Deposition of amyloid-beta (A beta) peptides in the brain is a central event in the pathogenesis of Alzheimer's disease (AD), which makes A beta peptides a crucial target for therapeutic intervention. Significant efforts have been made towards the development of ligands that bind to A beta peptides with a goal of early detection of amyloid aggregation and the neutralization of A toxicity. Short single-stranded oligonucleotide aptamers bind with high affinity and specificity to their targets. Aptamers that specifically bind to A beta monomers, specifically the 40 and 42 amino acid species (A beta(1-40) and A beta(1-42)), fibrils and plaques have a great potential for diagnostic applications and the treatment of AD. Herein, we review the aptamers that bind to the various forms of A beta peptides for use in diagnosis and to inhibit plaque formation.