The amino acids included in this list are those that have been incorporated into biologically active peptides, e.g., angiotensin II, to study structure-activity relationships. Most of these amino acids are synthetic and are either available commercially or have been synthesized by various investigators as structural variants of naturally occurring amino acids. However, a few of these are also naturally occurring. The selection here is of those most widely used and whose representation by symbols in peptide sequences has caused problems for authors and editors. The symbols listed are those considered most in keeping with the system originated by the IUPAC-IUB Commission on Biochemical Nomenclature. The list may also be useful in selecting suitable isosteres of natural amino acids. The bibliography may be helpful in synthesis, resolution, or studies of the effects of these substances on the biological activity of various peptides.

The following trivial names are listed under other names (given by the number of the entry): N-amidinoglycine (67), 6-aminocapric acid (18), 2-aminoethanesulfonic acid (112), β,β-bis(trifluoromethyl)alanine (70), carboxamoylglycine (73), 2-(2-carboxyhydrizinopropyl)propane (83), cycloleucine (15), diethylalanine (17), dihydrophenylalanine (46), dopa (57), glycocyamine (67), isovaline (52), β-lysine (52), mercaptovaline (60), α-methylalanine (21), penicillamine (60), 5-pyrrolidone-2-carboxylic acid (109), surinamine (94), tetrahydrophenylalanine (47), trimethylammoniocaproic acid (116).
# STRUCTURE AND SYMBOLS FOR SYNTHETIC AMINO ACIDS INCORPORATED INTO SYNTHETIC POLYPEPTIDES (Continued)

<table>
<thead>
<tr>
<th>No.</th>
<th>Structure</th>
<th>Name/Reference</th>
<th>Symbol</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>$\text{H}_2\text{C}=$\text{(NHCOCH}_3\text{)}\text{COOH}$</td>
<td>2-Acetamidoacrylic acid</td>
<td>$\text{AcAacr}$</td>
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<tr>
<td>2</td>
<td>$\text{HN}(\text{CH}_3)_2\text{CH(NHCOCH}_3\text{)}\text{CONHCH}_3$</td>
<td>$N^\alpha$-Acetyl-$2$-fluorophenylalanine</td>
<td>$\text{AcPhe}(2\text{F})$</td>
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<td>3</td>
<td>$\text{H}_2\text{N(CH})_2\text{CH(NHCOCH}_3\text{)}\text{COOH}$</td>
<td>$N^\alpha$-Acetyllysine-$N^\alpha$-methylamide</td>
<td>$\text{Ac-Lys-NHMe}$</td>
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<tr>
<td>4</td>
<td>$\text{CH}_2\text{CH}_2\text{CH(NH}_3\text{)}\text{COOH}$</td>
<td>$\beta$-Aminoacid</td>
<td>$\beta\text{AaaL}$</td>
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<td>5</td>
<td>$\text{HOOC(CH}_3\text{)}\text{CH(NH}_3\text{)}\text{COOH}$</td>
<td>$\beta$-Aminoisobutyric acid</td>
<td>$\gamma\text{Abu}$</td>
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<tr>
<td>6</td>
<td>$\text{CH}_2\text{CH}_2\text{CH(NH}_3\text{)}\text{COOH}$</td>
<td>$\beta$-Aminocrotoic acid</td>
<td>$\alpha\text{Acrt}$</td>
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<td>7</td>
<td>$\text{CH}_2\text{CH}_2\text{CH(NH}_3\text{)}\text{COOH}$</td>
<td>$\beta$-Aminobutyric acid</td>
<td>$\alpha\text{Abu}$</td>
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<td>8</td>
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<td>$\beta$-Aminocrotoic acid</td>
<td>$\alpha\text{Acrt}$</td>
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<td>14</td>
<td>$\text{H}_2\text{N}\text{COOH}$</td>
<td>1-Aminocyclohexane-$1$-carboxylic acid (cyclonoreicine)</td>
<td>$\text{cHxA}(\alpha\text{Cx})$; $\text{cNle}$</td>
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<td>15</td>
<td>$\text{N}(\text{CH}_3)_2\text{COOH}$</td>
<td>1-Aminocyclopentane-$1$-carboxylic acid (cycroleucine)</td>
<td>$\text{cPeA}(\alpha\text{Cx})$; $\text{cLeu}$</td>
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<td>$(\text{CH}_3)_2\text{NCH}_2\text{C}$\text{(CH}_3\text{)}\text{CH(NH}_3\text{)}\text{COOH}$</td>
<td>2-Amino-$6$-dimethylamino-$4$-hexynoic acid (1)</td>
<td>$\alpha\text{eA}_{4}\text{hxA}(\text{}\alpha\text{A},N^\alpha\text{Me}_3)$</td>
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<td>17</td>
<td>$\text{CH}_2\text{CH}_2\text{CH(CH}_3\text{)}\text{CH(NH}_3\text{)}\text{COOH}$</td>
<td>2-Amino-$3$-ethylalareic acid (diethylalanine)</td>
<td>$\text{Ala}(\beta\text{Et})$</td>
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<td>18</td>
<td>$\text{H}_2\text{N}$\text{(CH}_3)_2\text{COOH}$</td>
<td>6-Aminohexanoic acid ($6$-aminocaproic acid)</td>
<td>$\epsilon\text{Aha}$</td>
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<td>19</td>
<td>$(\text{CH}_3)_2\text{CHCH}_2\text{CH(NH}_3\text{)}\text{CH(OH)}\text{CH}_3\text{COOH}$</td>
<td>4-Amino-$3$-hydroxy-$6$-methylheptanoic acid (2,3)</td>
<td>$\gamma\text{Ahp}(\beta\text{OH,}\epsilon\text{Me})$</td>
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<td>20</td>
<td>$\text{N}(\text{CH}_3)_2\text{C}$\text{(CH}_3\text{)}\text{CH(NH}_3\text{)}\text{COOH}$</td>
<td>2-Amino-$3$-[2-imidazolyl]propionic acid</td>
<td>$\text{Apr}(\beta\text{Im}-2)$</td>
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<td>21</td>
<td>$(\text{CH}_3)_2\text{C}$\text{(NH}_3\text{)}\text{COOH}$</td>
<td>2-Aminoisoobutryric acid ($\alpha$-methylalanine)</td>
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<td>22</td>
<td>$\text{H}_2\text{NCH}_2\text{SO}_3\text{H}$</td>
<td>Aminomethanesulfonic acid</td>
<td>$\text{Ams}$</td>
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<td>23</td>
<td>$\text{CH}_2\text{NH}_2$</td>
<td>4-Aminomethylbenzoic acid</td>
<td>$\text{Bz}(\text{4Ame}); \text{Bz}(\text{4CH}_2\text{NH}_3)$</td>
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<tr>
<td>No.</td>
<td>Structure</td>
<td>Name/Reference</td>
<td>Symbol</td>
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<tr>
<td>24</td>
<td>CH&lt;sub&gt;3&lt;/sub&gt;CH(CH&lt;sub&gt;3&lt;/sub&gt;)CH&lt;sub&gt;2&lt;/sub&gt;NH&lt;sub&gt;2&lt;/sub&gt;COOH</td>
<td>2-Amino-4-methyl-hexanoic acid (4)</td>
<td>Ahx(gMe)</td>
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<td>25</td>
<td>CH&lt;sub&gt;2&lt;/sub&gt;CH=CH(CH&lt;sub&gt;3&lt;/sub&gt;)CH&lt;sub&gt;2&lt;/sub&gt;NH&lt;sub&gt;2&lt;/sub&gt;COOH</td>
<td>2-Amino-4-methyl-4-hexenoic acid (4)</td>
<td>Ahx(Δ&lt;sub&gt;g&lt;/sub&gt;, gMe)</td>
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<tr>
<td>26</td>
<td>CH&lt;sub&gt;2&lt;/sub&gt;=C(CH&lt;sub&gt;3&lt;/sub&gt;)CH&lt;sub&gt;2&lt;/sub&gt;NH&lt;sub&gt;2&lt;/sub&gt;COOH</td>
<td>2-Amino-5-methyl-5-hexenoic acid (4)</td>
<td>Ahx(Δ&lt;sub&gt;d&lt;/sub&gt;, dMe)</td>
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<tr>
<td>27</td>
<td>H&lt;sub&gt;2&lt;/sub&gt;N(CH&lt;sub&gt;3&lt;/sub&gt;)&lt;sub&gt;2&lt;/sub&gt;COOH</td>
<td>8-Aminooccanoic acid</td>
<td>αAoc</td>
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<td>28</td>
<td>(4-Amino)phenylalanine (5)</td>
<td>Phe(4NH&lt;sub&gt;3&lt;/sub&gt;)</td>
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<td>29</td>
<td>3-Amino-4-phenylbutyric acid</td>
<td>βAbu(gPh)</td>
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<td>30</td>
<td>HOOCCH(NH&lt;sub&gt;2&lt;/sub&gt;)(CH&lt;sub&gt;2&lt;/sub&gt;)&lt;sub&gt;3&lt;/sub&gt;COOH</td>
<td>2-Aminopimelic acid</td>
<td>αApm</td>
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<td>31</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;CH&lt;sub&gt;2&lt;/sub&gt;CH&lt;sub&gt;2&lt;/sub&gt;NH&lt;sub&gt;2&lt;/sub&gt;COOH</td>
<td>2-Amino-3-(2-pyridyl)propionic acid</td>
<td>Apr(βPrd-2)</td>
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<tr>
<td>32</td>
<td>(CH&lt;sub&gt;3&lt;/sub&gt;)&lt;sub&gt;3&lt;/sub&gt;N(CH&lt;sub&gt;2&lt;/sub&gt;)&lt;sub&gt;7&lt;/sub&gt;COOH</td>
<td>2-Amino-3-(2-pyrimidyl)propionic acid</td>
<td>Apr(βPyr-2)&lt;sup&gt;c4&lt;/sup&gt;</td>
</tr>
<tr>
<td>33</td>
<td>NOOCCH&lt;sub&gt;2&lt;/sub&gt;CH(NH&lt;sub&gt;2&lt;/sub&gt;)CONHCH&lt;sub&gt;3&lt;/sub&gt;COOH</td>
<td>3-Aminotyrosine</td>
<td>Tyr(3NH&lt;sub&gt;2&lt;/sub&gt;)</td>
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<tr>
<td>34</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;CH&lt;sub&gt;2&lt;/sub&gt;CH&lt;sub&gt;2&lt;/sub&gt;NHCH&lt;sub&gt;2&lt;/sub&gt;CH(NH&lt;sub&gt;2&lt;/sub&gt;)COOH</td>
<td>Aspartic α-methylamide</td>
<td>Asp-NHMe</td>
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<td>35</td>
<td>CH&lt;sub&gt;2&lt;/sub&gt;NHCOCH&lt;sub&gt;2&lt;/sub&gt;CH(NH&lt;sub&gt;2&lt;/sub&gt;)COOH</td>
<td>Aspartic β-methylamide</td>
<td>Asn(Me); Asp(NHMe)</td>
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<tr>
<td>36</td>
<td>H&lt;sub&gt;2&lt;/sub&gt;NCH&lt;sub&gt;2&lt;/sub&gt;CH(NH&lt;sub&gt;2&lt;/sub&gt;)COOH</td>
<td>Azetidine-2-carboxylic acid</td>
<td>Azt</td>
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<tr>
<td>37</td>
<td>HOOCCH&lt;sub&gt;2&lt;/sub&gt;CH(NH&lt;sub&gt;2&lt;/sub&gt;)CONHCH&lt;sub&gt;3&lt;/sub&gt;</td>
<td>Aziridinecarboxylic acid</td>
<td>Azr</td>
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<td>38</td>
<td>N&lt;sub&gt;2&lt;/sub&gt;CH&lt;sub&gt;2&lt;/sub&gt;CH&lt;sub&gt;2&lt;/sub&gt;NH&lt;sub&gt;2&lt;/sub&gt;COOH</td>
<td>Aziridino-n-carboxylic acid (6)</td>
<td>Azro</td>
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<tr>
<td>39</td>
<td>(PhCH&lt;sub&gt;2&lt;/sub&gt;)C(NH&lt;sub&gt;2&lt;/sub&gt;)COOH</td>
<td>(α-Benzyl)phenylalanine (7)</td>
<td>Phe(αBzl)</td>
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<tr>
<td>40</td>
<td>PhCH&lt;sub&gt;2&lt;/sub&gt;CH(NH&lt;sub&gt;2&lt;/sub&gt;)COOH</td>
<td>3-Benzyltyrosine (8)</td>
<td>Tyr(3Bzl)</td>
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<tr>
<td>No.</td>
<td>Structure</td>
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<td>Symbol</td>
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<tr>
<td>42</td>
<td><img src="image" alt="Structure 42" /></td>
<td>(4-Chloro)phenylalanine (5)</td>
<td>Phe(4Cl)</td>
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<tr>
<td>43</td>
<td>$H_2NCONH(CH_3)_2CH(NH_2)COOH$</td>
<td>Citrulline&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Ctr</td>
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<tr>
<td>44</td>
<td>NCCH$_2$CH(NH$_2$)COOH</td>
<td>$\beta$-Cyanalanine</td>
<td>Ala($\beta$CN)</td>
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<td>45</td>
<td>NCCH$_2$CH$_2$NHCCH$_2$COOH</td>
<td>$N$-(2-Cyanoethyl)glycine</td>
<td>(CNEt)Gly; CNEt-Gly</td>
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<tr>
<td>46</td>
<td><img src="image" alt="Structure 46" /></td>
<td>$\beta$-(1,4-Cyclohexadienyl)alanine (9) (dihydrophenylalanine)</td>
<td>Ala($\beta$H$_2$; Phe(H$_2$))</td>
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<tr>
<td>47</td>
<td><img src="image" alt="Structure 47" /></td>
<td>$\beta$-(Cyclohexyl)alanine (10, 20) (hexahydrophenylalanine)</td>
<td>Ala($\beta$Hx; Phe(H$_6$))</td>
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<tr>
<td>48</td>
<td><img src="image" alt="Structure 48" /></td>
<td>$\alpha$-(Cyclohexyl)glycine</td>
<td>Gly(CHx)</td>
</tr>
<tr>
<td>49</td>
<td><img src="image" alt="Structure 49" /></td>
<td>$\beta$-(Cyclopentyl)alanine</td>
<td>Ala($\beta$Pe)</td>
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<tr>
<td>50</td>
<td><img src="image" alt="Structure 50" /></td>
<td>$\alpha$-(Cyclopentyl)glycine</td>
<td>Gly(cPe)</td>
</tr>
<tr>
<td>51</td>
<td>$H_2NCH_2CH_2CH(NH_2)COOH$</td>
<td>2,4-Diaminobutyric acid</td>
<td>$\text{A}_2 \text{bu}^c$</td>
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<tr>
<td>52</td>
<td>$H_2N(CH_2)_3CH(NH_2)CH_2COOH$</td>
<td>3,6-Diaminohexanoic acid (isolysine&lt;sup&gt;b&lt;/sup&gt; $\beta$-lysine&lt;sup&gt;b&lt;/sup&gt;)</td>
<td>$\text{A}_2 \beta$, $\text{hxc}$; $\beta$Lys</td>
</tr>
<tr>
<td>53</td>
<td>$H_2NCH_2C=CH_2CH(NH_2)COOH$</td>
<td>2,6-Diamino-4-hexynoic acid (11)</td>
<td>$\alpha\text{exh} \Delta \alpha^b$</td>
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<tr>
<td>54</td>
<td>HOOCCH(NH$_2$)(CH$_2$)$_3$CH(NH$_2$)COOH</td>
<td>2,2'-Diaminopimelic acid</td>
<td>$\text{A}_2 \text{pm}^c$</td>
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<tr>
<td>55</td>
<td>$H_2NCH_2CH(NH_2)COOH$</td>
<td>2,3-Diaminopropionic acid</td>
<td>$\text{A}_3 \text{pr}^c$</td>
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</tbody>
</table>
| 56  | ![Structure 56](image) | 3,4-Dihydroxy-(\(\alpha\)-methyl)phenylalanine  
$\beta$-(3,4-Dihydroxyphenyl)-\(\alpha\)-methylalanine | Dopa($\alpha$Me) |
| 57  | ![Structure 57](image) | 3,4-Dihydroxyphenylalanine<sup>b</sup> | Dopa<sup>b</sup> |
### Structural and Symbols for Synthetic Amino Acids Incorporated into Synthetic Polypeptides

<table>
<thead>
<tr>
<th>No.</th>
<th>Structure</th>
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<th>Symbol</th>
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<tbody>
<tr>
<td>58</td>
<td><img src="image" alt="Structure" /></td>
<td>(3,4-Dihydroxyphenyl)serine</td>
<td>Dopa(βHO)</td>
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<tr>
<td>59</td>
<td>HOOCCH₂CH(Me₂N→O)COOH</td>
<td>N,N-Dimethylaspartic N-oxide (12)</td>
<td>(OMe₂)Asp; Me₂(O)Asp</td>
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<tr>
<td>60</td>
<td>(CH₃)₂CHCH(NH₂)COOH</td>
<td>β,β-Dimethylcysteine (β mercaptovaline; penicillamine&lt;sup&gt;a&lt;/sup&gt;)</td>
<td>Val(βSH); Cys(βMe₂)</td>
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<tr>
<td>61</td>
<td>(CH₃)₂CHCH₂CH(NH₂)COOH CH₃</td>
<td>threo-N, β-Dimethylleucine (13)</td>
<td>MeLeu(βMe)</td>
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<td><img src="image" alt="Structure" /></td>
<td>α,3-Dimethyltyrosine</td>
<td>Tyr(α3-Me₂)</td>
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<td>63</td>
<td>(C₆H₅)₂CHCH₂COOH</td>
<td>α,α-Diphenylglycine</td>
<td>Gly(Ph₂)</td>
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<td>CH₃CH₂SCH₂CH₂CH(NH₂)COOH</td>
<td>Ethionine&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Eth</td>
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<td>65</td>
<td>CH₃CH₂NHCH₂COOH</td>
<td>N-Ethylglycine</td>
<td>EtGly</td>
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<td>66</td>
<td><img src="image" alt="Structure" /></td>
<td>teleEthylhistidine&lt;sup&gt;abc&lt;/sup&gt; &quot;1-Ethylhistidine&quot; (14) (cf. 88, 89)</td>
<td>His(βEt)&lt;sup&gt;abc&lt;/sup&gt;</td>
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<td>67</td>
<td>H₂N(CONHCH₂COOH</td>
<td>Guanidinoacetyl (N-amidinoglycyl; glyoxycamine)</td>
<td>GdnAc–; AmdGly–</td>
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<tr>
<td>68</td>
<td>H₂N(CONHCH₂CH(NH₂)COOH</td>
<td>β-Guanidinoalanine</td>
<td>Ala(βGdn)</td>
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<td>69</td>
<td>H₂N(CONHCH₂CH(NH₂)COOH</td>
<td>5-Guanidinovaleric acid</td>
<td>Val(5Gdn)</td>
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<td>70</td>
<td>(CF₃)₂CHCH(NH₂)COOH</td>
<td>γ₁-Hexafluorovaline</td>
<td>Val(γ₁F₆)</td>
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<td>H₂N(CONHCH₂CH(NH₂)COOH</td>
<td>[β,β-bis(trifluoromethyl)alanine]</td>
<td>Val(βF₆)</td>
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<td>72</td>
<td>H₂N(CONHCH₂CH(NH₂)COOH</td>
<td>Homolysine&lt;sup&gt;c&lt;/sup&gt; (15)</td>
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<td>73</td>
<td>H₂NCONHCH₂COOH</td>
<td>Hydantoic acid; (carbamoylglycine)</td>
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<td>5-Hydantoinacetyl</td>
<td>HydAc–</td>
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<td>75</td>
<td>CH₂CH(OH)CH₂CH(NH₂)COOH</td>
<td>ε-Hydroxynorleucine (16)</td>
<td>Nle(εOH)</td>
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<td><img src="image" alt="Structure" /></td>
<td>1-Hydroxyippecolic acid (17)</td>
<td>Pip(1HO)</td>
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<td>Name/Reference</td>
<td>Symbol</td>
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<tr>
<td>77</td>
<td><img src="image" alt="Structure" /></td>
<td>1-Hydroxyproline (17)</td>
<td>Pro(1HO)</td>
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<td><img src="image" alt="Structure" /></td>
<td>3-Hydroxyproline</td>
<td>Pro(3HO)</td>
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<td>79</td>
<td><img src="image" alt="Structure" /></td>
<td>4-Hydroxyproline</td>
<td>Pro(4HO)</td>
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<td>CH₃N(OH)CH₂COOH</td>
<td>N-Hydroxysarcosine (17)</td>
<td>Sar(N-HO)</td>
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<tr>
<td>81</td>
<td>HOOCC₃H₂CH(NH₂)CONH₂</td>
<td>Isoasparagine&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Asp-NH₂&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>82</td>
<td>HOOCC₃H₂CH(NH₂)CONH₂</td>
<td>Isoglutamine&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Glu-NH₂&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>83</td>
<td>H₂NN(CHMe₂)COOH</td>
<td>2-Isopropylcarboxylic acid [2-(1-carboxyhydrazino)propane]</td>
<td>Hdz(iPr)</td>
</tr>
<tr>
<td>84</td>
<td>(CH₃)₂CHNH(CH₂)₂CH(NH₂)COOH</td>
<td>N²-Isopropylornithine</td>
<td>Orn(iPr)</td>
</tr>
<tr>
<td>85</td>
<td>CH₃C(SH)(NH₂)COOH</td>
<td>α-Mercaptopotamine (18)</td>
<td>Ala(αSH)</td>
</tr>
<tr>
<td>86</td>
<td>CH₃CH(NHCH₂)COOH</td>
<td>N-Methylalanine (19)</td>
<td>MeAla</td>
</tr>
<tr>
<td>87</td>
<td>CH₃CH₂CH₂CHCH₂CH(NHCH₂)COOH</td>
<td>N-Methylalloisoleucine (20)</td>
<td>(Me)alk</td>
</tr>
<tr>
<td>88</td>
<td><img src="image" alt="Structure" /></td>
<td>“1-Methylhistidine”&lt;sup&gt;bc&lt;/sup&gt;</td>
<td>His(1Me)&lt;sup&gt;bc&lt;/sup&gt;</td>
</tr>
<tr>
<td>89</td>
<td><img src="image" alt="Structure" /></td>
<td>“3-Methylhistidine”&lt;sup&gt;bc&lt;/sup&gt;</td>
<td>His(3Me)&lt;sup&gt;bc&lt;/sup&gt;</td>
</tr>
<tr>
<td>90</td>
<td>HOOCC₃H₂CH(NHCH₂)CONH₂</td>
<td>N-Methylisoasparagine (22)</td>
<td>MeAsp-NH₂</td>
</tr>
<tr>
<td>91</td>
<td><img src="image" alt="Structure" /></td>
<td>(N-Methyl)phenylalanine (23)</td>
<td>MePhe</td>
</tr>
<tr>
<td>92</td>
<td>CH₃OCH₂CH(NH₂)COOH</td>
<td>O-Methylserine</td>
<td>Ser(Me)&lt;sup&gt;e&lt;/sup&gt;</td>
</tr>
<tr>
<td>93</td>
<td>CH₃CH(OCH₂)CH(NH₂)COOH</td>
<td>O-Methylthreonine</td>
<td>Thr(Me)&lt;sup&gt;f&lt;/sup&gt;</td>
</tr>
<tr>
<td>94</td>
<td><img src="image" alt="Structure" /></td>
<td>N-Methyltyrosine (22)</td>
<td>MeTyr</td>
</tr>
</tbody>
</table>

<sup>a</sup> Surinamine (N-Methyltyrosine)

<sup>b</sup> Was described as “3-Methylhistidine” by Szent-Györgyi in 1956.

<sup>c</sup> Also termed “Histidine-M.”

<sup>d</sup> Described as “3-Methylhistidine” by Szent-Györgyi in 1956.

<sup>e</sup> Also termed “Histidine-M.”
### STRUCTURE AND SYMBOLS FOR SYNTHETIC AMINO ACIDS INCORPORATED INTO SYNTHETIC POLYPEPTIDES (Continued)

<table>
<thead>
<tr>
<th>No.</th>
<th>Structure</th>
<th>Name/Reference</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>95</td>
<td><img src="image1" alt="Structure" /></td>
<td>$\alpha$-Methlytyrosine</td>
<td>Tyr($\alpha$Me)</td>
</tr>
<tr>
<td>96</td>
<td><img src="image2" alt="Structure" /></td>
<td>O-Methlytyrosine</td>
<td>Tyr(OMe); Phe(4-OMe)</td>
</tr>
<tr>
<td>97</td>
<td><img src="image3" alt="Structure" /></td>
<td>$\beta$-(1-Naphthyl)alanine</td>
<td>Ala($\beta$Nap-1)</td>
</tr>
<tr>
<td>98</td>
<td><img src="image4" alt="Structure" /></td>
<td>$\beta$-(2-Naphthyl)alanine</td>
<td>Ala($\beta$Nap-2)</td>
</tr>
<tr>
<td>99</td>
<td><img src="image5" alt="Structure" /></td>
<td>Nitroguanidinoacetyl</td>
<td>NGdnAc-</td>
</tr>
<tr>
<td>100</td>
<td><img src="image6" alt="Structure" /></td>
<td>Norleucine (2-aminohexanoic acid)</td>
<td>Nle</td>
</tr>
<tr>
<td>101</td>
<td><img src="image7" alt="Structure" /></td>
<td>Norvaline (2-aminovaleric acid)</td>
<td>Nva</td>
</tr>
<tr>
<td>102</td>
<td><img src="image8" alt="Structure" /></td>
<td>(Pentafluorophenyl)alanine</td>
<td>Ala($\beta$PhF₅)</td>
</tr>
<tr>
<td>103</td>
<td><img src="image9" alt="Structure" /></td>
<td>Phenylglycine</td>
<td>Gly(Ph)</td>
</tr>
<tr>
<td>104</td>
<td><img src="image10" alt="Structure" /></td>
<td>Pipecolic acid (piperidine-2-carboxylic acid)</td>
<td>Pip</td>
</tr>
<tr>
<td>105</td>
<td><img src="image11" alt="Structure" /></td>
<td>$\beta$-(1-Pyrazolyl)alanine</td>
<td>Ala($\beta$Pz1)</td>
</tr>
<tr>
<td>106</td>
<td><img src="image12" alt="Structure" /></td>
<td>$\beta$-(3-Pyrazolyl)alanine (24, 25)</td>
<td>Ala ($\beta$Pz3)</td>
</tr>
<tr>
<td>No.</td>
<td>Structure</td>
<td>Name/Reference</td>
<td>Symbol</td>
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</tr>
<tr>
<td>107</td>
<td><img src="image1" alt="Structure" /></td>
<td>β-(4-Pyrazolyl)alanine (25)</td>
<td>Ala(βPz4)</td>
</tr>
<tr>
<td>108</td>
<td><img src="image2" alt="Structure" /></td>
<td>Pyro-2-aminoadipic acid</td>
<td>pAad; &lt; Aad</td>
</tr>
<tr>
<td>109</td>
<td><img src="image3" alt="Structure" /></td>
<td>Pyroglutamic acid&lt;sup&gt;b&lt;/sup&gt; 5-pyrrolidone-2-carboxylic acid</td>
<td>pGlu; &lt;Glu&lt;</td>
</tr>
<tr>
<td>110</td>
<td>CH₃HNCH₂COOH</td>
<td>Sarcosine&lt;sup&gt;c&lt;/sup&gt;; (N-methylglycine)</td>
<td>Sar&lt;sup&gt;c&lt;/sup&gt;; MeGly</td>
</tr>
<tr>
<td>111</td>
<td>HOOCC₂H₂CONH₂</td>
<td>Succinamic acid</td>
<td>Suc·NH₂</td>
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<tr>
<td>112</td>
<td>H₂NCH₂CH₂SO₃H</td>
<td>Taurine (2-aminoethanesulfonic acid)</td>
<td>Tau</td>
</tr>
<tr>
<td>113</td>
<td><img src="image4" alt="Structure" /></td>
<td>Thiazolidine-4-carboxylic acid</td>
<td>Tzl</td>
</tr>
<tr>
<td>114</td>
<td><img src="image5" alt="Structure" /></td>
<td>β-(2-Thienyl)alanine</td>
<td>Ala(βThi2)</td>
</tr>
<tr>
<td>115</td>
<td><img src="image6" alt="Structure" /></td>
<td>β-(2-Thienyl)serine</td>
<td>Ser(βThi2)</td>
</tr>
<tr>
<td>116</td>
<td>(CH₃)₃N(CH₂)₃COOH</td>
<td>ε-(Trimethylammonio)hexanoic acid [(ε-trimethylammonio)caproic acid]</td>
<td>εAhx(NMe₃)</td>
</tr>
<tr>
<td>117</td>
<td><img src="image7" alt="Structure" /></td>
<td>o-Tyrosine</td>
<td>Phe(2HO)</td>
</tr>
<tr>
<td>118</td>
<td><img src="image8" alt="Structure" /></td>
<td>m-Tyrosine&lt;sup&gt;e&lt;/sup&gt;</td>
<td>Phe(3HO)</td>
</tr>
</tbody>
</table>

Compiled by M. C. Khosla and W. E. Cohn.
Structures and Symbols for Synthetic Amino Acids Incorporated into Synthetic Polypeptides

References