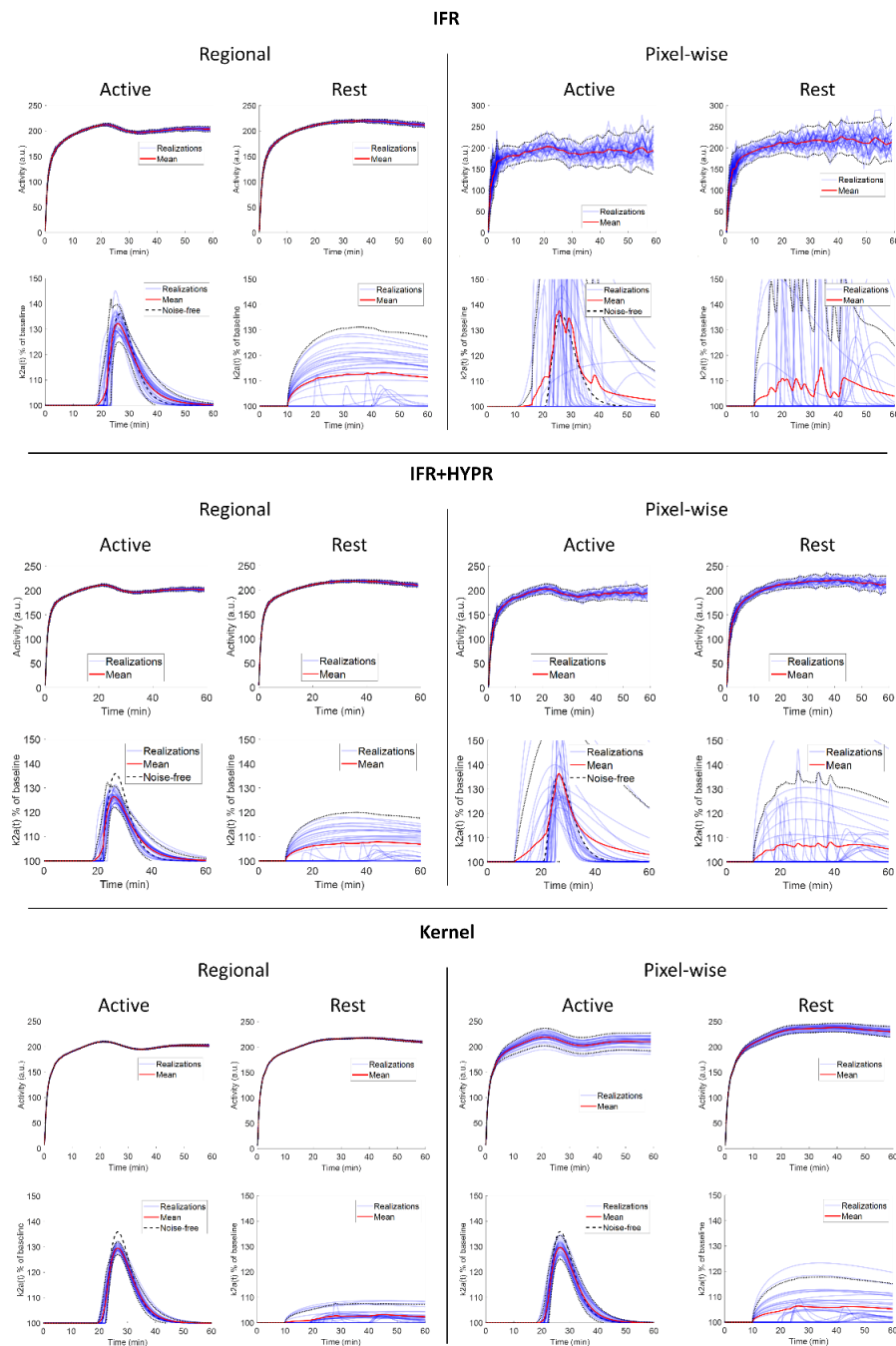
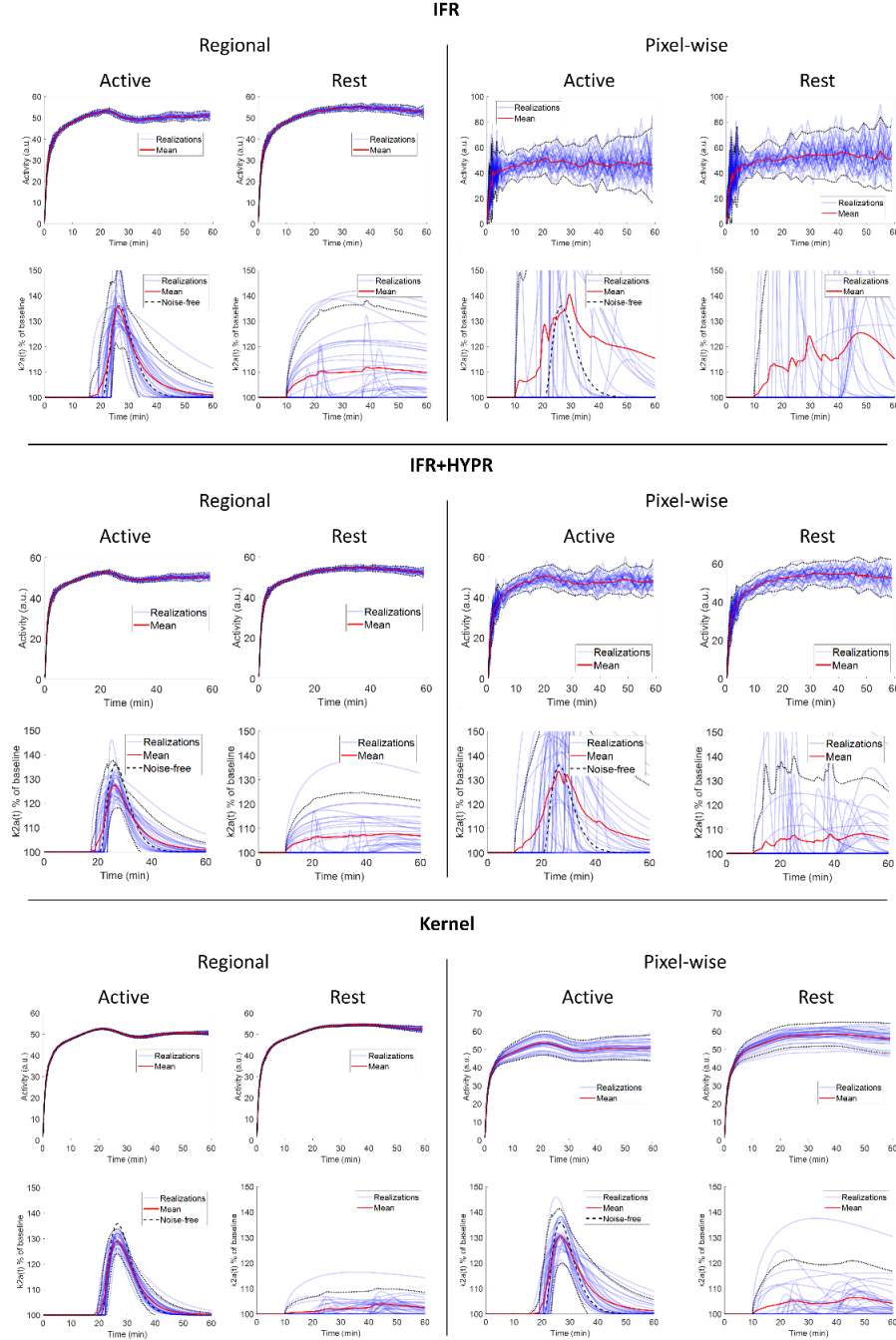


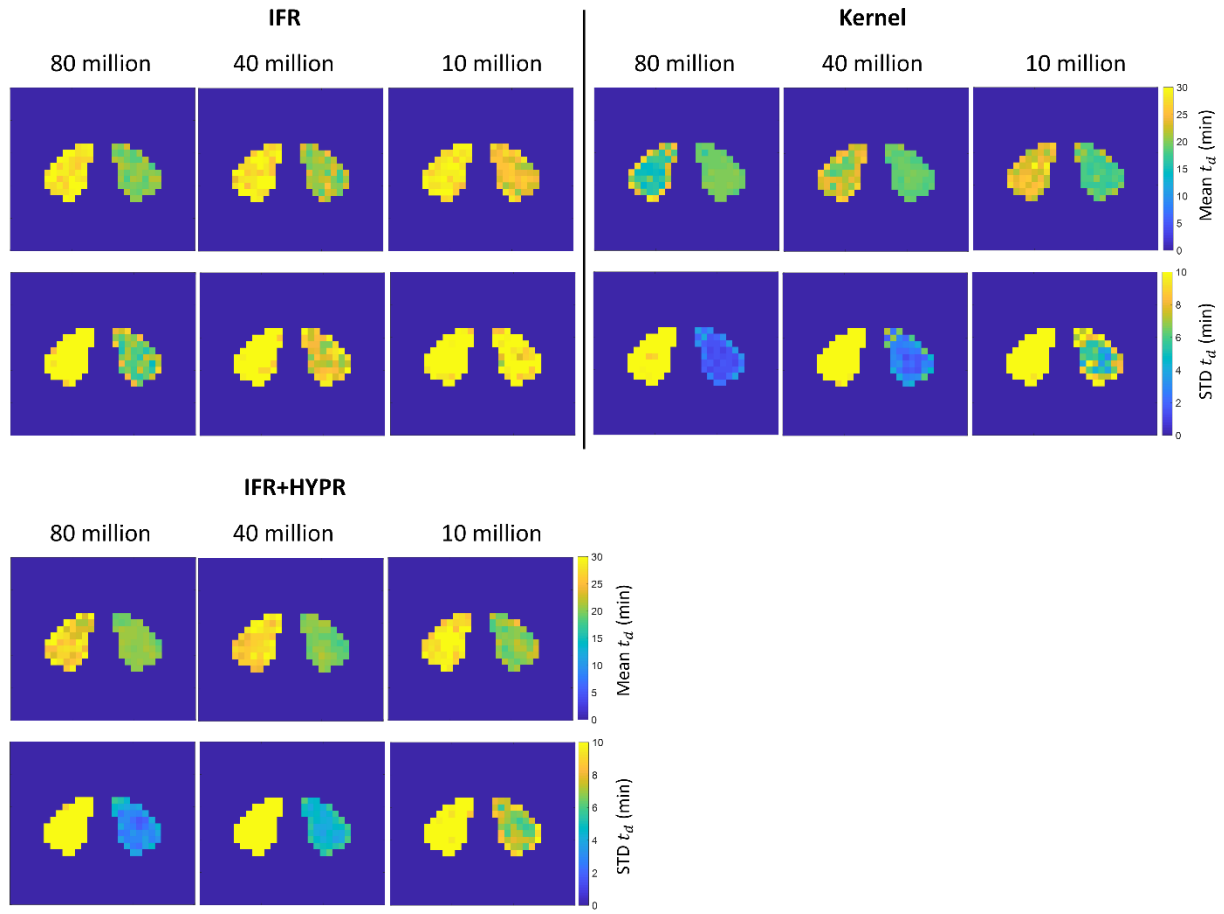
# Supplementary Material



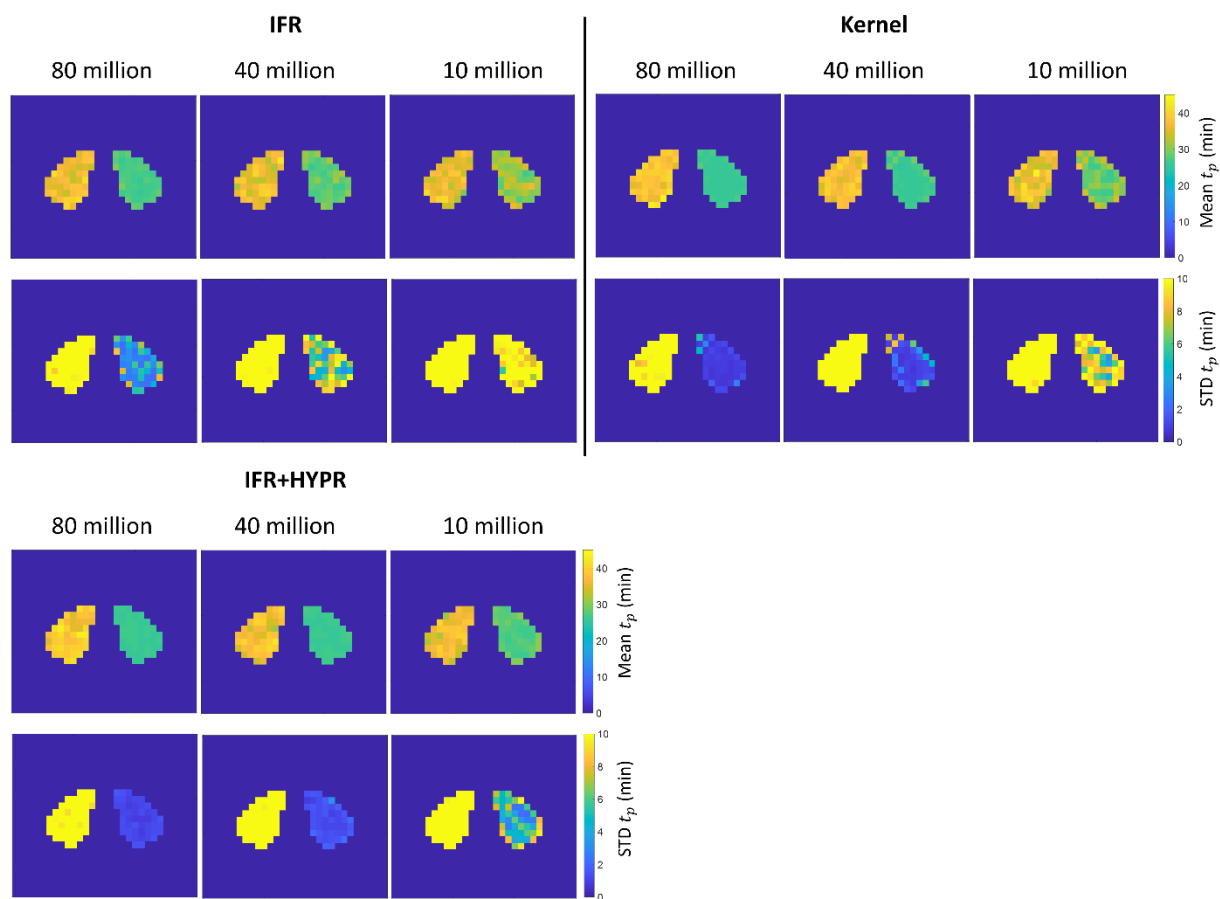
Supplementary Figure 1. Individual for every realization and mean regional and voxel-wise TACs (row 1 and 3) and activation response profiles (row 2 and 4), for the active and rest regions, using independent frame reconstruction (IFR), independent frame reconstruction with HYPR denoising (IFR+HYPR), and spatiotemporal kernel reconstruction (Kernel), for simulations with 40 million counts. Dotted lines show  $\pm 2$  std.



Supplementary Figure 2. Individual for every realization and mean regional and voxel-wise TACs (row 1 and 3) and activation response profiles (row 2 and 4), for the active and rest regions, using independent frame reconstruction (IFR), independent frame reconstruction with HYPR denoising (IFR+HYPR), and spatiotemporal kernel reconstruction (Kernel), for simulations with 10 million counts. Dotted lines show  $\pm 2$  std.

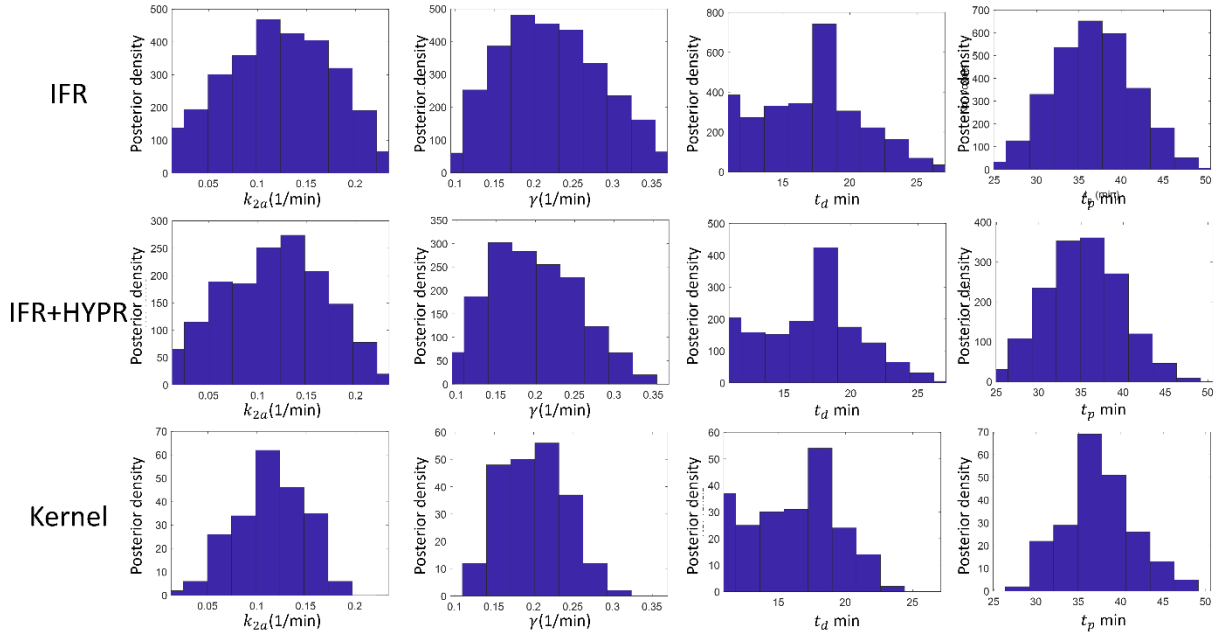


Supplementary Figure 3. Rest and active parametric  $t_d$  mean (top row) and standard deviation (bottom row) images, for independent frame reconstruction (IFR), for independent frame reconstruction with HYPR denoising (IFR+HYPR), and spatiotemporal kernel reconstructions (Kernel).



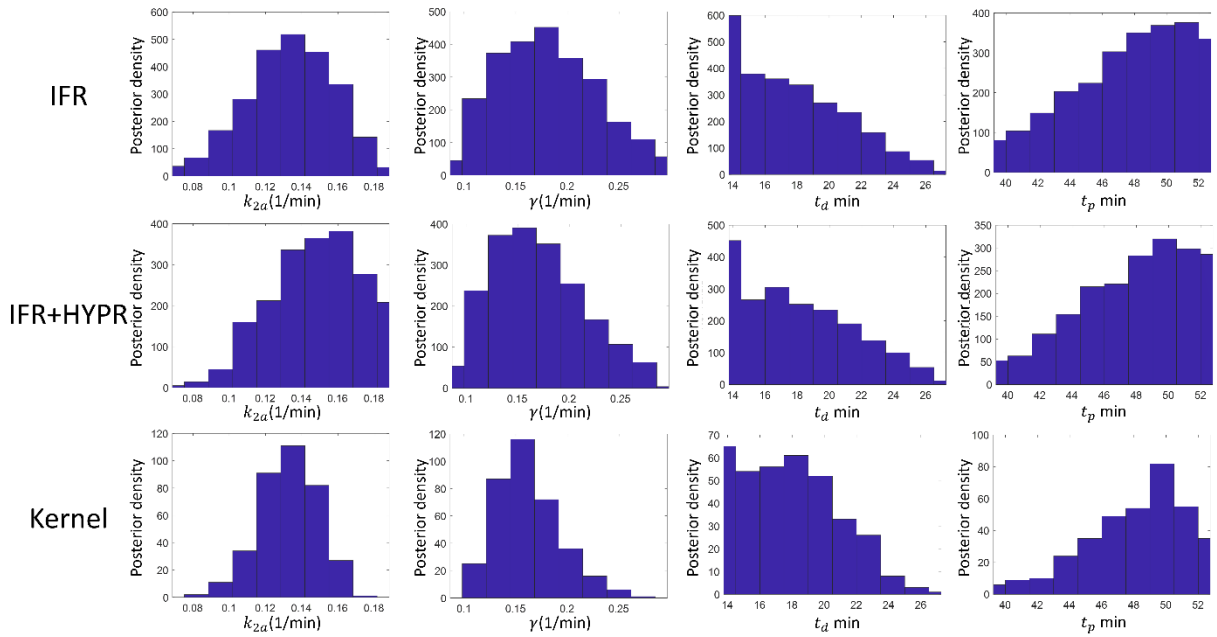
Supplementary Figure 4. Rest and active parametric  $t_p$  mean (top row) and standard deviation (bottom row) images, for independent frame reconstruction (IFR), for independent frame reconstruction with HYPR denoising (IFR+HYPR), and spatiotemporal kernel reconstructions (Kernel).

## Anesthesia

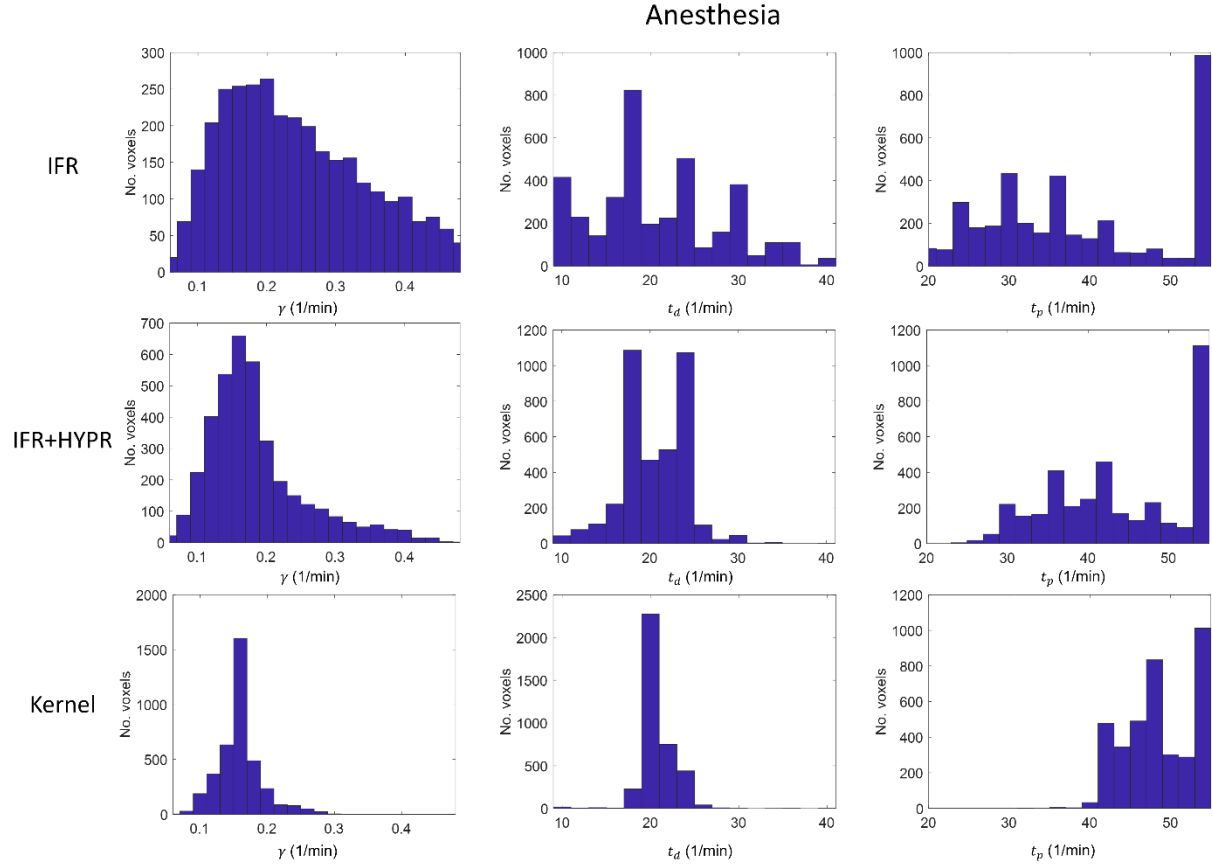


Supplementary Figure 5. Posterior distribution of  $k_{2a}$ ,  $\gamma$ ,  $t_d$ , and  $t_p$  parameters calculated with the ABC algorithm, in IFR, IFR+HYPR, and Kernel reconstruction, in the rat anesthesia scan with cold raclopride injection.

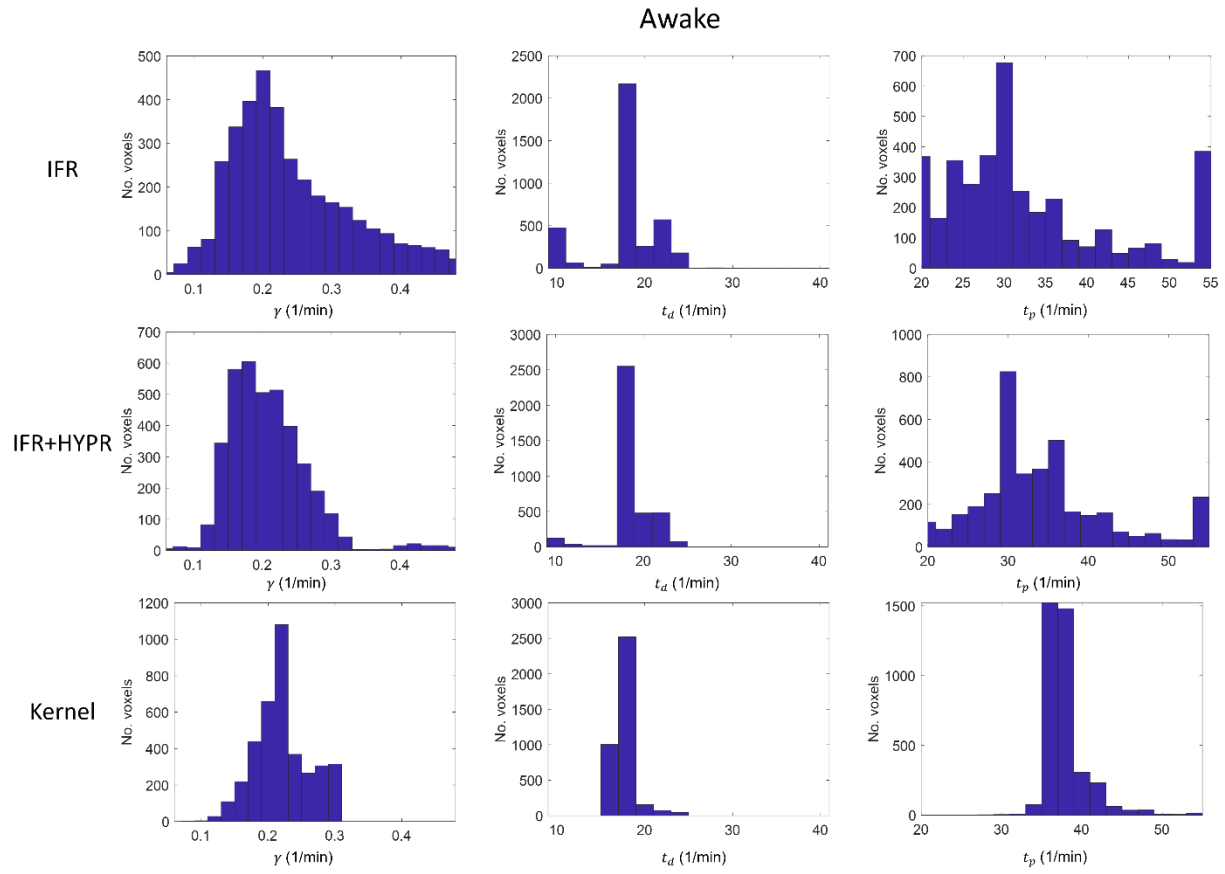
## Awake



Supplementary Figure 6. Posterior distribution of  $k_{2a}$ ,  $\gamma$ ,  $t_d$ , and  $t_p$  parameters calculated with the ABC algorithm, in IFR, IFR+HYPR, and Kernel reconstruction, in the rat awake scan with cold raclopride injection.



Supplementary Figure 7. Histogram of  $\gamma$ ,  $t_d$ , and  $t_p$  values considering striatum voxels from the anesthesia scan, using independent frame reconstruction (first row, IFR), for independent frame reconstruction with HYPR denoising (middle row, IFR+HYPR), and the spatiotemporal kernel reconstruction (third row, Kernel).



Supplementary Figure 8. Histogram of  $\gamma$ ,  $t_d$ , and  $t_p$  values considering striatum voxels from the awake scan, using independent frame reconstruction (first row, IFR), for independent frame reconstruction with HYPR denoising (middle row, IFR+HYPR), and the spatiotemporal kernel reconstruction (third row, Kernel).