

Table S1. Snake venom components as novel drug candidates to eliminate drug resistant bacteria.

| No. | Bacteria strains | Toxins or enzymes | Snake | References |
|-----|---|--|--|------------|
| 1 | MRSA, MDR <i>Escherichia coli</i> , MDR <i>Pseudomonas aeruginosa</i> | OH-CATH30 and OH-CM6 (cathelicidins) | <i>Ophiophagus hannah</i> | [37] |
| 2 | MRSA and VRSA | CATHPb1 (cathelicidin) | <i>Python bivittatus</i> | [38] |
| 3 | MDR <i>Acinetobacter baumannii</i> and MRSA | OH-CATH30 (cathelicidins) | <i>Ophiophagus hannah</i> | [39] |
| 4 | MRSA | Cath-A (cathelicidin) | <i>Bungarus fasciatus</i> | [40] |
| 5 | MDR <i>Burkholderia pseudomallei</i> | Crotoxin B and daboitoxin (phospholipase A2) | <i>Crotalus durissus terrificus</i> , <i>Daboia russelli siamensis</i> | [41] |
| 6 | MDR <i>B. pseudomallei</i> | metalloproteinase | <i>Agkistrodon halys</i> | [42] |
| 7 | MDR <i>B. pseudomallei</i> | VipTx-II (phospholipase A2) | <i>Daboia russelli russelli</i> | [43] |
| 8 | MDR <i>Mycobacterium tuberculosis</i> | vpg-1 peptide | <i>Naja atra</i> | [44] |
| 9 | MRSA | pC-CoaTxII phospholipase A2 | <i>Crotalus oreganus abyssus</i> | [45] |

MRSA: methicillin-resistant *Staphylococcus aureus*; VRSA: vancomycin-resistant *Staphylococcus aureus*; MDR: multi-drug-resistant.

Table S2. Anticancer properties of snake venom and its components.

| No. | Cell lines | Toxins or enzymes | Snake | References |
|-------------------------------|--|-------------------------------|--|------------|
| Metastasis inhibition | | | | |
| 1 | human melanoma M24met | contortrostatin (disintegrin) | <i>Agkistrodon contortrix contortrix</i> | [46] |
| 2 | human breast cancer MDA-MB-435 | contortrostatin (disintegrin) | <i>Agkistrodon contortrix contortrix</i> | [47] |
| 3 | human glioblastoma T98G, U87, A172, and U138 | contortrostatin (disintegrin) | <i>Agkistrodon contortrix contortrix</i> | [48] |
| 4 | human hepato-carcinoma HepG2 and SMMC-7721 | agkhipin (arginine esterase) | <i>Gloydius halys Pallas</i> | [49] |
| 5 | human gingival carcinoma Ca9-22 | cardiotoxin III | <i>Naja naja atra</i> | [50] |
| 6 | human breast cancer MDA-MB-231 | Vaa-Dis (disintegrin) | <i>Vipera ammodytes ammodytes</i> | [51] |
| Induction of apoptosis | | | | |
| 7 | human gastric cancer MKN-45, colorectal | l-amino acid oxidases (LAAO) | <i>Bothrops leucurus</i> | [52] |

| No. | Cell lines | Toxins or enzymes | Snake | References |
|-----|--|-------------------------|--|------------|
| | cancer HUTU, colon carcinoma RKO | | | |
| 8 | human ovarian cancer CAOV3 and OVCAR3 | LAAO | <i>Crotalus adamanteus</i> | [1] |
| 9 | human colorectal cancer LoVo, HTC-116, and HT-29 | SVT | <i>Echis coloratus</i> | [54] |
| 10 | human leukemia HL60, JURKAT, murine melanoma B16F10 | LAAO | <i>Bothrops atrox</i> | [55] |
| 11 | human prostate cancer PC-3 and DU145 | SVT | <i>Vipera lebetina turanica</i> | [56] |
| 12 | human breast cancer MCF-7 | rusvinoxidase (LAAO) | <i>Daboia russelii russelii</i> | [57] |
| 13 | human colon adenocarcinoma HCT116 and HT-29 | SVT | <i>Vipera lebetina turanica</i> | [58] |
| 14 | human teratocarcinoma PA-1 and human ovarian cancer SK-OV3 | SVT | <i>Vipera lebetina turanica</i> | [59] |
| 15 | human neuroblastoma SK-N-MC and SK-N-SH | SVT | <i>Vipera lebetina turanica</i> | [60] |
| 16 | human lung cancer A549 | ACTX-6 (cytotoxin) | <i>Agkistrodon acutus</i> | [61] |
| 17 | colorectal adenocarcinoma LS174, HCT116, and HT-29 | lebein (disintegrin) | <i>Macrovipera lebetina</i> | [62] |
| 18 | human leukemia HL-60 and hepatocellular carcinoma HepG2 | CR-LAAO | <i>Calloselasma rhodostoma</i> | [63] |
| 19 | HL-60 and HepG2 | BthTX-I (PLA2s) | <i>Bothrops jararacussu</i> | [64] |
| 20 | HepG2, MCF-7, and DU145 | SVT | <i>Naja naja oxiana</i> | [65] |
| 21 | HCT-8, MDA-MB-231 | SVT | <i>Bitis arietans</i> , <i>C. gasperettii</i> , <i>E. coloratus</i> , and <i>Echis pyramidum</i> | [66] |
| 22 | human endo-cervical carcinoma Ca Ski, C33A, A549, MCF-7 | SVT | <i>Vipera lebetina turanica</i> | [67] |
| 23 | human cervical cancer SiHa and HeLa | SVT | <i>Bothrops jararaca</i> and <i>Bothrops erythromelas</i> | [68] |
| 24 | MCF7 | Phospholipase A2 (PLA2) | <i>Bungarus fasciatus</i> | [69] |
| 25 | HeLa | Pllans-II (PLA2) | <i>Porthidium lansbergii lansbergii</i> | [70] |
| 26 | human melanoma SK-MEL-28 and LU-1205 | lebein (disintegrin) | <i>Macrovipera lebetina</i> | [71] |
| 27 | MCF-7, SK-BR-3, and MDA-MB-231 | BthTX-I (PLA2) | <i>Bothrops jararacussu</i> | [72] |
| 28 | MCF-7 | SVT | <i>Cerastes cerastes</i> and <i>Vipera lebetina</i> | [73] |

| No. | Cell lines | Toxins or enzymes | Snake | References |
|--------------------------------------|---|-----------------------------------|---|------------|
| 29 | HCT-116, SW-480, and HT-29 | LAAO | <i>Crotalus adamanteus</i> | [74] |
| Cell adhesion inhibition | | | | |
| 30 | human fibrosarcoma HT1080, IGR39, HT29-D4, K562 | MVL-PLA2 | <i>Macrovipera lebetina transmediterranea</i> | [75] |
| 31 | human melanoma SK-Mel-28 | colombistatin (disintegrin) | <i>Bothrops colombiensis</i> | [76] |
| 32 | human melanoma A-375 and A-549 | tzabcanin (disintegrin) | <i>Crotalus simus tzabcan</i> | [77] |
| <i>Anti-proliferative activities</i> | | | | |
| 33 | MCF-7 and A549 | LAAO | <i>Ophiophagus hannah</i> | [78] |
| 34 | glioblastoma HCB151 | L-amino acid oxidase (LAAOcdt) | <i>Crotalus durissus terrificus</i> | [79] |
| 35 | ovarian carcinoma MDAH 2774 | saxatilin (disintegrin) | <i>Gloydius saxatilis</i> | [80] |
| 36 | Hep2 and HeLa | SVT | <i>Lapemis curtus</i> | [81] |
| 37 | HeLa | disintegrin | <i>Echis multisquamatis</i> | [82] |
| 38 | HeLa and Hep2 | SVT | <i>Hydrophis spiralis</i> | [83] |
| 39 | MCF-7 and MDA-MB-231 | SVT | <i>Vipera raddei kurdistanica</i> | [84] |
| Inhibition of angiogenesis | | | | |
| 40 | lung cancer NCI-H460 | saxatilin (disintegrin) | <i>Gloydius saxatilis</i> | [85] |
| 41 | HT-1080 and MDA-MB-231 | vixapatin (C-type lectin-protein) | <i>Vipera xantina palestinae</i> | [86] |
| 42 | MDA-MB-231 | bothropoidin (metalloproteinase) | <i>Bothrops pauloensis</i> | [87] |

Table S3. Elapidae and Viperidae families as representatives of the well-characterized proteomics of snake venoms.

| No. | Snake | References |
|-----------------|-----------------------------------|------------|
| Elapidae | | |
| 1 | <i>Aipysurus laevis</i> | [135] |
| 2 | <i>Austrelaps labialis</i> | [136] |
| 3 | <i>Bungarus caeruleus</i> | [137] |
| 4 | <i>Bungarus candidus</i> | [138] |
| 5 | <i>Bungarus fasciatus</i> | [138,139] |
| 6 | <i>Bungarus multicinctus</i> | [139,140] |
| 7 | <i>Dendroaspis angusticeps</i> | [141] |
| 8 | <i>Dendroaspis polylepis</i> | [142] |
| 9 | <i>Drysdalia coronoides</i> | [143] |
| 10 | <i>Hydrophis cyanocinctus</i> | [144] |
| 11 | <i>Hydrophis schistosus</i> | [145] |
| 12 | <i>Micrurus alleni</i> | [146] |
| 13 | <i>Micrurus altirostris</i> | [147] |
| 14 | <i>Micrurus fulvius</i> | [148] |
| 15 | <i>Micrurus mipartitus</i> | [149] |
| 16 | <i>Micrurus mosquitensis</i> | [146] |
| 17 | <i>Micrurus nigrocinctus</i> | [150] |
| 18 | <i>Micrurus tschudii tschudii</i> | [151] |
| 19 | <i>Naja atra</i> | [140,152] |
| 20 | <i>Naja haje</i> | [153] |

| No. | Snake | References |
|------------------|----------------------------------|------------|
| 21 | <i>Naja kaouthia</i> | [154,155] |
| 22 | <i>Naja katiensis</i> | [156] |
| 23 | <i>Naja melanoleuca</i> | [157] |
| 24 | <i>Naja mossambica</i> | [156] |
| 25 | <i>Naja naja</i> | [158,159] |
| 26 | <i>Naja nigricollis</i> | [156] |
| 27 | <i>Naja nubiae</i> | [156] |
| 28 | <i>Naja pallida</i> | [156] |
| 29 | <i>Oxyuranus scutellatus</i> | [160] |
| 30 | <i>Pelamis platura</i> | [161] |
| 31 | <i>Pseudechis papuanus</i> | [162] |
| 32 | <i>Toxicocalamus longissimus</i> | [144] |
| Viperidae | | |
| 33 | <i>Agkistrodon contortrix</i> | [163,164] |
| 34 | <i>Atropoides nummifer</i> | [165] |
| 35 | <i>Atropoides picadoi</i> | [165] |
| 35 | <i>Bitis caudalis</i> | [166] |
| 37 | <i>Bitis gabonica</i> | [166] |
| 38 | <i>Bitis nasicornis</i> | [166] |
| 39 | <i>Bothriechis aurifer</i> | [168] |
| 40 | <i>Bothriechis bicolor</i> | [168] |
| 41 | <i>Bothriechis lateralis</i> | [168] |
| 42 | <i>Bothriechis marchi</i> | [168] |
| 43 | <i>Bothriechis nigroviridis</i> | [167] |
| 44 | <i>Bothriechis schlegelii</i> | [168] |
| 45 | <i>Bothriechis thalassinus</i> | [168] |
| 46 | <i>Bothrocophias campbelli</i> | [169] |
| 47 | <i>Bothropoides pauloensis</i> | [170] |
| 48 | <i>Bothrops atrox</i> | [171–175] |
| 49 | <i>Bothrops ayerbei</i> | [176] |
| 50 | <i>Bothrops barnetti</i> | [172] |
| 51 | <i>Bothrops caribbaeus</i> | [177] |
| 52 | <i>Bothrops colombiensis</i> | [178] |
| 53 | <i>Bothrops cotiara</i> | [179] |
| 54 | <i>Bothrops diporus</i> | [180] |
| 55 | <i>Bothrops erythromelas</i> | [181] |
| 56 | <i>Bothrops fonsecai</i> | [179] |
| 57 | <i>Bothrops insularis</i> | [182] |
| 58 | <i>Bothrops jararaca</i> | [174,183] |
| 59 | <i>Bothrops lanceolatus</i> | [177] |
| 60 | <i>Bothrops neuwiedi</i> | [174] |
| 61 | <i>Bothrops pictus</i> | [172] |
| 62 | <i>Bothrops pirajai</i> | [184] |
| 63 | <i>Bothrops punctatus</i> | [185] |
| 64 | <i>Calloselasma rhodostoma</i> | [186] |
| 65 | <i>Cerastes cerastes</i> | [187] |
| 66 | <i>Cerrophidion godmani</i> | [188] |
| 67 | <i>Crotalus adamanteus</i> | [189] |
| 68 | <i>Crotalus atrox</i> | [209] |
| 69 | <i>Crotalus basiliscus</i> | [190] |
| 70 | <i>Crotalus durissus</i> | [191,192] |
| 71 | <i>Crotalus horridus</i> | [193] |

| No. | Snake | References |
|-----|-------------------------------------|------------|
| 72 | <i>Crotalus simus</i> | [194] |
| 73 | <i>Crotalus tigris</i> | [210] |
| 74 | <i>Crotalus viridis</i> | [195] |
| 75 | <i>Daboia russelii</i> | [196–198] |
| 76 | <i>Gloydus brevicauda</i> | [199] |
| 77 | <i>Gloydus intermedius</i> | [200] |
| 78 | <i>Lachesis acrochorda</i> | [201] |
| 79 | <i>Lachesis melanocephala</i> | [201] |
| 80 | <i>Lachesis muta</i> | [211] |
| 81 | <i>Lachesis stenophrys</i> | [201] |
| 82 | <i>Macrovipera lebetinus</i> | [212] |
| 83 | <i>Macrovipera mauritanica</i> | [202] |
| 84 | <i>Ovophis okinavensis</i> | [203] |
| 85 | <i>Porthidium lansbergii</i> | [204] |
| 86 | <i>Porthidium nasutum</i> | [188] |
| 87 | <i>Porthidium ophryomegas</i> | [188] |
| 88 | <i>Protobothrops flavoviridis</i> | [203] |
| 89 | <i>Protobothrops mucrosquamatus</i> | [205] |
| 90 | <i>Sistrurus catenatus</i> | [213] |
| 91 | <i>Tropidolaemus wagleri</i> | [206] |
| 92 | <i>Vipera anatolica</i> | [208] |
| 93 | <i>Vipera nikolskii</i> | [207] |
| 94 | <i>Vipera orlovi</i> | [207] |
| 95 | <i>Vipera renardi</i> | [207] |

Table S4. List of snake species for which transcriptomics libraries are available.

| No. | Snake | References |
|-------------------|---------------------------------|-------------|
| Colubridae | | |
| 1 | <i>Dispholidus typus</i> | [5,224] |
| 2 | <i>Liophis miliaris</i> | [224] |
| 3 | <i>Liophis poecilogyris</i> | [5,224] |
| 4 | <i>Philodryas olfersii</i> | [5,224,225] |
| 5 | <i>Rhabdophis tigrinus</i> | [5,224] |
| 6 | <i>Telescopus dhara</i> | [5,224] |
| 7 | <i>Thamnodynastes strigatus</i> | [226] |
| 8 | <i>Thrasops jacksonii</i> | [5] |
| 9 | <i>Trimorphodon biscutatus</i> | [5,224] |
| Elapidae | | |
| 10 | <i>Austrelaps labialis</i> | [136] |
| 11 | <i>Bungarus flaviceps</i> | [227] |
| 12 | <i>Bungarus multicinctus</i> | [228] |
| 13 | <i>Demansia vestigiata</i> | [229] |
| 14 | <i>Drysdalia coronoides</i> | [143] |
| 15 | <i>Hydrophis curtus</i> | [230] |
| 16 | <i>Micropechis ikaheca</i> | [231] |
| 17 | <i>Micrurus altirostris</i> | [147] |
| 18 | <i>Micrurus corallinus</i> | [147,232] |
| 19 | <i>Micrurus fulvius</i> | [148] |
| 20 | <i>Micrurus mipartitus</i> | [233] |

| No. | Snake | References |
|---------------------|---------------------------------|------------|
| 21 | <i>Naja atra</i> | [228] |
| 22 | <i>Oxyuranus microlepidotus</i> | [5] |
| Homalopsidae | | |
| 23 | <i>Cerberus rynchops</i> | [234] |
| 24 | <i>Enhydris polylepis</i> | [224] |
| Viperidae | | |
| 25 | <i>Agkistrodon piscivorus</i> | [235] |
| 26 | <i>Atropoides mexicanus</i> | [236] |
| 27 | <i>Atropoides picadoi</i> | [236] |
| 28 | <i>Azemiops feae</i> | [5,224] |
| 29 | <i>Bitis gabonica</i> | [237] |
| 30 | <i>Bothriechis lateralis</i> | [236] |
| 31 | <i>Bothriechis schlegelii</i> | [236] |
| 32 | <i>Bothropoides pauloensis</i> | [170] |
| 33 | <i>Bothrops alternatus</i> | [238] |
| 34 | <i>Bothrops asper</i> | [236] |
| 35 | <i>Bothrops atrox</i> | [239] |
| 36 | <i>Bothrops insularis</i> | [182,222] |
| 37 | <i>Bothrops jararaca</i> | [240,241] |
| 38 | <i>Causus rhombeatus</i> | [5] |
| 39 | <i>Cerrophidion godmani</i> | [236] |
| 40 | <i>Crotalus adamanteus</i> | [189,242] |
| 41 | <i>Crotalus durissus</i> | [243,244] |
| 42 | <i>Crotalus horridus</i> | [193] |
| 43 | <i>Crotalus simus</i> | [236,245] |
| 44 | <i>Deinagkistrodon acutus</i> | [246] |
| 45 | <i>Echis carinatus</i> | [247] |
| 46 | <i>Echis coloratus</i> | [247] |
| 47 | <i>Echis ocellatus</i> | [248,249] |
| 48 | <i>Echis pyramidum</i> | [247] |
| 49 | <i>Lachesis muta</i> | [250] |
| 50 | <i>Sistrurus catenatus</i> | [251] |
| 51 | <i>Vipera ammodytes</i> | [252] |

Table S5. List of promising antivenom molecules.

| No. | Antivenom molecules | Toxins or enzymes | Snake | References |
|----------------------------------|----------------------------|------------------------|--|------------|
| Monoclonal antibody (MA) | | | | |
| 1 | MA | toxin alpha | <i>Naja nigricollis</i> | [259] |
| 2 | MA | metalloproteinase HR1a | <i>Protobothrops flavoviridi</i> | [260] |
| 3 | MA | dendrotoxins | <i>Dendroaspis polylepis</i> | [261] |
| 4 | MA | crotoxin | <i>Crotalus durissus terrificus</i> | [262] |
| 5 | MA | Phospholipases A2 | <i>Bothrops jararacussu</i> | [263] |
| 6 | MA | alpha-neurotoxin | <i>Naja kaouthia</i> | [264] |
| 7 | MA | unspecified | <i>Bothrops jararacussu</i> , <i>Crotalus durissus</i> | [265] |
| Small molecule inhibitors | | | | |
| 8 | vaespladib (LY315920) | phospholipase A2 | <i>Micrurus fulvius</i> , <i>Vipera berus</i> | [266] |
| 9 | LY333013 | phospholipase A2 | <i>Oxyuranus scutellatus</i> | [267] |
| 10 | batimastat and mari-mastat | metalloproteinase | <i>Echis ocellatus</i> | [268] |

| No. | Antivenom molecules | Toxins or enzymes | Snake | References |
|---------------------------|---|----------------------|---|------------|
| 11 | varespladib | phospholipase A2 | <i>Deinagkistrodon acutus</i> , <i>Agkistrodon halys</i> , <i>Bungarus multicinctus</i> , and <i>Naja atra</i> | [269] |
| 12 | batimastat | metalloproteinases | <i>Bothrops asper</i> | [270] |
| 13 | thiosemicarbazones | metalloproteinases | <i>Bothrops pauloensis</i> | [271] |
| Nanoparticles | | | | |
| 14 | C60 fullerene | unspecified | <i>Crotalus oreganushelleri</i> | [272] |
| Antibody fragments | | | | |
| 15 | llama single-domain antibodies VHHs (C2 and C20) and VHH-Fc | α -cobratoxin | <i>Naja kaouthia</i> | [273] |
| 16 | humanized-single domain antibodies VH/VHH | phospholipase A2 | <i>Naja kaouthia</i> | [274] |
| 17 | camelid Single-Domain Antibodies (VHHs) | crotoxin | <i>Crotalus durissus terrificus</i> | [275] |
| 18 | recombinant single chain antibody, scFv | metalloproteinase | <i>Bothrops asper</i> | [276] |
| 19 | single-chain variable fragment (scFv) | unspecified | <i>Agkistrodon acutus</i> | [277] |