<table>
<thead>
<tr>
<th>Target Molecule</th>
<th>CAR-T constructs in development (for MM)</th>
<th>Expression Profile (% of cases of MM patients)</th>
<th>Application in CAR T-cell therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCMA (B cell maturation antigen)</td>
<td>Bb2121, AUTO2, P-BCMA-101, EGFR/BCMA-41BBz, LCAR-B38M, Kite 585 and BCMA/CS1 CAR-T</td>
<td>Expressed on normal plasma cells and a small subset of B cells; varied expression levels on MM cells</td>
<td>Several CAR-Ts developed; pre-screening patients for high BCMA expression leads to improved outcomes; some preliminary data was previously described. See Table 2 for clinical trials.</td>
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<tr>
<td>CD19</td>
<td>CART-19</td>
<td>B cells; low expression on MM cells</td>
<td>Due to low expression on MM cells this is not a major target for MM, although a phase I trial is ongoing</td>
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<td>CD38</td>
<td>CD38-CART</td>
<td>Precursor B cells, plasma cells, T-cells, NK cells and myeloid precursors, also expressed in the prostate, nervous system, gut, muscle and on osteoclasts; highly expressed on MM cells (80-100%)</td>
<td>Due to wide expression of CD38 on many normal cells, affinity optimization has been used to select high affinity scFv's which appear to be more selective for CD38 on MM cells (which is expressed at higher levels) compared with normal cells; caspase-9 based suicide genes also included to allow selective CAR T-cell removal</td>
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<tr>
<td>CD138</td>
<td>CART-138</td>
<td>Plasma cells, salivary glands, liver and skin; varied expression levels on MM cells</td>
<td>Preliminary clinical trial conducted with 5 patients – 4/5 had stable disease longer than 3 months; one had advanced plasma cell leukemia Phase I clinical trial ongoing</td>
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<td>Immunoglobulin kappa light chain</td>
<td>Kappa-CD28 T cells</td>
<td>Mature B cells; possible expression by B cells that have been characterized as MM stem cells</td>
<td>Phase I clinical trial</td>
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<tr>
<td>SLAMF7 (CS1) (signaling lymphocyte activating molecule)</td>
<td>CM-CS1, BCMA/CS1 CAR-T</td>
<td>Plasma cells, NK cells, CD8+ cells, activated monocytes, B cells and dendritic cells; high levels of expression on MM cells Expressed on MM cells (&gt;90% of 532 MM cases regardless of cytogenetic abnormalities)</td>
<td>Pre-clinical study of CAR T-cells in mouse MM models showed positive effects. Another pre-clinical study has shown that lenalidomide enhances CS1-directed CAR T-cells Two clinical trials underway</td>
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<td>CD56</td>
<td>Anti-CD56 scFv</td>
<td>NK cells, T cells, neuronal cells; strongly expressed on MM cells from most patients (60-80%)</td>
<td>Specifically targeted MM cells in pre-clinical experiments, but expression on neuronal cells has limited development</td>
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<tr>
<td>CD44v6</td>
<td>CD44v6-specific CAR with suicide gene</td>
<td>Expressed on MM cells of 43% of patients; expressed on activated T cells, activated monocytes, keratinocytes</td>
<td>Pre-clinical study carried out in mice but has not been further developed</td>
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<td>CD70 (CD27 Ligand)</td>
<td>Not yet tested specifically for MM</td>
<td>Activated lymphoid cells; some MM cells</td>
<td>Pre-clinical study tested 7 anti-human CD70 CARs with binding moieties from human CD27 combined with CD3-zeta and CD28 and/or 41BB in mice; CAR with extracellular domain of CD27 fused with 41BB and CD3-zeta (trCD27-41BB-zeta) most effective; not tested specifically for MM</td>
</tr>
</tbody>
</table>

Table 1 Notes:

5. [https://clinicaltrials.gov/ct2/show/NCT00881920](https://clinicaltrials.gov/ct2/show/NCT00881920)
6. [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4119545/](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4119545/)
7. [http://www.bloodjournal.org/content/128/22/812?sso-checked=true](http://www.bloodjournal.org/content/128/22/812?sso-checked=true)
8. [http://cancerres.aacrjournals.org/content/72/8_Supplement/3499](http://cancerres.aacrjournals.org/content/72/8_Supplement/3499)
9. [http://cancerres.aacrjournals.org/content/72/8_Supplement/3499](http://cancerres.aacrjournals.org/content/72/8_Supplement/3499)
10. [http://www.bloodjournal.org/content/122/20/3461.long?sso-checked=true](http://www.bloodjournal.org/content/122/20/3461.long?sso-checked=true)