Drug delivery to the brain is hampered by the presence of the blood-brain barrier (BBB) that under physiological conditions precludes entrance of most substances contained in the systemic circulation. Thus, this barrier must be overcome to deliver medicines into the brain parenchyma. The transferrin receptor is exclusively expressed on capillaries of the brain, which makes it an interesting target for transport of drugs towards the brain. However, the current evidence on the receptor movement in brain capillaries does not suggest transcytosis, and delivering medicines or nanoparticles using antibodies towards this receptor has largely been without success. We investigated the impact of antibody affinity on the transport of gold nanoparticles into the brain parenchyma. PEGylated gold nanoparticles were conjugated to either a high or low affinity antibodies towards the transferrin receptor, an isotype IgG control, or no antibodies, and injected into mice. Brain capillary depletion, ICP-MS, and various microscopy techniques were employed to analyse the resulting tissue. For the transferrin receptor-targeted groups, gold nanoparticles could be detected along vessel structures as revealed by silver enhancement and light microscopy. Electron microscopy showed that the particles had been efficiently endocytosed into the endothelial cells of the BBB. A small fraction of particles could also be detected in the brain parenchyma, which was underscored by measuring the gold content in brain parenchyma after capillary depletion. Furthermore, the uptake of gold nanoparticles into both the brain capillaries and brain parenchyma were significantly affected by the affinity of the attached antibodies.