### AmpR alignment

| ECH1   | MTSRYLPLSLRAFEAAAHLSTTHAIELNVTSAI2QHVTLEQHLNCQLPFVRVSVRGL 60 |
|--------|------------------------------------------------------------------|
| ECH2   | MTSRYLPLSLRAFEAAAHLSTTHAIELNVTSAI2QHVTLEQHLNCQLPFVRVSVRGL 60 |
| ECH3   | MTSRYLPLSLRAFEAAAHLSTTHAIELNVTSAI2QHVTLEQHLNCQLPFVRVSVRGL 60 |
| ECH6   | MTSRYLPLSLRAFEAAAHLSTTHAIELNVTSAI2QHVTLEQHLNCQLPFVRVSVRGL 60 |
| ECH11  | MTSRYLPLSLRAFEAAAHLSTTHAIELNVTSAI2QHVTLEQHLNCQLPFVRVSVRGL 60 |
| ECH24  | MTSRYLPLSLRAFEAAAHLSTTHAIELNVTSAI2QHVTLEQHLNCQLPFVRVSVRGL 60 |
| ECH23  | MTSRYLPLSLRAFEAAAHLSTTHAIELNVTSAI2QHVTLEQHLNCQLPFVRVSVRGL 60 |
| ATCC13047 CTX-S | MTSRYLPLSLRAFEAAAHLSTTHAIELNVTSAI2QHVTLEQHLNCQLPFVRVSVRGL 60 |

| ECH1   | MLTIDENLPLNDSDRAGLDFANHRAQELKLIGVGTAGFLSFQLEDHRGNY 120 |
|--------|--------------------------------------------------------|
| ECH2   | MLTIDENLPLNDSDRAGLDFANHRAQELKLIGVGTAGFLSFQLEDHRGNY 120 |
| ECH3   | MLTIDENLPLNDSDRAGLDFANHRAQELKLIGVGTAGFLSFQLEDHRGNY 120 |
| ECH6   | MLTIDENLPLNDSDRAGLDFANHRAQELKLIGVGTAGFLSFQLEDHRGNY 120 |
| ECH11  | MLTIDENLPLNDSDRAGLDFANHRAQELKLIGVGTAGFLSFQLEDHRGNY 120 |
| ECH24  | MLTIDENLPLNDSDRAGLDFANHRAQELKLIGVGTAGFLSFQLEDHRGNY 120 |
| ECH23  | MLTIDENLPLNDSDRAGLDFANHRAQELKLIGVGTAGFLSFQLEDHRGNY 120 |
| ATCC13047 CTX-S | MLTIDENLPLNDSDRAGLDFANHRAQELKLIGVGTAGFLSFQLEDHRGNY 120 |

| ECH1   | PHTIAFLSDTHNNRVPDAEAGLDYIVRYGGAHTEAEFLCHAPLPLCTPDIAASLHP 180 |
|--------|-------------------------------------------------------------|
| ECH2   | PHTIAFLSDTHNNRVPDAEAGLDYIVRYGGAHTEAEFLCHAPLPLCTPDIAASLHP 180 |
| ECH3   | PHTIAFLSDTHNNRVPDAEAGLDYIVRYGGAHTEAEFLCHAPLPLCTPDIAASLHP 180 |
| ECH6   | PHTIAFLSDTHNNRVPDAEAGLDYIVRYGGAHTEAEFLCHAPLPLCTPDIAASLHP 180 |
| ECH11  | PHTIAFLSDTHNNRVPDAEAGLDYIVRYGGAHTEAEFLCHAPLPLCTPDIAASLHP 180 |
| ECH24  | PHTIAFLSDTHNNRVPDAEAGLDYIVRYGGAHTEAEFLCHAPLPLCTPDIAASLHP 180 |
| ECH23  | PHTIAFLSDTHNNRVPDAEAGLDYIVRYGGAHTEAEFLCHAPLPLCTPDIAASLHP 180 |
| ATCC13047 CTX-S | PHTIAFLSDTHNNRVPDAEAGLDYIVRYGGAHTEAEFLCHAPLPLCTPDIAASLHP 180 |

| ECH1   | ADILRFTLRLSRDWRMTAWNQAAGEHPPSTHRVMVFDSSTVMLAAQAQCVGIAIAVPD 240 |
|--------|-----------------------------------------------------------------|
| ECH2   | ADILRFTLRLSRDWRMTAWNQAAGEHPPSTHRVMVFDSSTVMLAAQAQCVGIAIAVPD 240 |
| ECH3   | ADILRFTLRLSRDWRMTAWNQAAGEHPPSTHRVMVFDSSTVMLAAQAQCVGIAIAVPD 240 |
| ECH6   | ADILRFTLRLSRDWRMTAWNQAAGEHPPSTHRVMVFDSSTVMLAAQAQCVGIAIAVPD 240 |
| ECH11  | ADILRFTLRLSRDWRMTAWNQAAGEHPPSTHRVMVFDSSTVMLAAQAQCVGIAIAVPD 240 |
| ECH24  | ADILRFTLRLSRDWRMTAWNQAAGEHPPSTHRVMVFDSSTVMLAAQAQCVGIAIAVPD 240 |
| ECH23  | ADILRFTLRLSRDWRMTAWNQAAGEHPPSTHRVMVFDSSTVMLAAQAQCVGIAIAVPD 240 |
| ATCC13047 CTX-S | ADILRFTLRLSRDWRMTAWNQAAGEHPPSTHRVMVFDSSTVMLAAQAQCVGIAIAVPD 240 |

| ECH1   | MPTTHLASSIRQVRFATTQIELGSYWTQRLQSRABTPAMREFSRWLVEKMKK 291 |
|--------|----------------------------------------------------------|
| ECH2   | MPTTHLASSIRQVRFATTQIELGSYWTQRLQSRABTPAMREFSRWLVEKMKK 291 |
| ECH3   | MPTTHLASSIRQVRFATTQIELGSYWTQRLQSRABTPAMREFSRWLVEKMKK 291 |
| ECH6   | MPTTHLASSIRQVRFATTQIELGSYWTQRLQSRABTPAMREFSRWLVEKMKK 291 |
| ECH11  | MPTTHLASSIRQVRFATTQIELGSYWTQRLQSRABTPAMREFSRWLVEKMKK 291 |
| ECH24  | MPTTHLASSIRQVRFATTQIELGSYWTQRLQSRABTPAMREFSRWLVEKMKK 291 |
| ECH23  | MPTTHLASSIRQVRFATTQIELGSYWTQRLQSRABTPAMREFSRWLVEKMKK 291 |
| ATCC13047 CTX-S | MPTTHLASSIRQVRFATTQIELGSYWTQRLQSRABTPAMREFSRWLVEKMKK 291 |
### AmpD Alignment

|     | ATCC13047   | ECH23   | ECH24   | ECH1   | ECH3   | ECH6   | ECH11   |
|-----|-------------|---------|---------|--------|--------|--------|---------|
| **CTX-S** | \(\text{-----MLLDEGWLVDAR}\text{VPSPHHDCRPEDKPTLLLVHTNISLPGEFGP}WIDALFTG\)T | \(\text{-----MLLDEGWLVDAR}\text{VPSPHHDCRPEDKPTLLLVHTNISLPGEFGP}WIDALFTG\)T | \(\text{-----MLLDEGWLVDAR}\text{VPSPHHDCRPEDKPTLLLVHTNISLPGEFGP}WIDALFTG\)T | \(\text{--------MSSSMLLEGW}LVDARVPSPHHDCRPEDKPTLLLVHTNISLPGEFGP}WIDALFTG\)T | \(\text{--------MSSSMLLEGW}LVDARVPSPHHDCRPEDKPTLLLVHTNISLPGEFGP}WIDALFTG\)T | \(\text{--------MSSSMLLEGW}LVDARVPSPHHDCRPEDKPTLLLVHTNISLPGEFGP}WIDALFTG\)T | \(\text{--------MSSSMLLEGW}LVDARVPSPHHDCRPEDKPTLLLVHTNISLPGEFGP}WIDALFTG\)T |
| **CTX-S** | \(\text{DPDAHFFFAIAH}L\text{RVSHCLRRDG}E\text{VVYVPFDKRA}WA\text{HAG}V\text{SMYQG}ERCNDFSIGIE} \) | \(\text{DPDVHFFFAIAH}L\text{RVSHCLRRDG}E\text{VVYVPFDKRA}WA\text{HAG}V\text{SMYQG}ERCNDFSIGIE} \) | \(\text{DPDVHFFFAIAH}L\text{RVSHCLRRDG}E\text{VVYVPFDKRA}WA\text{HAG}V\text{SMYQG}ERCNDFSIGIE} \) | \(\text{DPDVHFFFAIAH}L\text{RVSHCLRRDG}E\text{VVYVPFDKRA}WA\text{HAG}V\text{SMYQG}ERCNDFSIGIE} \) | \(\text{DPDVHFFFAIAH}L\text{RVSHCLRRDG}E\text{VVYVPFDKRA}WA\text{HAG}V\text{SMYQG}ERCNDFSIGIE} \) | \(\text{DPDVHFFFAIAH}L\text{RVSHCLRRDG}E\text{VVYVPFDKRA}WA\text{HAG}V\text{SMYQG}ERCNDFSIGIE} \) | \(\text{DPDVHFFFAIAH}L\text{RVSHCLRRDG}E\text{VVYVPFDKRA}WA\text{HAG}V\text{SMYQG}ERCNDFSIGIE} \) |
| **CTX-S** | \(\text{LEGTDIPEYTDAYQYK}LADIQTQLIRLYPAI\text{AENM}TGHDCIPARKTDGPAPDWPFFRA} \) | \(\text{LEGTDIPEYTDAYQYK}LADIQTQLIRLYPAI\text{AENM}TGHDCIPARKTDGPAPDWPFFRA} \) | \(\text{LEGTDIPEYTDAYQYK}LADIQTQLIRLYPAI\text{AENM}TGHDCIPARKTDGPAPDWPFFRA} \) | \(\text{LEGTDIPEYTDAYQYK}LADIQTQLIRLYPAI\text{AENM}TGHDCIPARKTDGPAPDWPFFRA} \) | \(\text{LEGTDIPEYTDAYQYK}LADIQTQLIRLYPAI\text{AENM}TGHDCIPARKTDGPAPDWPFFRA} \) | \(\text{LEGTDIPEYTDAYQYK}LADIQTQLIRLYPAI\text{AENM}TGHDCIPARKTDGPAPDWPFFRA} \) | \(\text{LEGTDIPEYTDAYQYK}LADIQTQLIRLYPAI\text{AENM}TGHDCIPARKTDGPAPDWPFFRA} \) |
| **CTX-S** | \(\text{MLTASSE}----- \) | \(\text{MLTSSDEKIEIT} \) | \(\text{MLTSSDEKIEIT} \) | \(\text{MLTSSDEKIEIT} \) | \(\text{MLTSSDEKIEIT} \) | \(\text{MLTSSDEKIEIT} \) | \(\text{MLTSSDEKIEIT} \) |

| **AmpD Homologues** | **ATCC13047** | **ECH23** | **ECH24** | **ECH1** | **ECH3** | **ECH6** | **ECH11** |
|----------------------|---------------|-----------|-----------|-----------|----------|---------|---------|
| **CTX-S** | \(\text{-----MLLDEGWLVDAR}\text{VPSPHHDCRPEDKPTLLLVHTNISLPGEFGP}WIDALFTG\)T | \(\text{-----MLLDEGWLVDAR}\text{VPSPHHDCRPEDKPTLLLVHTNISLPGEFGP}WIDALFTG\)T | \(\text{-----MLLDEGWLVDAR}\text{VPSPHHDCRPEDKPTLLLVHTNISLPGEFGP}WIDALFTG\)T | \(\text{--------MSSSMLLEGW}LVDARVPSPHHDCRPEDKPTLLLVHTNISLPGEFGP}WIDALFTG\)T | \(\text{--------MSSSMLLEGW}LVDARVPSPHHDCRPEDKPTLLLVHTNISLPGEFGP}WIDALFTG\)T | \(\text{--------MSSSMLLEGW}LVDARVPSPHHDCRPEDKPTLLLVHTNISLPGEFGP}WIDALFTG\)T | \(\text{--------MSSSMLLEGW}LVDARVPSPHHDCRPEDKPTLLLVHTNISLPGEFGP}WIDALFTG\)T |
| **CTX-S** | \(\text{DPDAHFFFAIAH}L\text{RVSHCLRRDG}E\text{VVYVPFDKRA}WA\text{HAG}V\text{SMYQG}ERCNDFSIGIE} \) | \(\text{DPDVHFFFAIAH}L\text{RVSHCLRRDG}E\text{VVYVPFDKRA}WA\text{HAG}V\text{SMYQG}ERCNDFSIGIE} \) | \(\text{DPDVHFFFAIAH}L\text{RVSHCLRRDG}E\text{VVYVPFDKRA}WA\text{HAG}V\text{SMYQG}ERCNDFSIGIE} \) | \(\text{DPDVHFFFAIAH}L\text{RVSHCLRRDG}E\text{VVYVPFDKRA}WA\text{HAG}V\text{SMYQG}ERCNDFSIGIE} \) | \(\text{DPDVHFFFAIAH}L\text{RVSHCLRRDG}E\text{VVYVPFDKRA}WA\text{HAG}V\text{SMYQG}ERCNDFSIGIE} \) | \(\text{DPDVHFFFAIAH}L\text{RVSHCLRRDG}E\text{VVYVPFDKRA}WA\text{HAG}V\text{SMYQG}ERCNDFSIGIE} \) | \(\text{DPDVHFFFAIAH}L\text{RVSHCLRRDG}E\text{VVYVPFDKRA}WA\text{HAG}V\text{SMYQG}ERCNDFSIGIE} \) |
| **CTX-S** | \(\text{LEGTDIPEYTDAYQYK}LADIQTQLIRLYPAI\text{AENM}TGHDCIPARKTDGPAPDWPFFRA} \) | \(\text{LEGTDIPEYTDAYQYK}LADIQTQLIRLYPAI\text{AENM}TGHDCIPARKTDGPAPDWPFFRA} \) | \(\text{LEGTDIPEYTDAYQYK}LADIQTQLIRLYPAI\text{AENM}TGHDCIPARKTDGPAPDWPFFRA} \) | \(\text{LEGTDIPEYTDAYQYK}LADIQTQLIRLYPAI\text{AENM}TGHDCIPARKTDGPAPDWPFFRA} \) | \(\text{LEGTDIPEYTDAYQYK}LADIQTQLIRLYPAI\text{AENM}TGHDCIPARKTDGPAPDWPFFRA} \) | \(\text{LEGTDIPEYTDAYQYK}LADIQTQLIRLYPAI\text{AENM}TGHDCIPARKTDGPAPDWPFFRA} \) | \(\text{LEGTDIPEYTDAYQYK}LADIQTQLIRLYPAI\text{AENM}TGHDCIPARKTDGPAPDWPFFRA} \) |
| **CTX-S** | \(\text{MLTASSE}----- \) | \(\text{MLTSSDEKIEIT} \) | \(\text{MLTSSDEKIEIT} \) | \(\text{MLTSSDEKIEIT} \) | \(\text{MLTSSDEKIEIT} \) | \(\text{MLTSSDEKIEIT} \) | \(\text{MLTSSDEKIEIT} \) |