Cyclic boronic acids as beta-lactamase inhibitors

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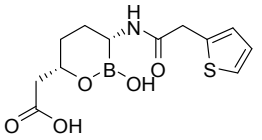
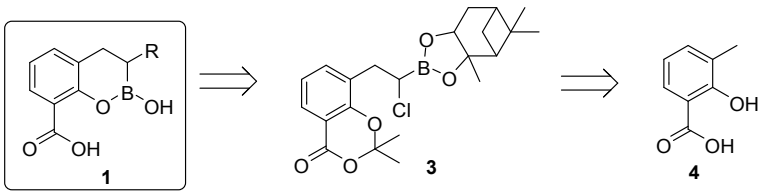
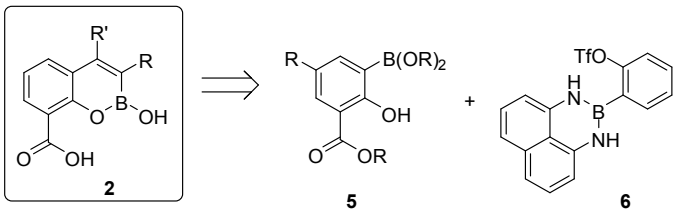
β-Lactamases enable resistance to almost all β-lactam antibiotics (BLAs). Pioneering work revealed that acyclic boronic acids can act as "transition state analogue" inhibitors of nucleophilic serine enzymes, including serine β-lactamases (SBL). The β-lactamase-catalysed hydrolysis of BLAs is of central importance in antibiotic resistance[1]



RPX7009 - vaborbactam



1 **3** **4**



2 **5** **6**

Acyclic boronic acids are established as SBL/PBP (penicillin-binding-protein) inhibitors and SBL inhibitor RPX7009 (vaborbactam)[2] was approved by FDA in August 29, 2017 (*Vabomere* (combination of vaborbactam with BLA meropenem)) for treatment of complicated urinary tract infections including pyelonephritis. Therefore we have focused our investigations on the synthesis of cyclic boronic acids **1** and **2**.

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