[*Angew. Chem. Int. Ed.*, **39**, 2358-2360 (2000)] [Lab. of Pharm. Chemistry]

A Convenient Synthesis of α-Halomethylene Aldols or β-Halo-α-(hydroxyalkyl)acrylates Using the Chalcogeno-Baylis-Hillman Reaction.

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The chalcogeno-Baylis-Hillman reaction of electron-deficient alkynes was performed using dimethyl sulfide and titanium halides. The halo-substituted Baylis-Hillman adducts such as α-halomethylene aldols or β-halo-α-(hydroxyalkyl)acrylates could be readily prepared from alkynyl ketones or esters, respectively. The α-halomethylene aldols were *E*-selectively formed, whereas the β-halo-α-(hydroxyalkyl)acrylates were *Z*-selectively produced.

[*Heterocycles*, **53**, 1997-2008 (2000)] [Lab. of Pharm. Chemistry]

Structure and Reaction of 2,6-Bis(alkoxycarbonyl)-1-methyl-2*H*- and 4*H*-Selenopyranium Tetrafluoroborates.

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The stereochemistry of the three isomers of 2,6-bis(ethoxycarbonyl)-1-methylselenopyranium salts was discussed on the basis of their NMR spectral data and determined to be 4*H*-, trans-2*H*-, and cis-2*H*-selenopyranium salts. A mixture of selenopyranium salts reacted with carbonyl compounds at the 4-position to give 4-methylidene-4*H*-selenopyranium salts, whereas the corresponding selenabenzene did not react with acetone. The reaction of the selenabenzene proceeded in the presence of $BF_3 \cdot Et_2O$ to give the 4-methylidene-4*H*-selenopyranium salt and the demethylated product in 65 and 33% yields, respectively.

[*Int. J. Mol. Med.*, **6**, 329-335 (2000)] [Lab. of Pharm. Chemistry]

Opioid Analgesic-induced Apoptosis and Caspase-independent Cell Death in Human Lung Carcinorma A549 Cells.

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Treatment with 100 μM buprenorphine induced cell death of human carcinomas, such as A549 (squamous epithelial cell of lung cancer), MCF-7 (breast cancer) and N417 (small cell of lung cancer), but not in KATO III (gastric cancer) cells as evaluated by alamar blue assay. Among 18 clinically utilized and related analgesics, buprenorphine and loperamide showed potent inhibition of cell viability. However, these anti-cancer effects were not affected by opioid receptor antagonists nor by pertussis toxin. The cell death manifested the characteristics of apoptosis, such as DNA-laddering and nuclear fragmentation, which were sensitive to a caspase inhibitor, Z-Asp-CH_2-DCB. The nuclear fragmentation was independent of cell cycle phase specificity. The activity of caspase-3-like protease that is known to be closely related to apoptotic DNA-laddering was markedly enhanced by buprenorphine. However, the inhibition of cell viability by buprenorphine was not affected by the caspase inhibitor.

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A Novel Stereoselective Preparation of Various Vinyl Sulfide Derivatives Using β-Alkylthioalkenylselenonium Salts.

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The treatment of alkynylselenonium salt and various thiophenol derivatives with a catalytic amount of triethylamine gave β-arylthioalkenylselenonium salts in good yields. The alkenylselenonium salts thus prepared reacted with nucleophiles such as acetylides, thiolates, and alkoxides to produce (*Z*)-β-arylthio-α-functionalized ethenes in high yields. The vinylselenonium salts bearing a hydroxy group on a β-side chain caused intramolecular cyclization upon treatment with sodium hydride to produce medium-membered heterocyclic compounds containing sulfur and oxygen atoms. The reactions giving (*Z*)-β-arylthio-α-functionalized ethenes would proceed via the formation of selenurane intermediates followed by the ligand coupling reaction.