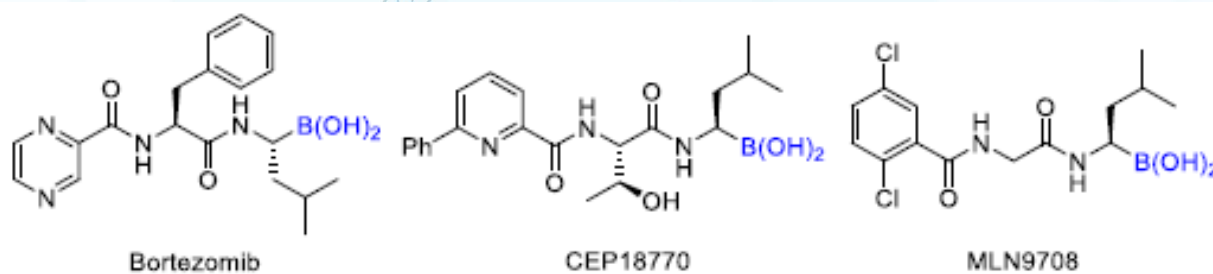


Organoselenium & Organoboron Chemistry

Our Core Capabilities

❖ Organoboron Chemistry

Organoboron compounds have important synthetic value and can be applied in numerous transformations. Their low toxicity and easy handling make them widely applicable in the total synthesis of natural products with bioactivity. In addition, organoboronic acids can be directly utilized as therapeutic agents and biological probes. For example, bortezomib and its derivatives, which are carboxylic bioisosteres, can replace motifs with similar chemical and physical properties and act as proteasome inhibitors.



Structures of important α -aminoboronic acid-based pharmaceuticals

Properties and Applications:

- Organoboron compounds are less toxic than organostannane reagents.
- Unlike alkynylzinc and magnesium, many organoboron compounds possess remarkable oxidative and thermal stabilities.

- Organometallic boranes exhibit a range of interesting properties, including:
 - Reactivity: Organometallic boranes can react with various substrates to form new compounds, making them useful intermediates in organic synthesis.
 - Catalysis: Some organometallic boranes have been shown to exhibit catalytic activity, making them potentially useful in industrial processes.
 - Materials Science: Organometallic boranes have been used to synthesize novel materials with unique properties, such as boron-based polymers and ceramics.

Expertise:

- TCGLS teams expertly manage organometallic borane processes for forming carbon-carbon bonds, enabled by labs equipped to handle air- and moisture-sensitive reactions.
- Apart from use of different borane reagents in organic synthesis, hydroboration and oxidation, boronic acid/ester or Molander salts in metal-catalyzed coupling reactions, TCGLS has expertise in synthesizing aminoboronic acids. Discovery of bortezomib for the treatment of multiple myeloma is worth mentioning in this area. TCGLS is capable of synthesizing α -aminoboronic acid stereoselectively on a large scale.
- TCGLS has expertise to characterize analytical data.
- Various types of compounds have been synthesized using modern organoboron chemistry.

❖ **Organoselenium Chemistry**

Organoselenium compounds offer promising avenues in the treatment of diseases associated with oxidative stress, inflammation, cancer, and infectious agents. In recent years, we have developed expertise in the synthesis of organoselenium compounds (mg to gram scale) and biological evaluation of a wide range of selenium-based molecules.

Our work bridges synthetic chemistry and pharmacology to develop selenium-containing scaffolds with high selectivity, potency, and safety profiles. We employ innovative synthetic methodologies and advanced screening platforms to evaluate the pharmacodynamic and pharmacokinetic properties of our compounds.

Our organization actively partners with clinical and industrial stakeholders to accelerate the translation of our research into viable therapeutics.