

CLAIMS

We claim:

1. A chimeric receptor comprising:
 - a cytoplasmic domain, wherein the cytoplasmic domain comprises a signaling domain of a receptor that when activated activates a macrophage;
 - a transmembrane domain; and
 - an extracellular domain, wherein the extracellular domain comprises an amyloid binding region.
2. The chimeric receptor of claim 1, wherein the extracellular domain comprises an antibody or functional fragment thereof.
3. The chimeric receptor of claim 2, wherein the antibody fragment is an scFv.
4. The chimeric receptor of any one of claims 1-3, wherein the antibody comprises a VL comprising a CDRL1, a CDRL2, and a CDRL3 and a VH comprising a CDRH1, a CDRH2, and a CDRH3, wherein the
 - CDRL1 comprises the amino acid sequence set forth in SEQ ID NO:24;
 - the CDRL2 comprises the amino acid sequence set forth in SEQ ID NO:25;
 - the CDRL3 comprises the amino acid sequence set forth in SEQ ID NO:26;
 - the CDRH1 comprises the amino acid sequence set forth in SEQ ID NO:21;
 - the CDRH2 comprises the amino acid sequence set forth in SEQ ID NO:22; and
 - the CDRH3 comprises the amino acid sequence set forth in SEQ ID NO:23.
5. The chimeric receptor of any one of claims 1-4, wherein the antibody comprises a VL comprising the amino acid sequence set forth in SEQ ID NO:19 or 34 and a VH comprising the amino acid sequence set forth in SEQ ID NO:20 or 35.
6. The chimeric receptor of claim 1, wherein the amyloid binding region comprises an 11-1F4 antibody fragment.
7. The chimeric receptor of any one of claims 2-6, wherein the antibody fragment is humanized.
8. The chimeric receptor of claim 1, wherein the extracellular domain comprises an amyloid-reactive peptide.
9. The chimeric receptor of claim 8, wherein the amyloid-reactive peptide comprises the sequence set forth in SEQ ID NO:1-18.

10. The chimeric receptor of claim 8 or 9, wherein the amyloid binding region is joined directly or indirectly to a CH2 domain or fragment thereof.
11. The chimeric receptor of claim 10, wherein the CH2 domain comprises an amino acid sequence having at least 80, 85, 90, 95, 97, 98, or 99% sequence identity to the amino acid sequence set forth in SEQ ID NO:33.
12. The chimeric receptor of any of claims 1-11, wherein the cytoplasmic domain comprises a cytoplasmic domain I, cytoplasmic domain II, or functional fragment thereof.
13. The chimeric receptor of claim 12, wherein the cytoplasmic domain comprises an amino acid sequence having at least 80, 85, 90, 95, 97, 98, or 99% sequence identity to the amino acid sequence set forth in SEQ ID NO: 30, 31, 41, 42, or 45.
14. The chimeric receptor of any of claims 1-12, wherein binding of an amyloid to the extracellular domain activates the cytoplasmic domain of the chimeric receptor.
15. The chimeric receptor of claim 1, wherein the receptor has 80, 85, 90, 95, 97, 98, or 99% sequence identity to the sequence set forth in SEQ ID NO: 43 with or without the secretory leader sequence.
16. The chimeric receptor of claim 1 or the method of any of claims 11-15, wherein each component of the receptor has 80, 85, 90, 95, 97, 98, or 99% sequence identity to the corresponding component of SEQ ID NO:43 together or separately.
17. Nucleic acid encoding the chimeric receptor of any one of claims 1-16.
18. An engineered cell comprising the nucleic acid of claim 17.
19. A method for removing an amyloid, comprising contacting an amyloid deposit with the chimeric receptor of any of claims 1-16 or the engineered cell of claim 18.
20. The method of claim 19, wherein the amyloid is AA, AL, AH, ATTR, AB2M, Wild type TTR, AApoAI, AApoAII, AGel, ALys, ALect2, Afib, ACys, ACal, AMedin, AIAPP, APro, AIns, APrP, or A β .

21. The method of claim 20, wherein the amyloid binding region of the chimeric receptor has binding affinity to the amyloid.
22. The method of any of claims 19-21, wherein contacting the amyloid deposit with the chimeric receptor results in at least partial clearance of the amyloid.
23. A method of treating a subject having an amyloid disorder comprising administering to the subject the chimeric receptor of any of claims 1-16 or the engineered cell of claim 18.
24. The method of claim 23, wherein administering to the subject the chimeric receptor comprises administering a macrophage or monocyte expressing the chimeric receptor.