To target adenoviral vectors to cells of the vasculature and shielding vectors from inactivation by the immune system. Complexes of reporter gene expressing adenoviral vectors with positively charged magnetic nanoparticles were formed by electrostatic interaction in presence or absence of additional negatively charged poly(ethylene glycol)-based polymer. Transduction of HUVEC was analyzed in vitro under flow. Protection from inactivation by the immune system was analyzed by pre-incubation of AdV and complexes with neutralizing antibodies and subsequent reporter protein analysis of infected cells. Physical association of AdV with MNP and polymers was demonstrated by radioactive labelling of components and co-sedimentation in a magnetic field. Ad-MNP+/-polymer resulted in efficient transduction of HUVEC, depending on MOI and flow rate in presence of magnetic field, whereas no transduction was observed without complex formation with MNP or in absence of magnetic field. Association with MNP did result in protection from neutralizing antibodies, with slightly increased protection provided by the polymer. Complex formation of AdV with MNP is a viable means for targeting of vectors to areas of magnetic field gradient. Additional coating with polymer might proof useful in protection from inactivation by the immune system.