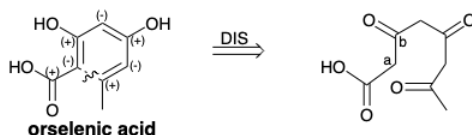


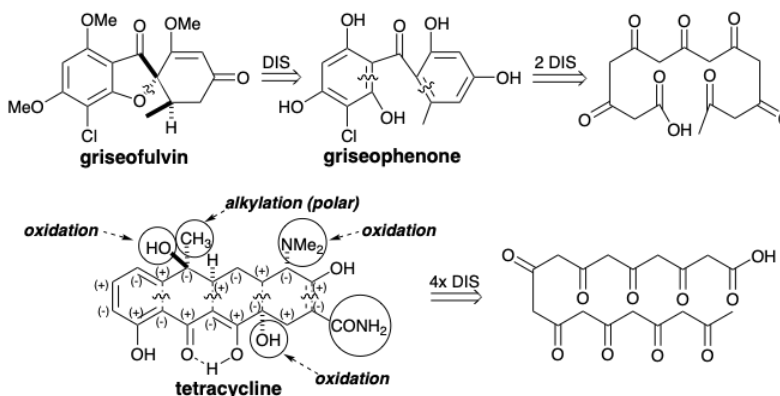
## CHAPTER OVERVIEW

### 5: Polyketides

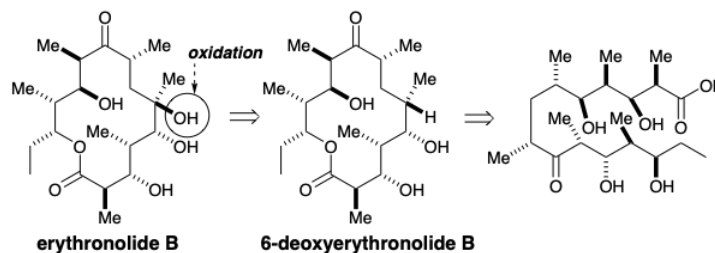
The polyketides, a diverse family of highly oxygenated natural products, are characterized by the presence of many  $\beta$ -dihydroxy or  $\beta$ -hydroxycarbonyl consonant polar functional relationships. Some polyketides have carbon skeletons comprised of a long straight chain of carbon atoms that is often crosslinked into one or more six-membered rings. Thus, a variety of aromatic compounds is produced in nature from acetate-derived (poly- $\beta$ -keto)carboxylic acids through **dehydrocyclization**, i.e. intramolecular aldol condensation. For example, orselenic acid is topologically and functionally related to a mono crosslinked 3,5,7-triketo octanoic acid.



Some polyketides are further modified by oxidative coupling, as in the conversion of griseophenone into griseofulvin. Other modifications include alkylations at the nucleophilic carbon atoms, reduction of carbonyl groups, and electrophilic aromatic substitutions. For example, tetracycline is topologically related to a tetra crosslinked 3,5,7,9,11,13,15,17-octaketo octadecanoic acid. However a dimethylamino and two hydroxyl groups are present that do not fit the otherwise entirely consonant polar reactivity pattern of the remaining functionality. Also a methyl and carboxamido group are also present that are not derived from a (poly- $\beta$ -keto)carboxylic acid precursor.



A large family of polyoxygenated macrolide antibiotics, that contain 12-, 14-, or 16-membered lactone rings, share a polyketide biogenesis. For example, erythromycin B is a diglycoside of erythronolide B, a propionate-derived aglycone.



[5.1: Orselenic Acid](#)

[5.2: Griseofulvin](#)

[5.3: Tetracyclines](#)

[5.4: Erythronolide B](#)

[5.5: Terminology](#)

[5.6: Study Questions](#)

[5.7: References](#)

---

This page titled [5: Polyketides](#) is shared under a [CC BY-NC 4.0](#) license and was authored, remixed, and/or curated by [Robert G. Salomon](#).