



**Supplementary Figure 1.** Preliminary relationships between oxygen extraction fraction, hematocrit, and cerebral blood flow in patients with sickle cell anemia. (A) Oxygen extraction fraction in weakly, inversely correlated with cerebral blood flow across all volunteers ( $R=0.31$ ;  $p=0.04$ ). Consistent with the primary hypothesis of this study, the correlation is strongest for patients that are less impaired ( $R=-0.54$ ;  $p=0.019$ ) relative to those that are more impaired ( $R=-0.23$ ;  $p=0.17$ ). After correcting for the dependence of blood water T1 on hematocrit, there is no significant relationship between the hematocrit and cerebral blood flow ( $R=-0.19$ ;  $p>0.05$  for both patient groups). The hematocrit is more strongly, inversely correlated with oxygen extraction fraction in more impaired volunteers ( $R=-0.62$ ;  $p<0.01$ ) than in less impaired volunteers ( $R=-0.13$ ;  $p=0.32$ ). These data are consistent with oxygen extraction fraction and cerebral blood flow providing different information regarding impairment in patients with sickle cell anemia, however larger studies are necessary to fully characterize these relationships