

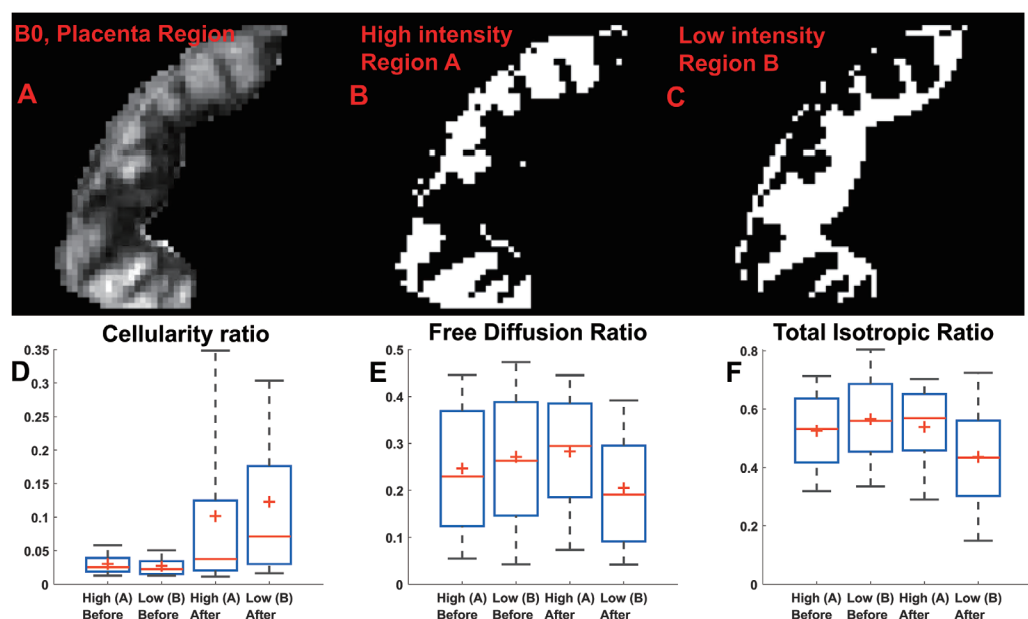


Figure S1. DBSI-derived voxel-wise ratios in two regions. (A): b0 image, masked by segmentation of placenta region. (B): High signal intensity region. Normalized voxel-wise signal > 0.5. (C): Low signal intensity region. Normalized voxel-wise signal < 0.5. (D–F): DBSI-derived signals in two regions before and after registration. DBSI: diffusion basis spectrum imaging.

We divided the placenta region into two parts based on the voxel-wise signal intensity on b0 image (Figure S1 A). The T2WI typically shows high signal intensity in areas rich in water. Considering the placental anatomy, the high signal region comprises the intervillous space that is filled with maternal blood (Figure S1 B), and the low signal region comprises of the placenta parenchyma (Figure S1 C). For convenience, the high signal region will be referred to as region A (intervillous space) and the low signal region as region B (placenta parenchyma).

We compare the DBSI-derived indices in these two regions before and after registration.

(1) After registration, Region B showed higher cellularity

than Region A (Figure S1 D), which are consistent with human placenta physiology. Specifically speaking, placental immune cells mainly reside in the placenta parenchyma. In later pregnancy, significant immune cell infiltration originating from myometrium accounts for the increased cellularity in the placenta parenchyma.

(2) After registration, free water diffusion and total isotropic ratio in Region B is lower than those in Region A (Figure S1 E and F). As mentioned, region A corresponds to the intervillous space, the blood pool for the oxygen and nutrition exchange between mum and fetus. The intervillous space is known for low restriction for water diffusion.