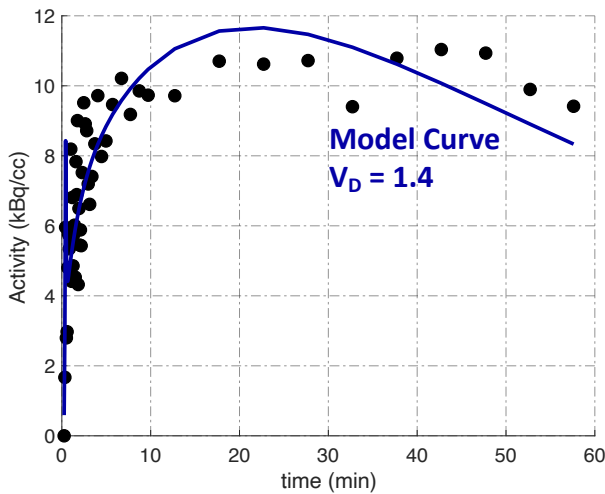
A **^{18}F -Fluoroglutamine (^{18}F -Gln)**



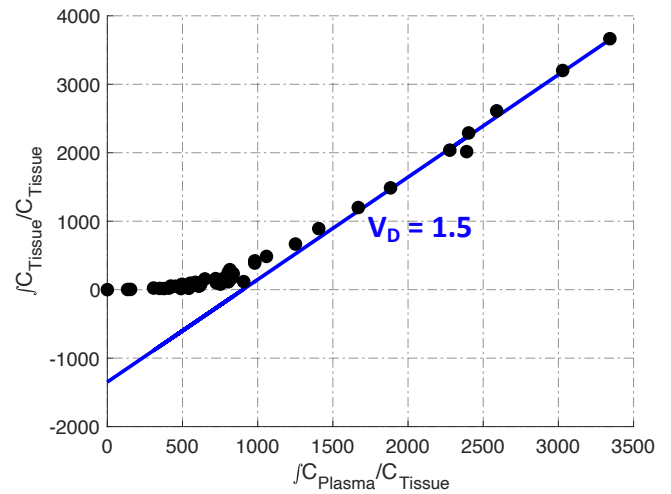
^{18}F -Fluorodeoxyglucose (FDG)



B **^{18}F -Gln TAC: ER+ Human**



^{18}F -Gln TAC: ER+ Human



Supplemental Figure 6. Preliminary data from human ^{18}F -Gln study showing (A) axial and coronal image from an ER+ breast cancer patient imaged with ^{18}F -Gln (left) and FDG (right). *The institutional review board approved this study and all subjects signed a written informed consent (Clinical Trial Number NCT03863457).* (B) Dynamic ^{18}F -Gln data fit to a one-compartment model (left) and a Logan plot (right).