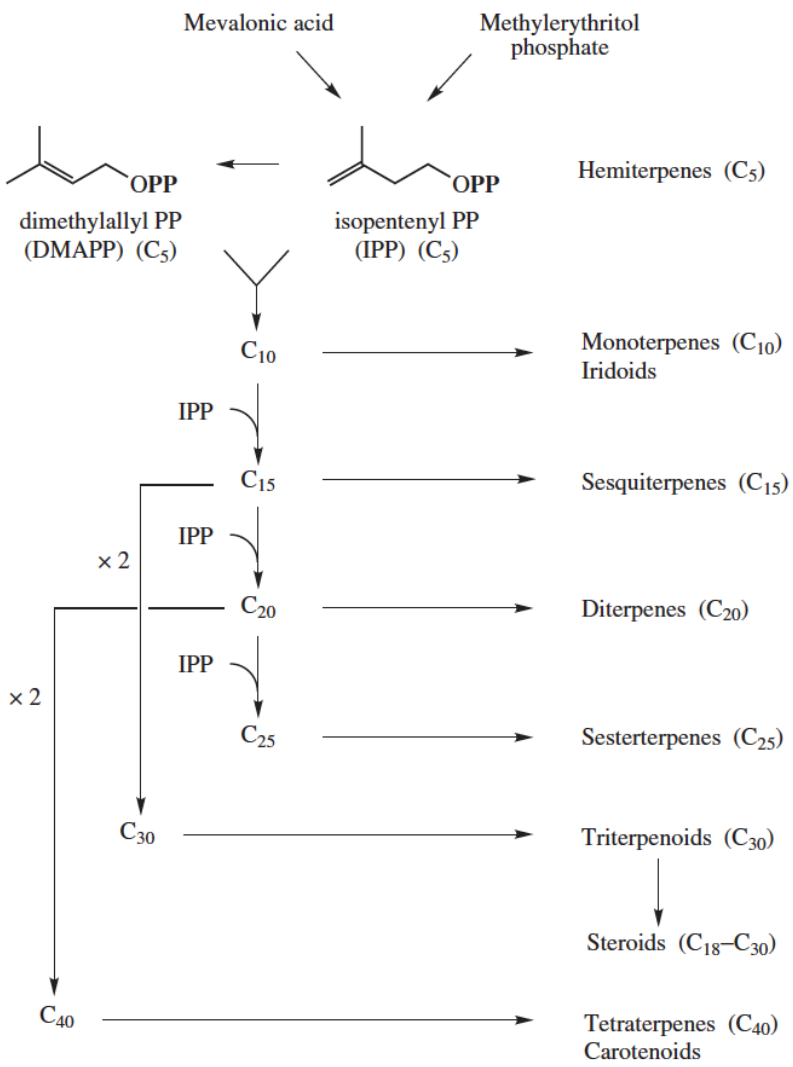
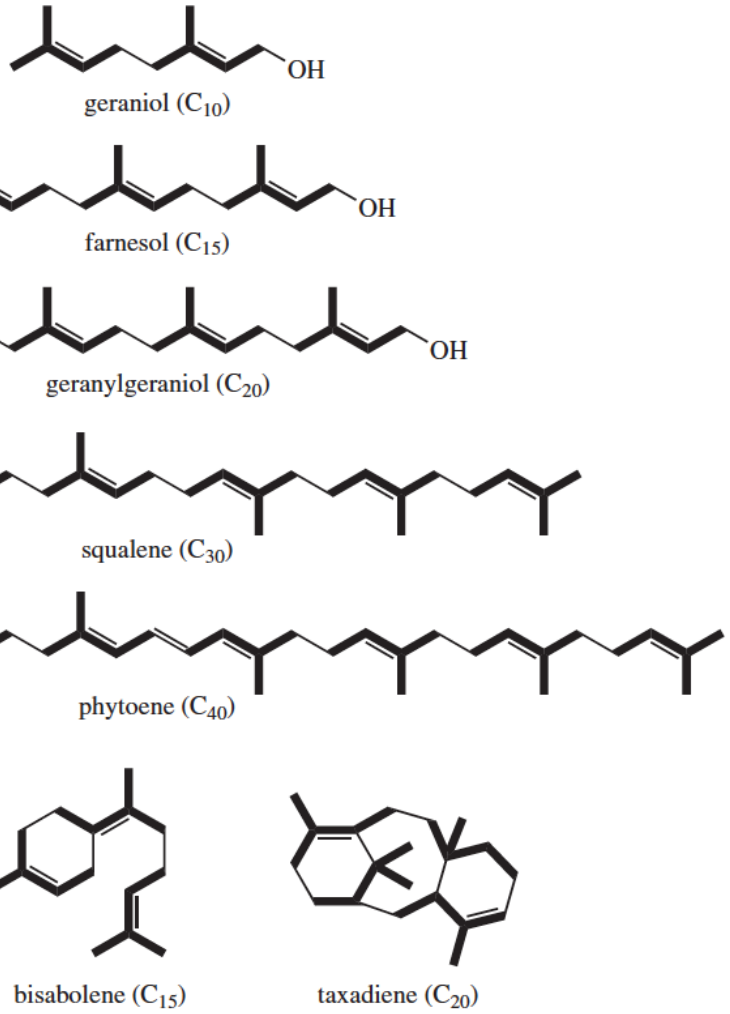
CHIMICA DELLE SOSTANZE ORGANICHE NATURALI

Mentha x piperita

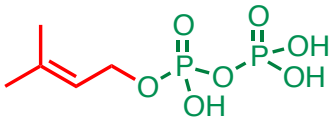
LA VIA DEL MEVALONATO: TERPENOIDI E STEROIDI

BIOSINTESI DEI TERPENI



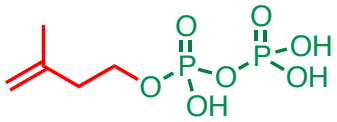


BIOSINTESI DEI TERPENI



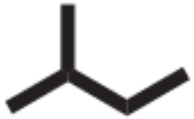
Dimetilallil difosfato

DMAPP

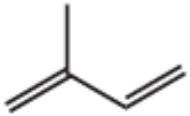


Isopentenil difosfato

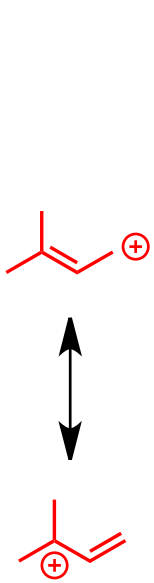
IPP

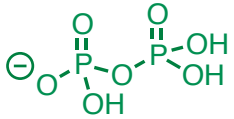


C_5 isoprene unit



isoprene



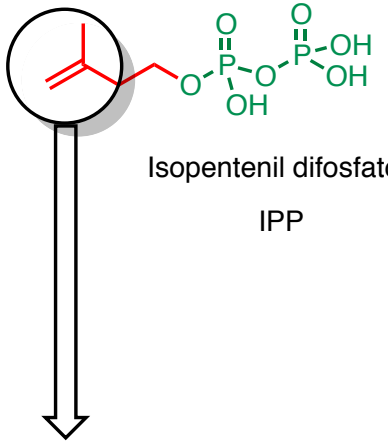


Buon gruppo uscente
base coniugata di un acido forte
Base debole

Carbocatione allilico
stabilizzato per risonanza

ELETTROFILO

E^+



Isopentenil difosfato

IPP

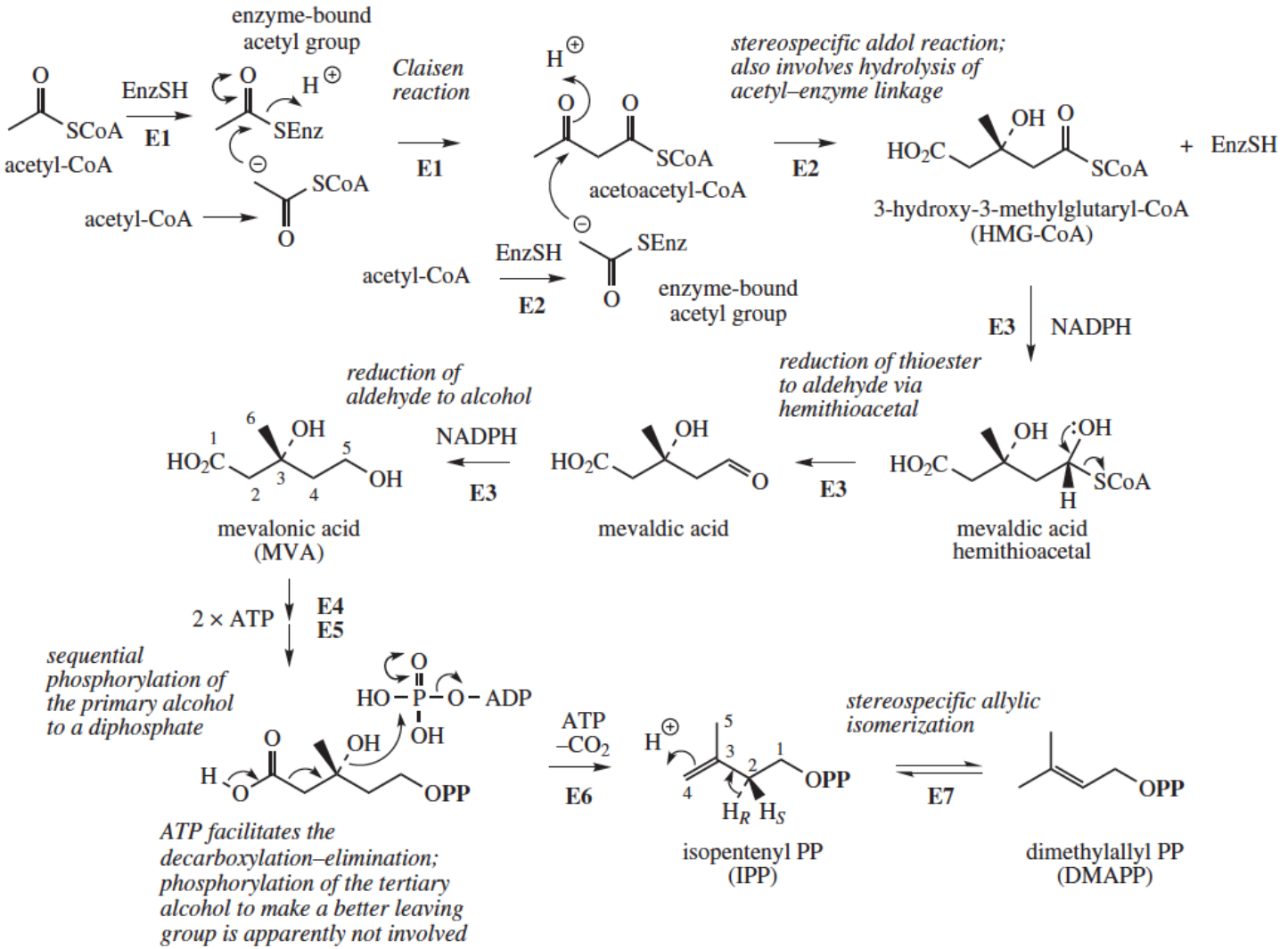
Doppio legame non coniugato
ricco di elettroni

NUCLEOFILO

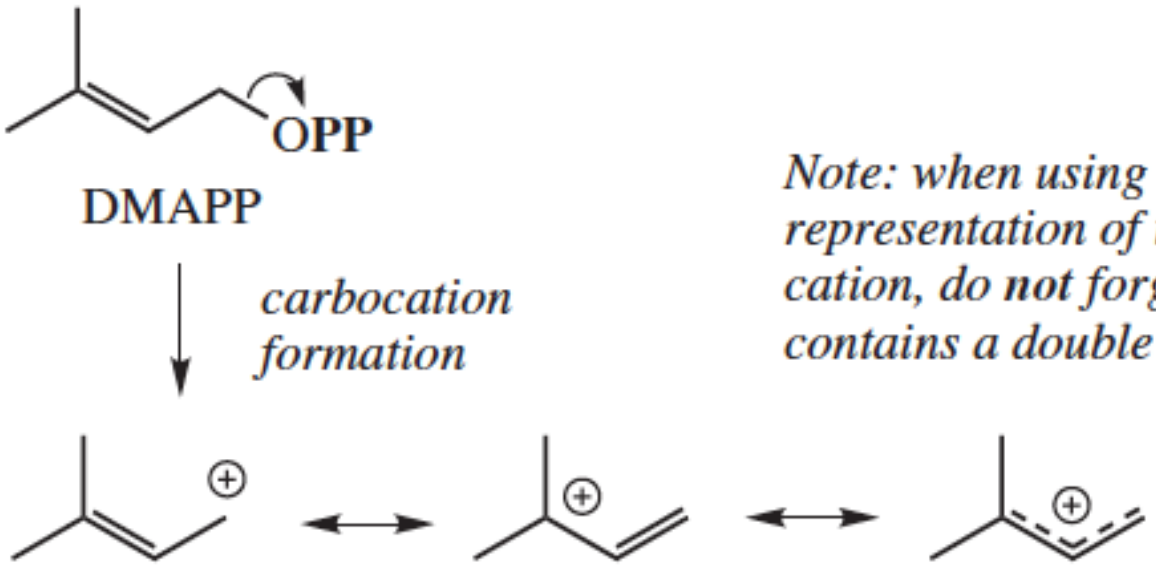
Nu

Pinus sylvestris

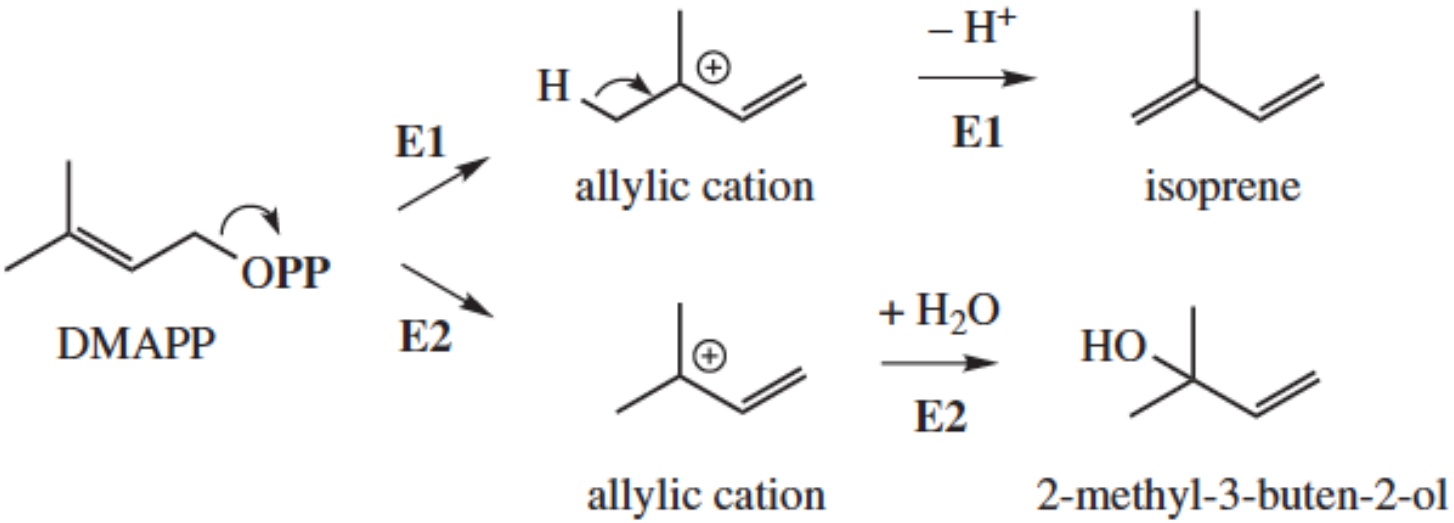
BIOSINTESI DEI TERPENI



BIOSINTESI DEI TERPENI



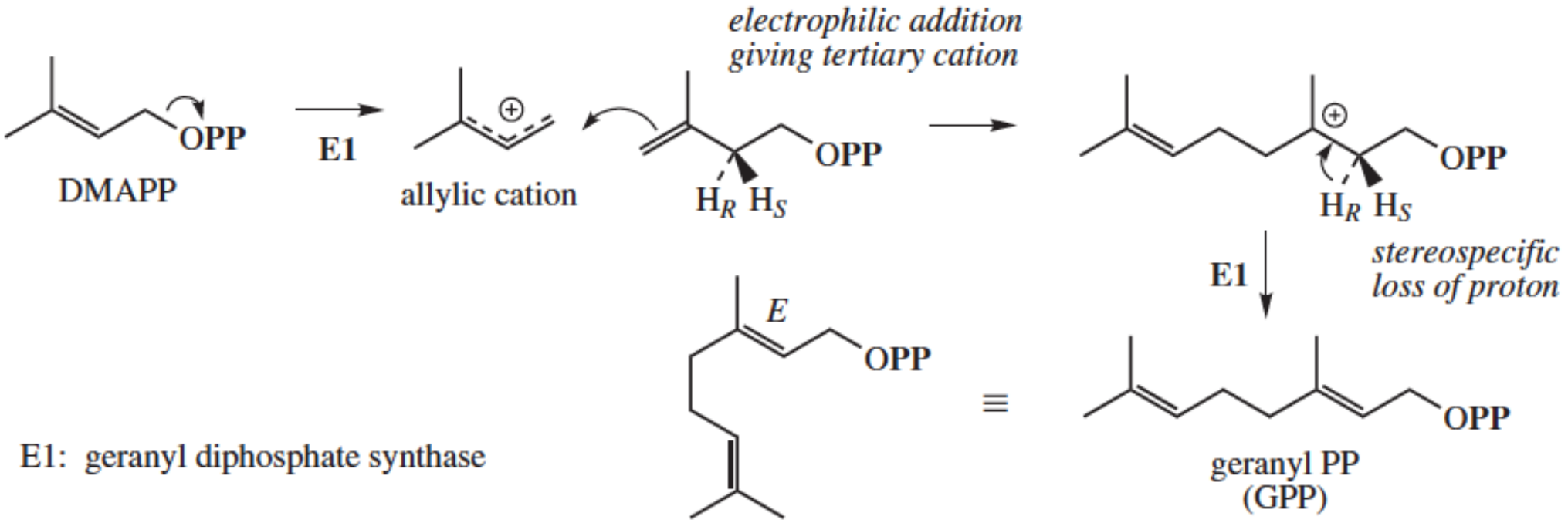
BIOSINTESI DEI TERPENI: EMITERPENI C5



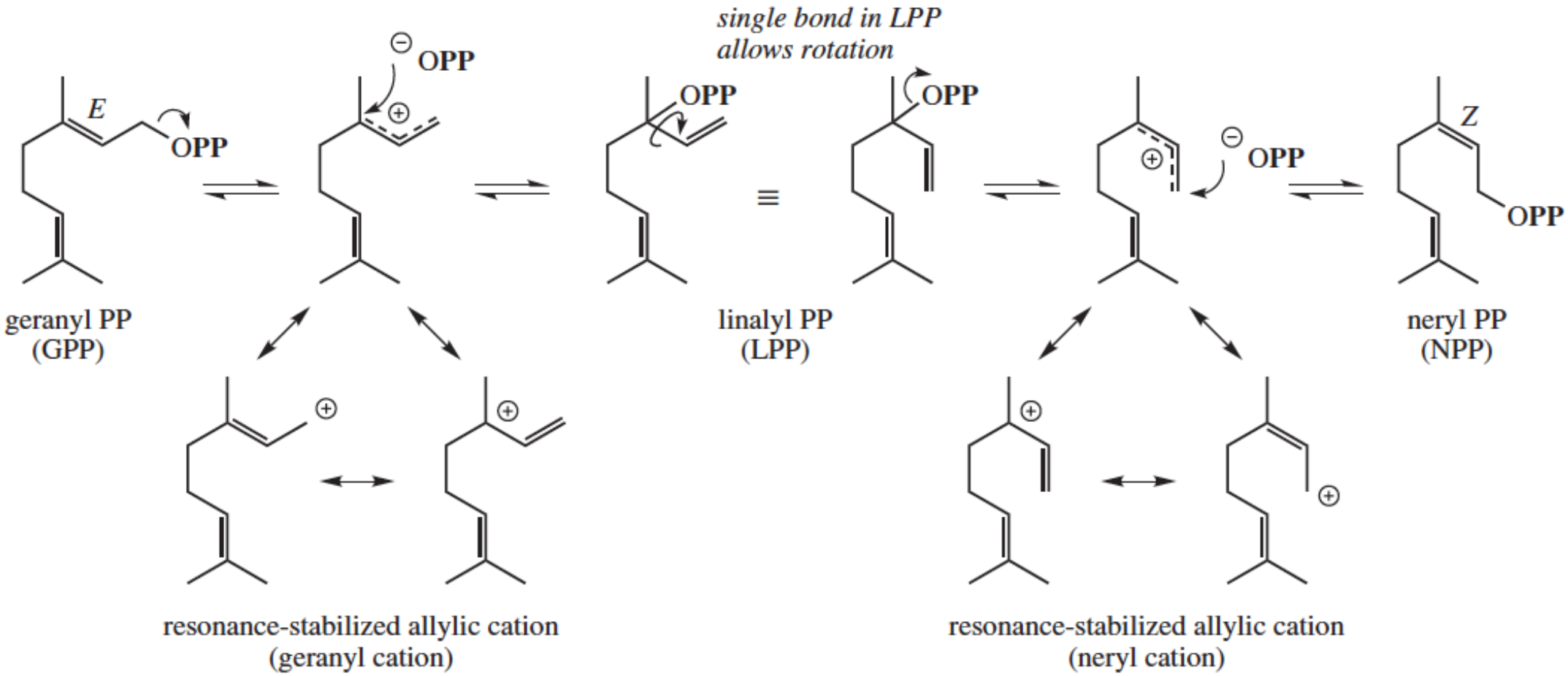
E1: isoprene synthase
E2: methylbutenol synthase

BIOSINTESI DEI TERPENI: MONOTERPENI C10

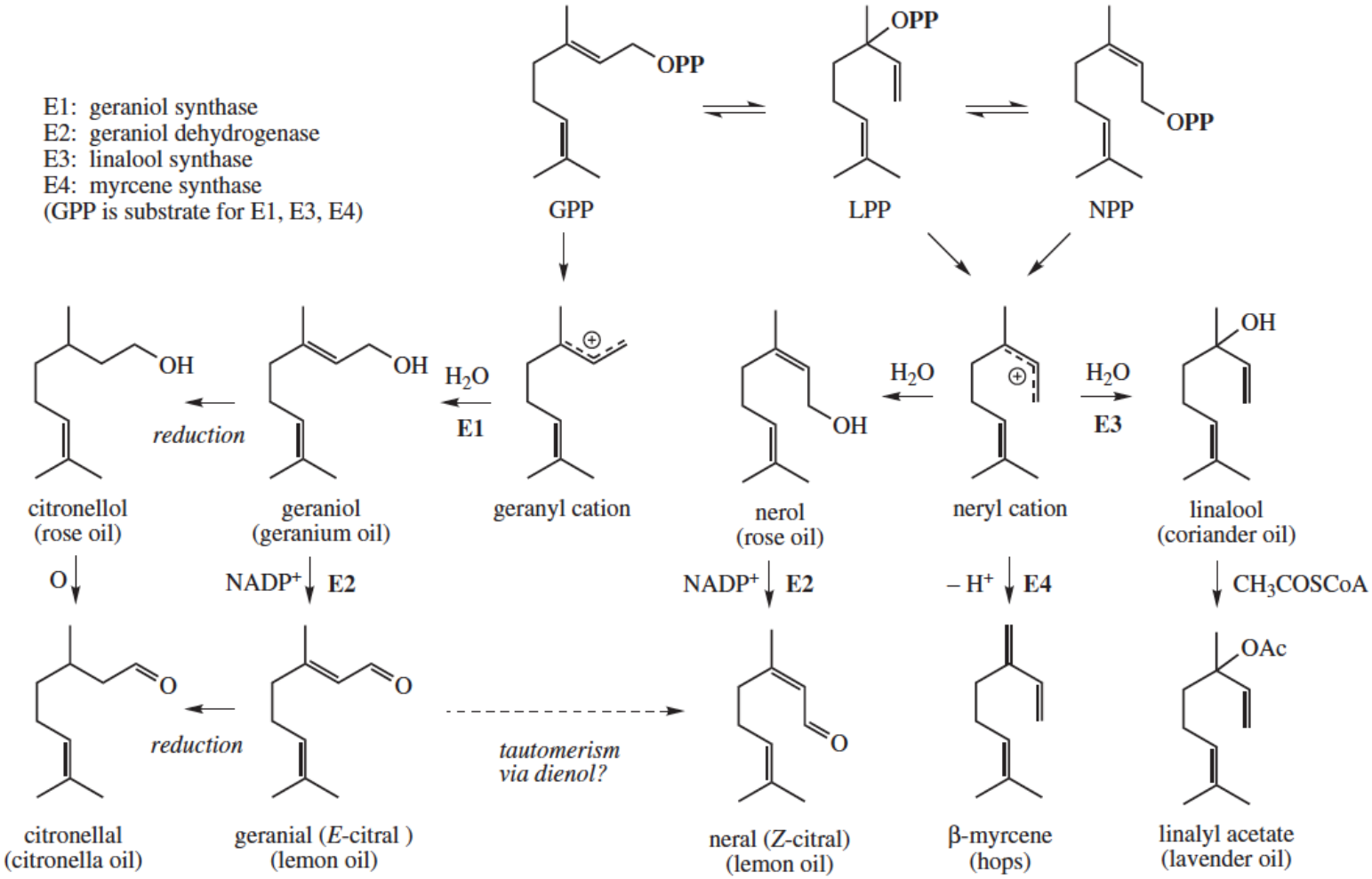
Biosintesi del Geranil pirofosfato



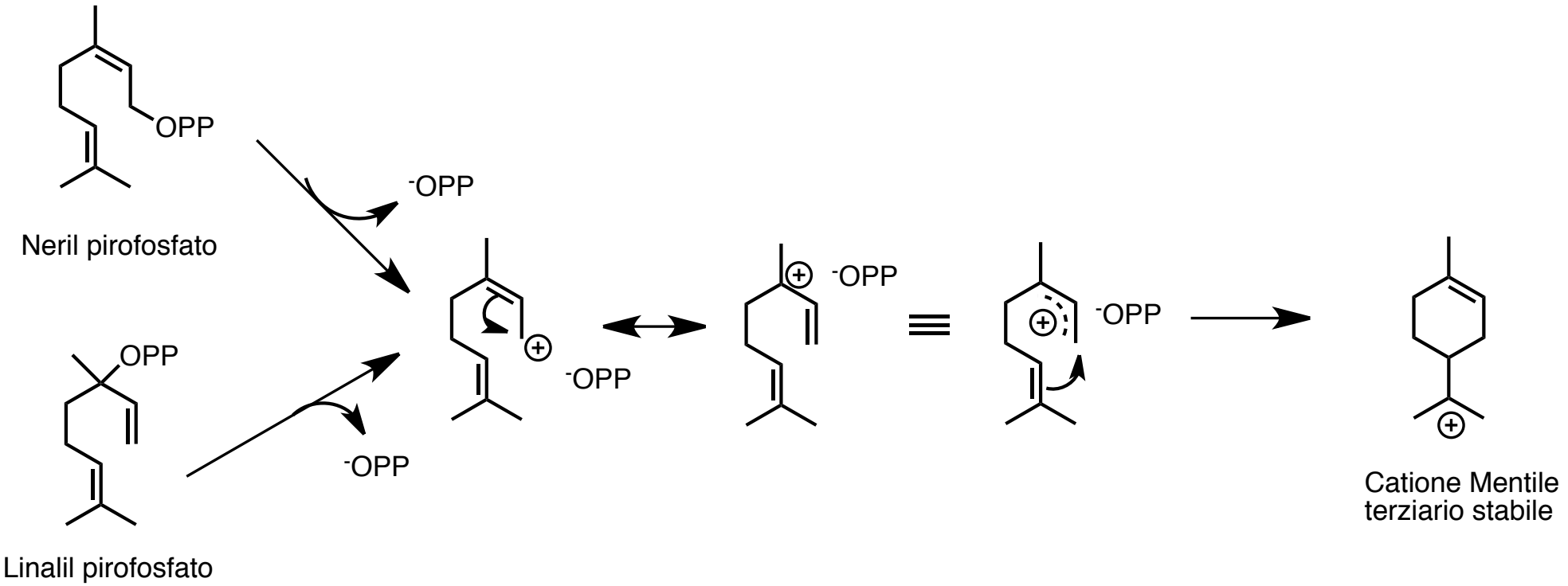
BIOSINTESI DEI TERPENI: LINALIL E NERIL PIROFOSFATO



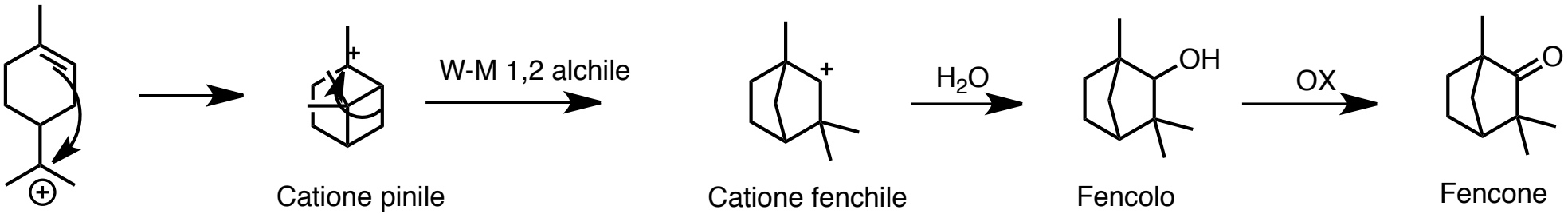
BIOSINTESI DEI TERPENI

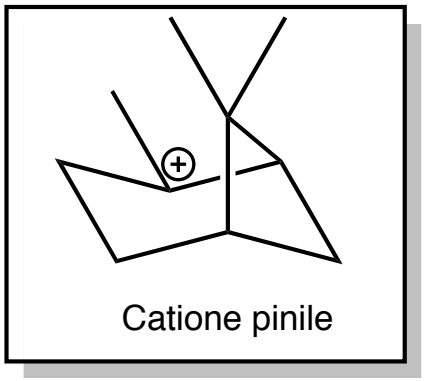


BIOSINTESI DEI TERPENI: Monoterpeni ciclici

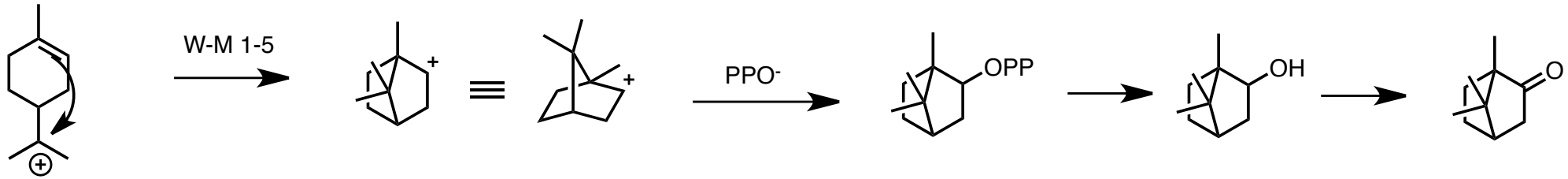


BIOSINTESI DEI TERPENI: monoterpeni ciclici





BIOSINTESI DEI TERPENI Trasposizione di Wagner-Meerwein 1-5



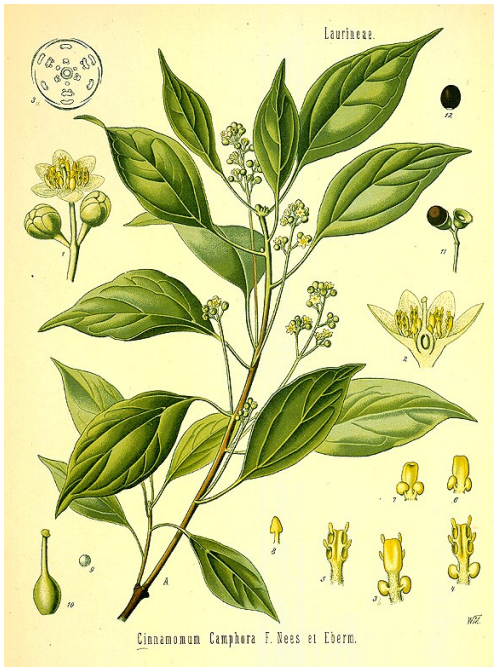
Catione Mentile terziario stabile

Catione Bornile

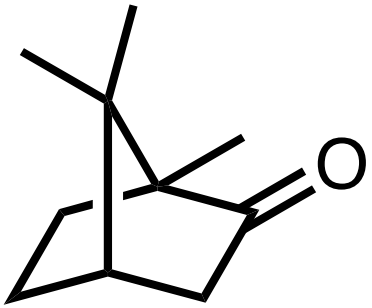
Bornil pirofosfato

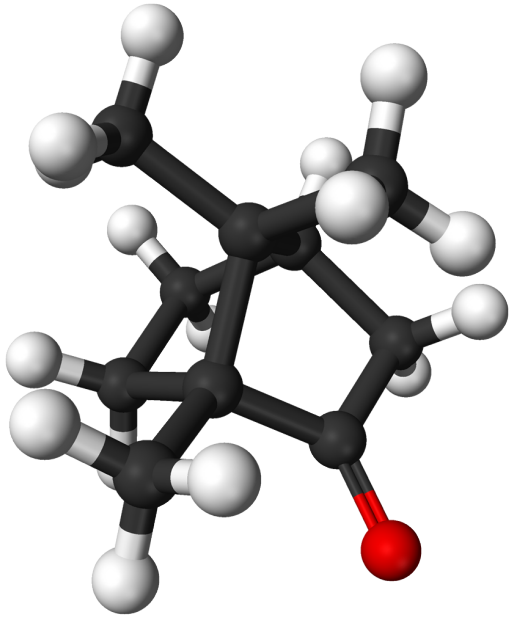
Borneolo

Canfora

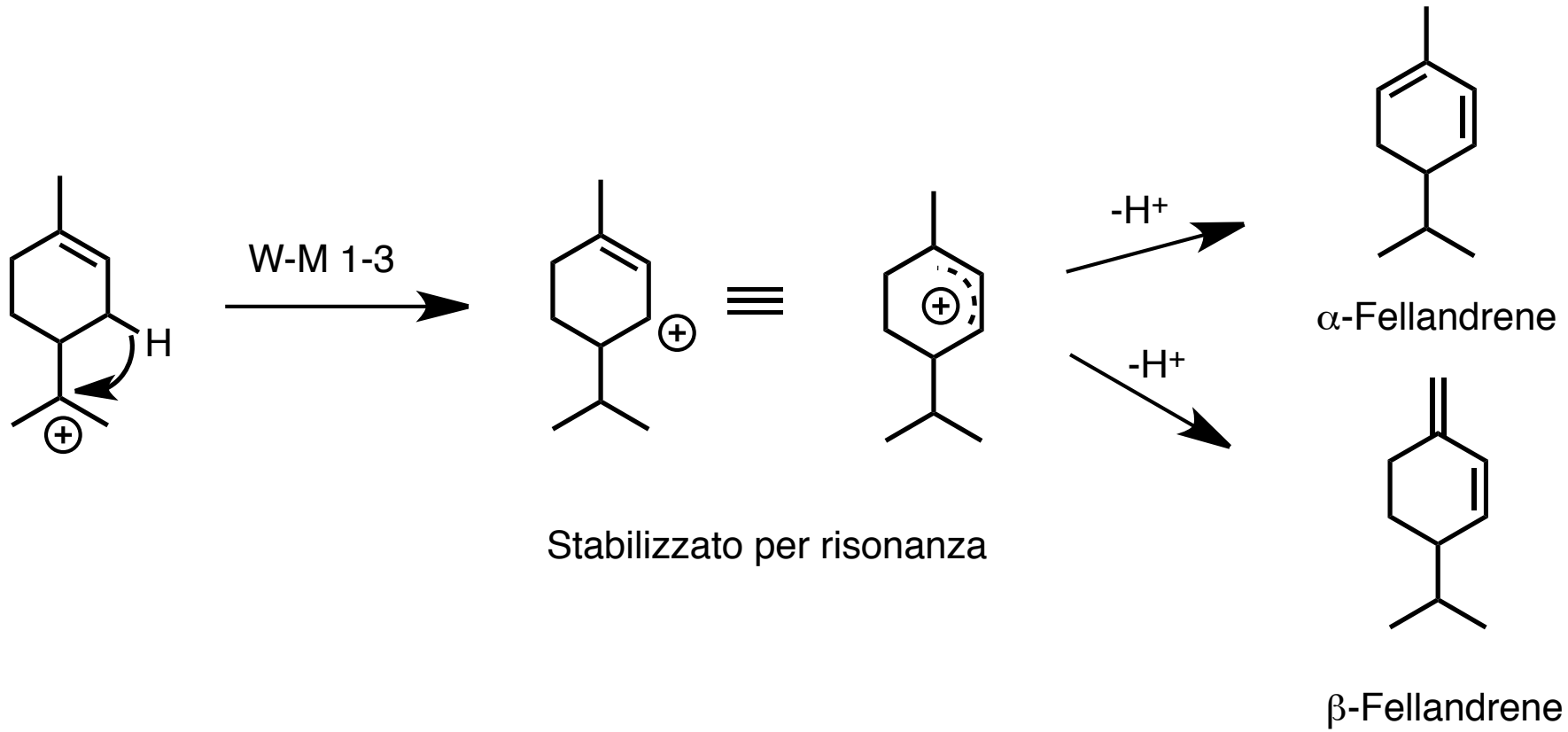


Cinnamonum camphora

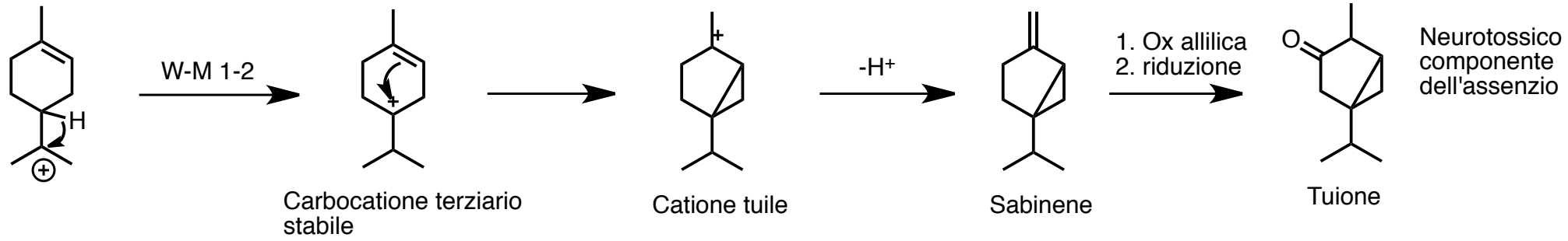




BIOSINTESI DEI TERPENI Trasposizione di Wagner-Meerwein 1-3

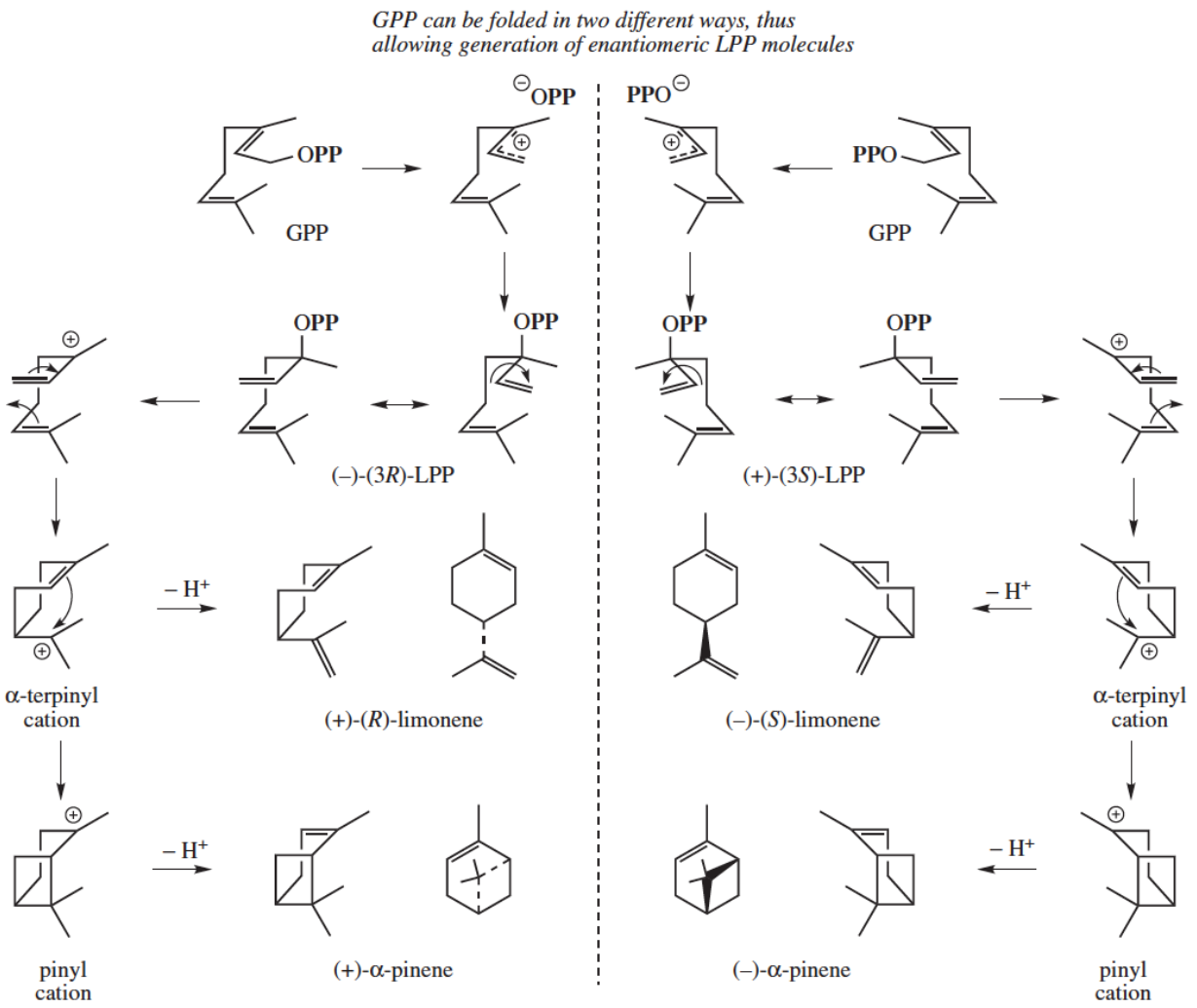


BIOSINTESI DEI TERPENI Trasposizione di Wagner-Meerwein 1-2

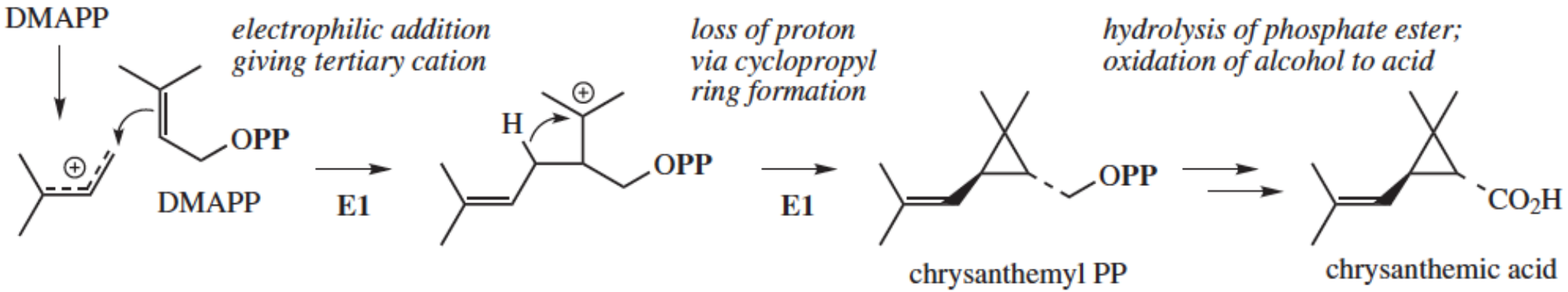


Artemisia absinthium

BIOSINTESI DEI TERPENI



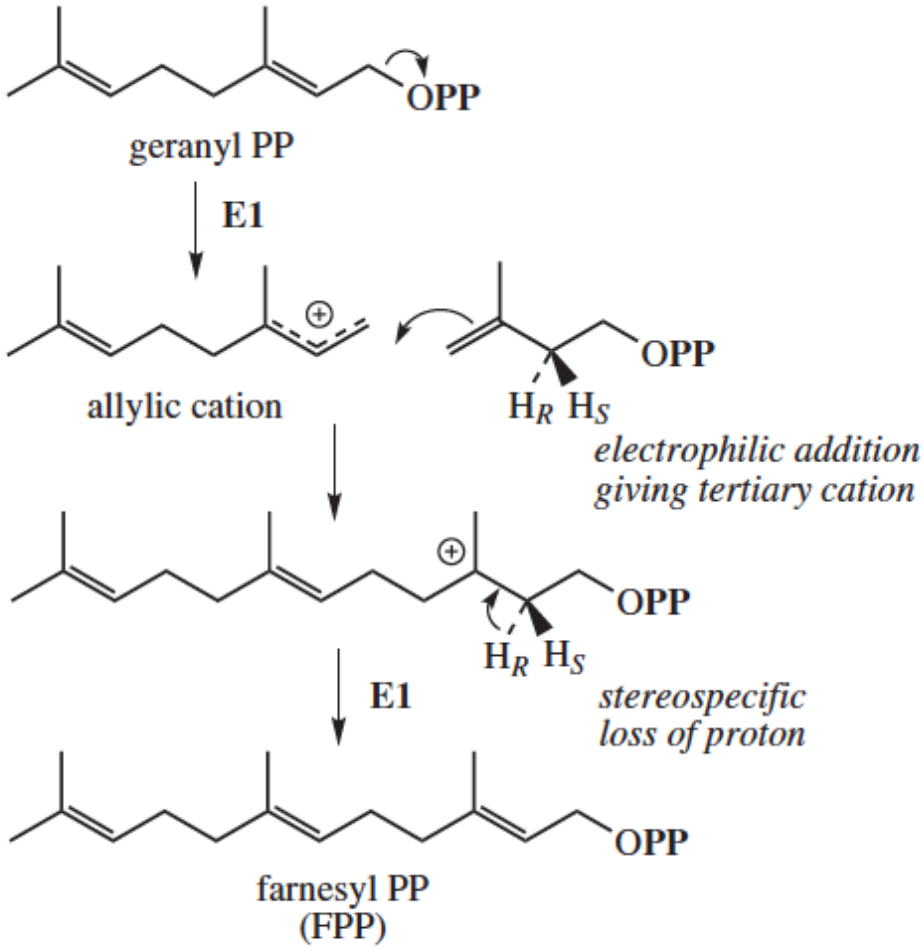
BIOSINTESI DEI TERPENI: monoterpeni irregolari



E1: chrysanthemyl diphosphate synthase
(substrate DMAPP)

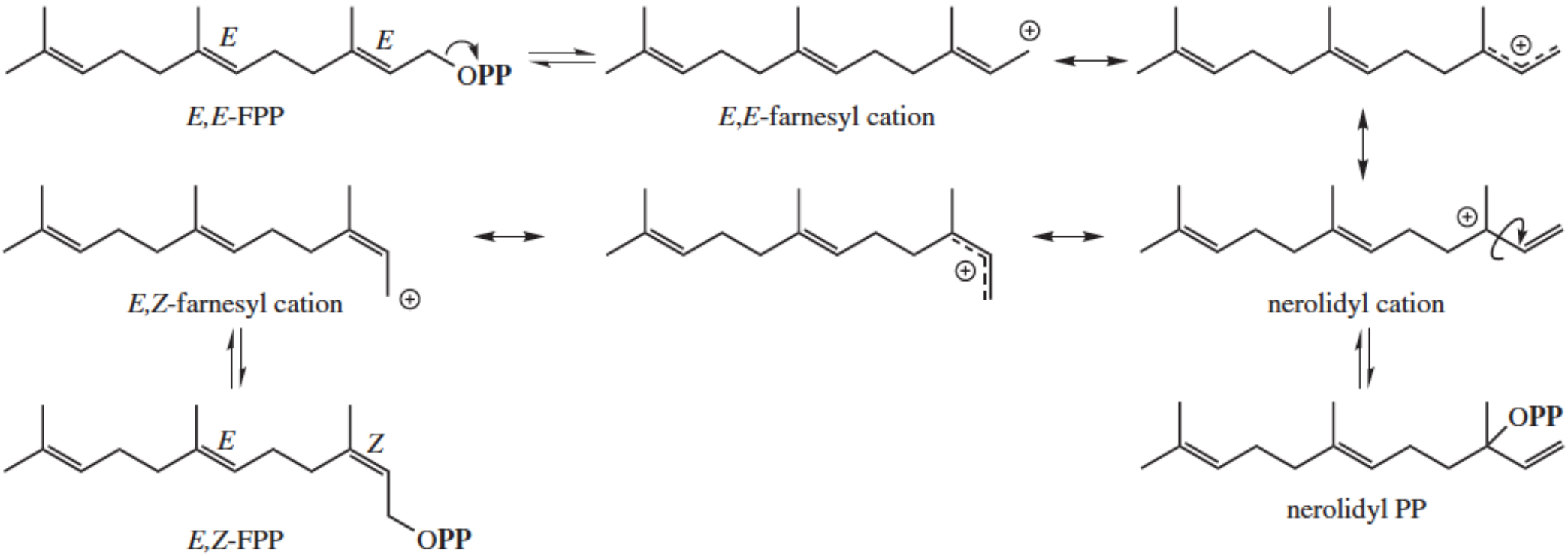
Chrysanthemum cinerariaefolium

BIOSINTESI DEI TERPENI SESQUITERPENI C15

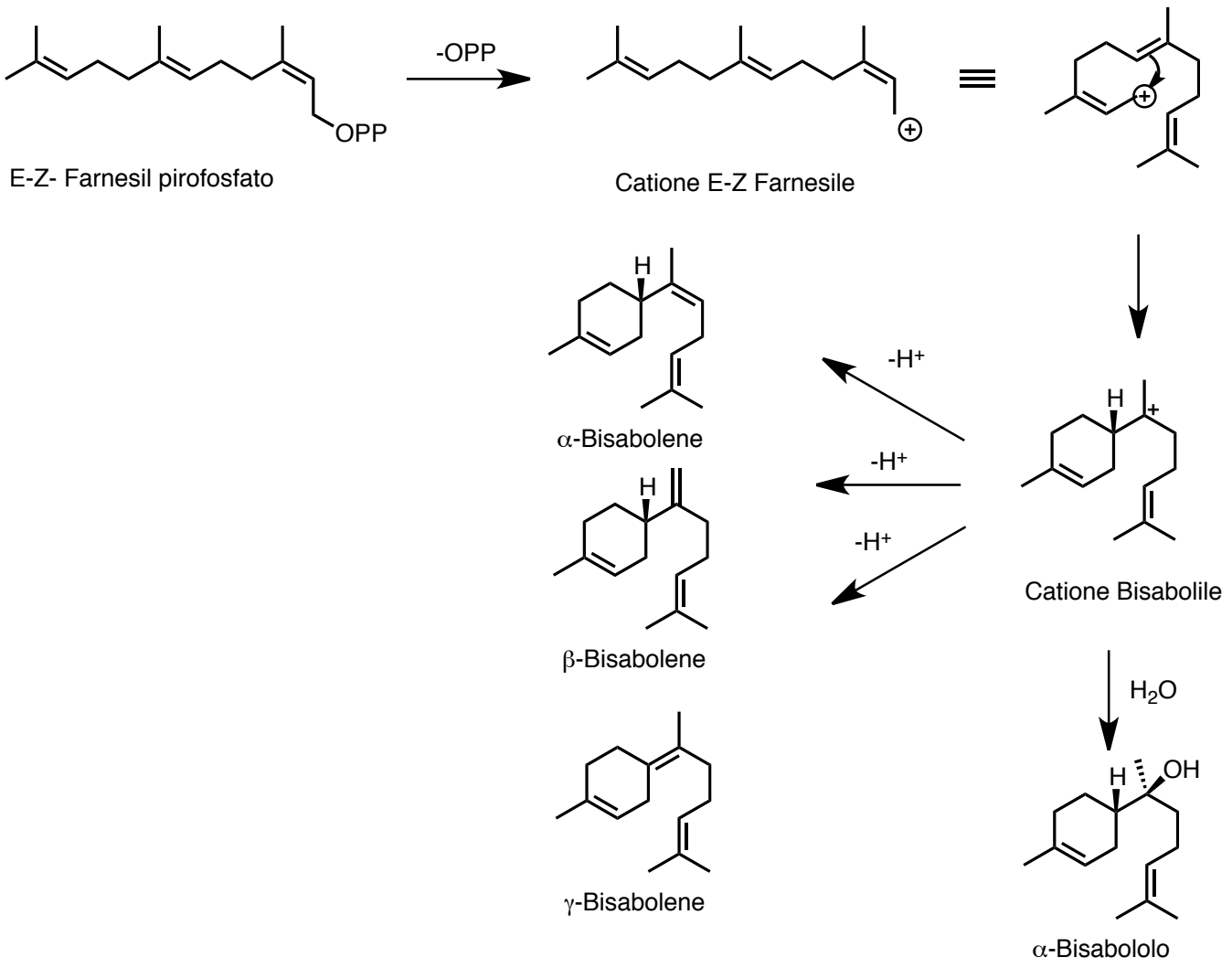


E1: farnesyl diphosphate synthase

BIOSINTESI DEI TERPENI SESQUITERPENI C15

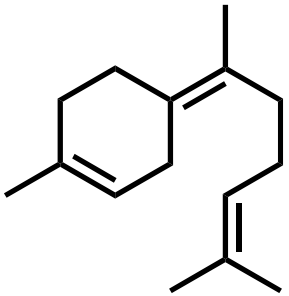


BIOSINTESI DEI TERPENI SESQUITERPENI CICLICI



BIOSINTESI DEI TERPENI

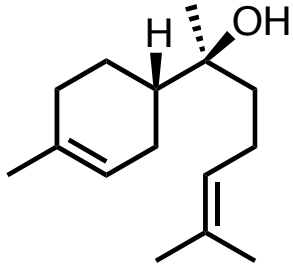
Zingiber officinalis



γ-Bisabolene

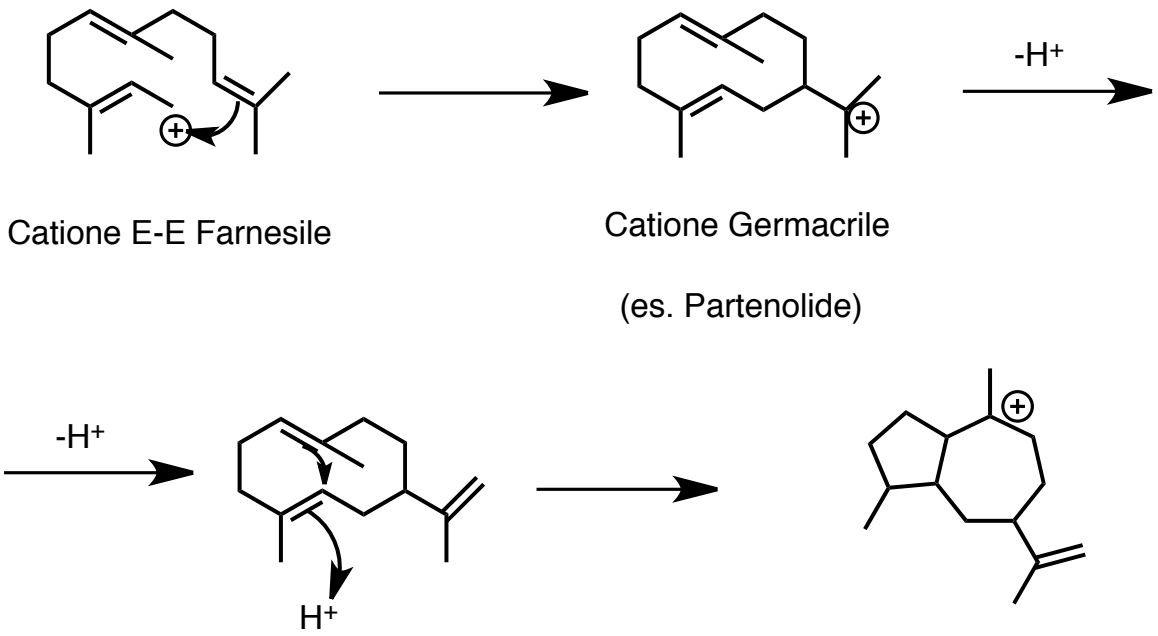
Zenzero

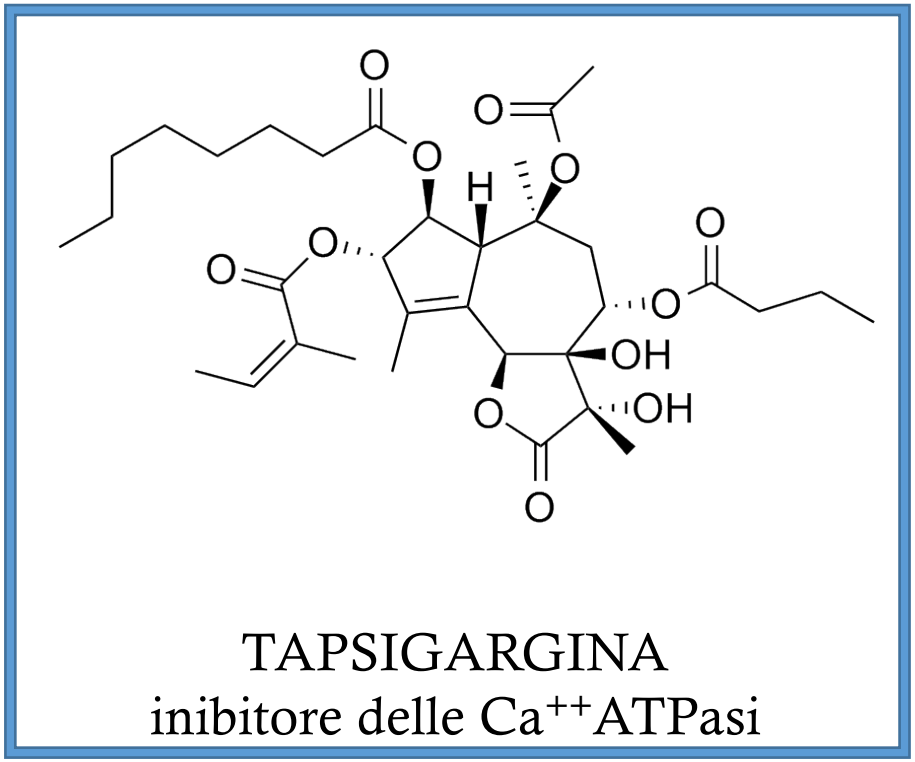
Matricaria chamomilla



α-Bisabololo

BIOSINTESI DEI TERPENI Catione Guaile-TAPSIGARGINA

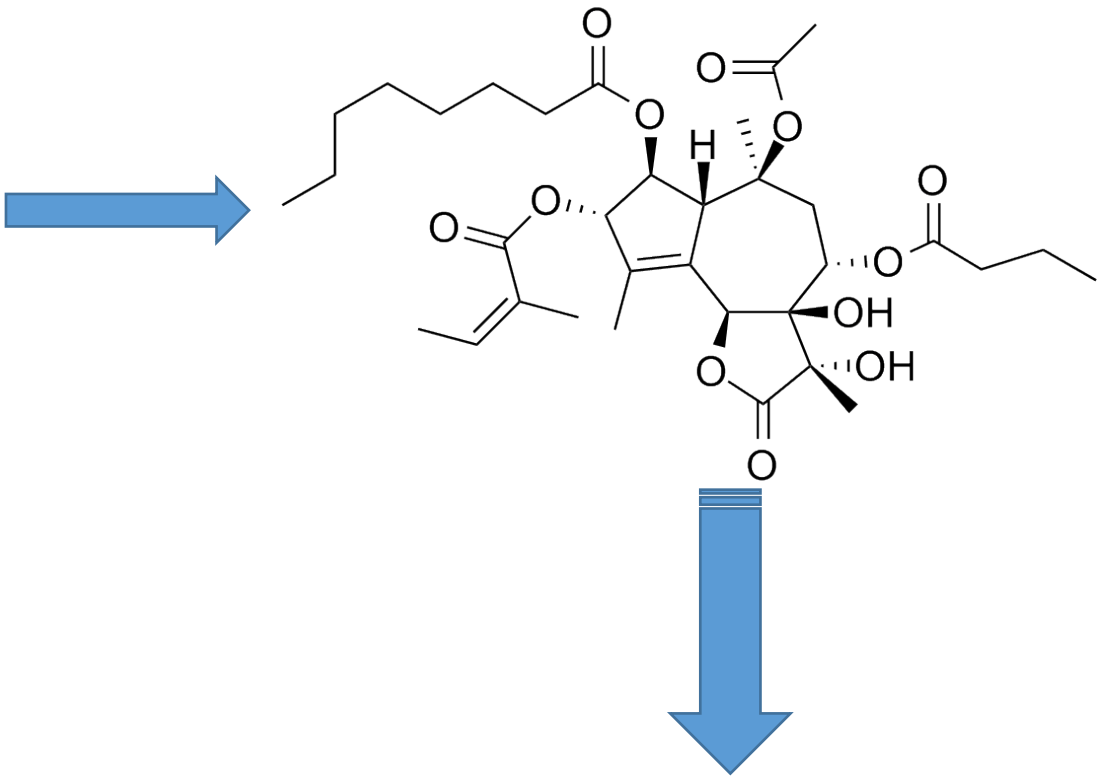




TAPSIGARGINA
inibitore delle Ca^{++}ATPasi

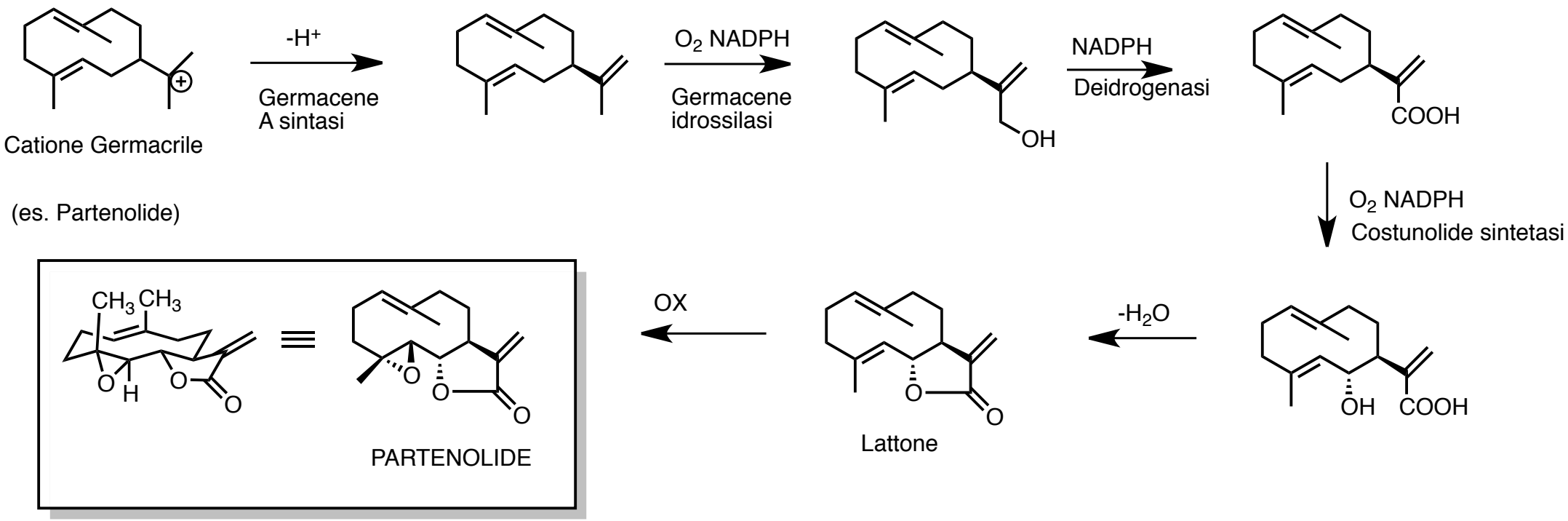
BIOSINTESI DEI TERPENI: TAPSIGARGINA

Thapsia garganica



Trattamento del cancro alla prostata

BIOSINTESI DEI TERPENI: PARTENOLIDE



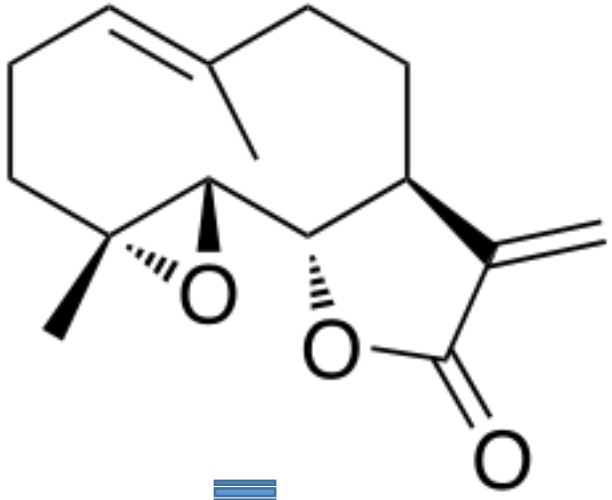
BIOSINTESI DEI TERPENI

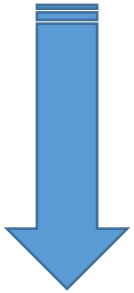
Feverfew

Feverfew is a traditional herbal remedy for the relief of arthritis, migraine, toothache, and menstrual difficulties. The plant is a perennial, strongly aromatic herb of the Compositae/Asteraceae family, and has been classified variously as *Tanacetum parthenium* (which is currently favoured), *Chrysanthemum parthenium, Leucanthemum parthenium*, or *Pyrethrum parthenium*. Studies have confirmed that feverfew is an effective prophylactic treatment for migraine in about 70% of sufferers. It reduces the frequency and severity of attacks and the vomiting associated with them. The herb has been shown to inhibit blood platelet aggregation, the release of 5-hydroxytryptamine (5-HT, serotonin) from platelets, the release of histamine from mast cells, and the production of prostaglandins, thromboxanes, and leukotrienes. Of a range of sesquiterpene lactones of the germacrane and guianane groups characterized in the leaf material, the principal constituent and major active component is parthenolide (Figure 5.34) (up to about 1% in dried leaves). The powerful pungent odour of the plant arises from the volatile oil constituents, of which the monoterpene camphor (Figure 5.14) is a major constituent. Feverfew may be taken as the fresh leaf, often eaten with bread in the form of a sandwich to minimize the bitter taste, or it can be obtained in commercial dosage forms as tablets or capsules of the dried powdered leaf. The parthenolide content of dried leaf deteriorates on storage, and many commercial preparations of feverfew have been shown to contain little parthenolide, or to be well below the stated content. This may be a consequence of complexation with plant thiols via Michael addition. Consumers of fresh leaf can be troubled by sore mouth or mouth ulcers, caused by the sesquiterpenes. Parthenolide is also known to be capable of causing some allergic effects, e.g. contact dermatitis. The proposed mechanism of action of parthenolide via alkylation of thiol groups in proteins is shown in Figure 5.35.

BIOSINTESI DEI TERPENI

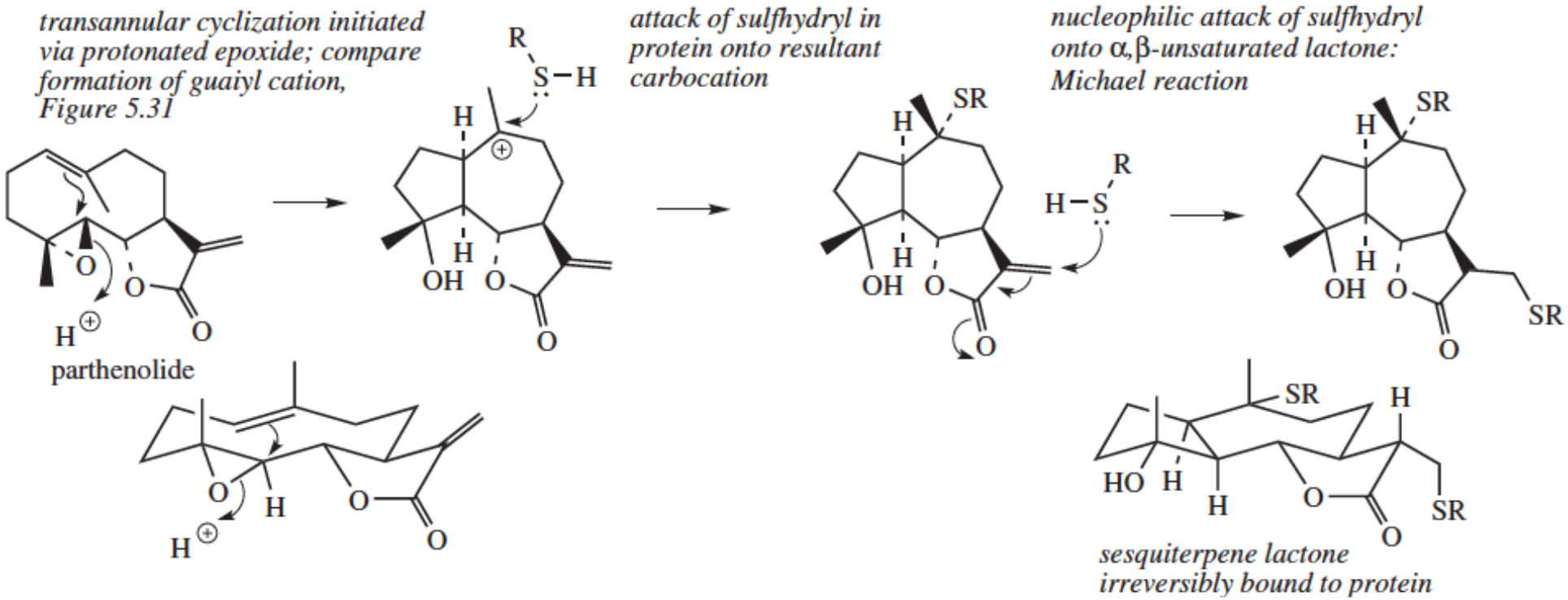
Tanacetum parthenium



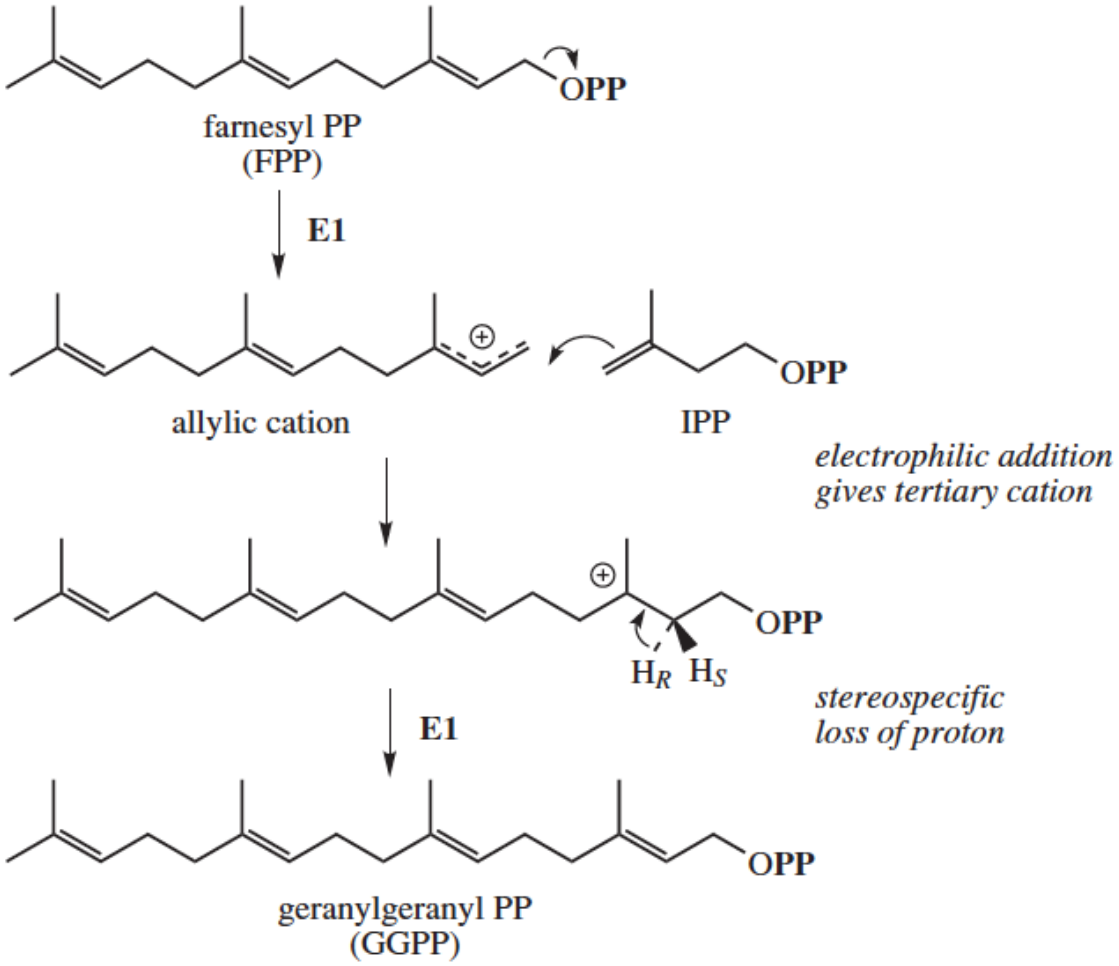


Trattamento dell’emicrania

BIOSINTESI DEI TERPENI: Partenolide meccanismo d'azione

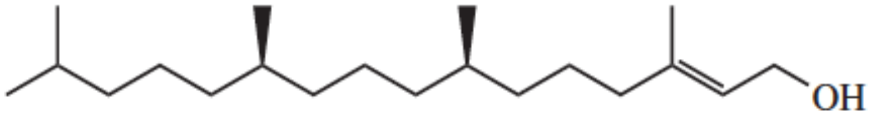


BIOSINTESI DEI DITERPENI C20

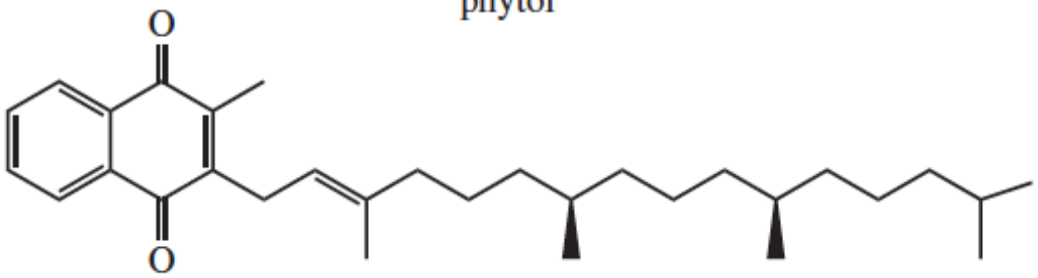


E1: geranylgeranyl diphosphate synthase

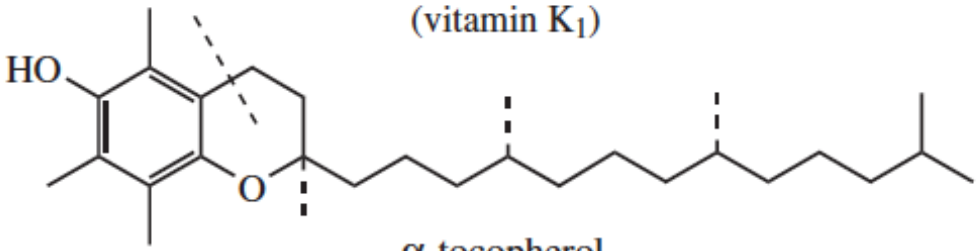
BIOSINTESI DEI DITERPENI



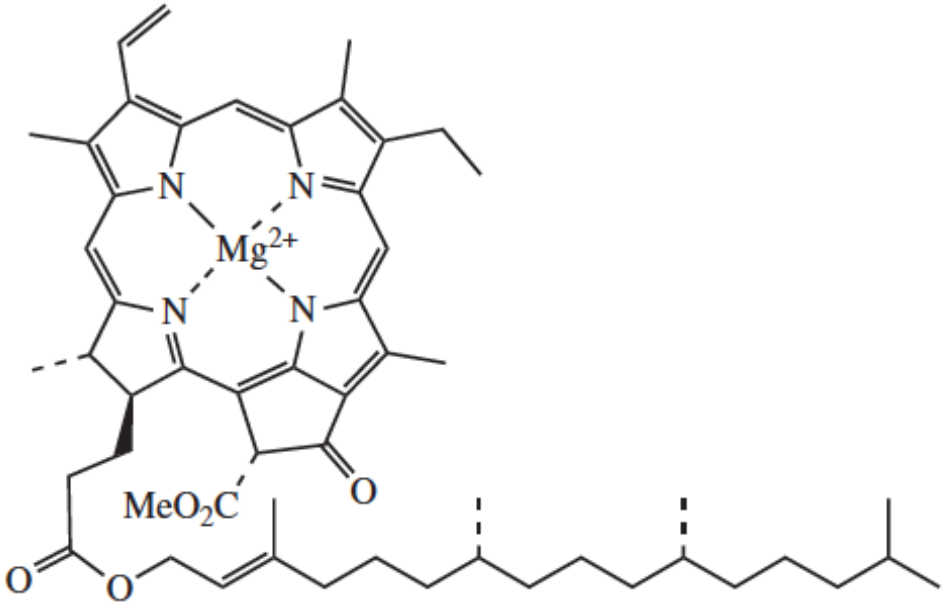
phytol



phylloquinone
(vitamin K_1)

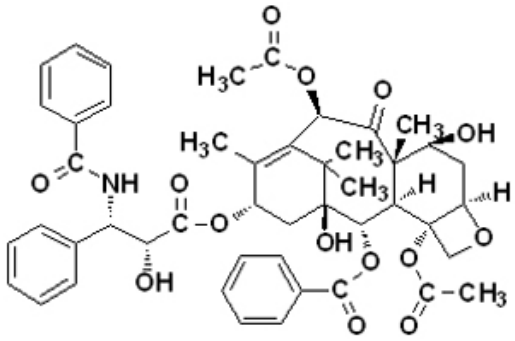


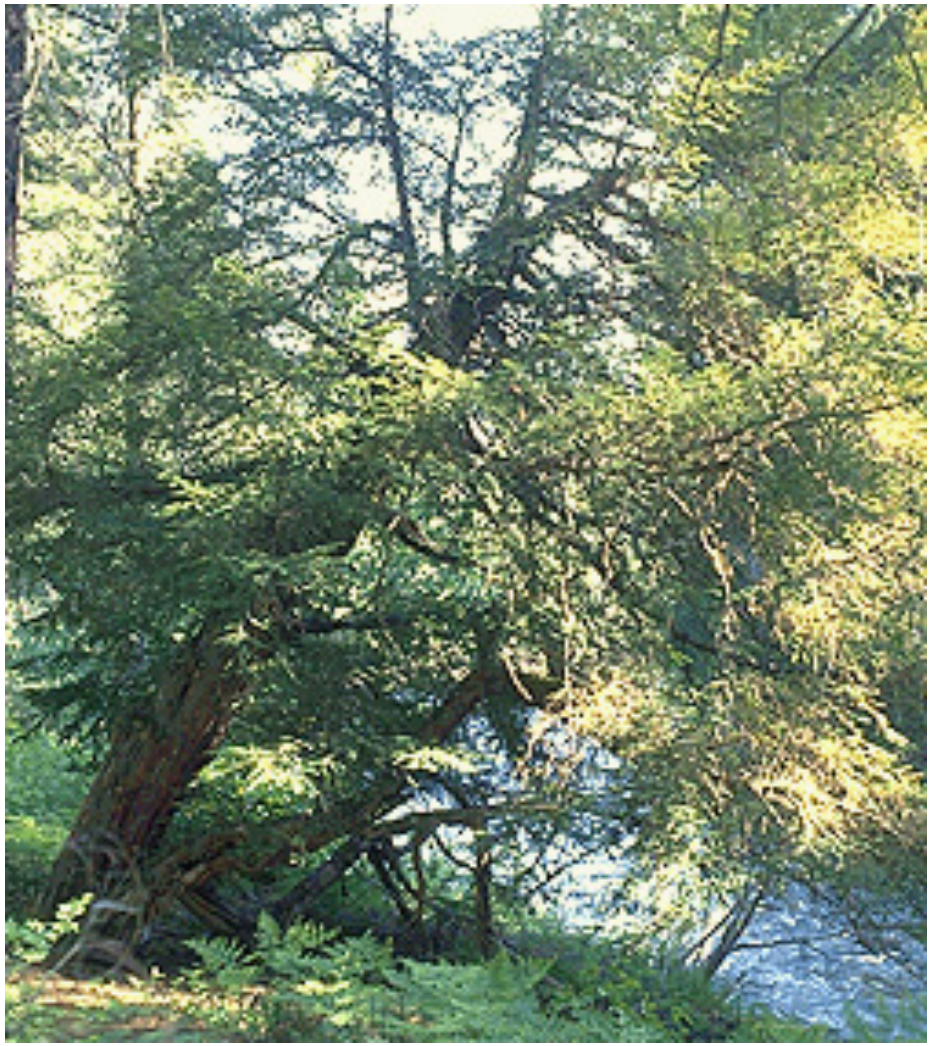
α-tocopherol
(vitamin E)



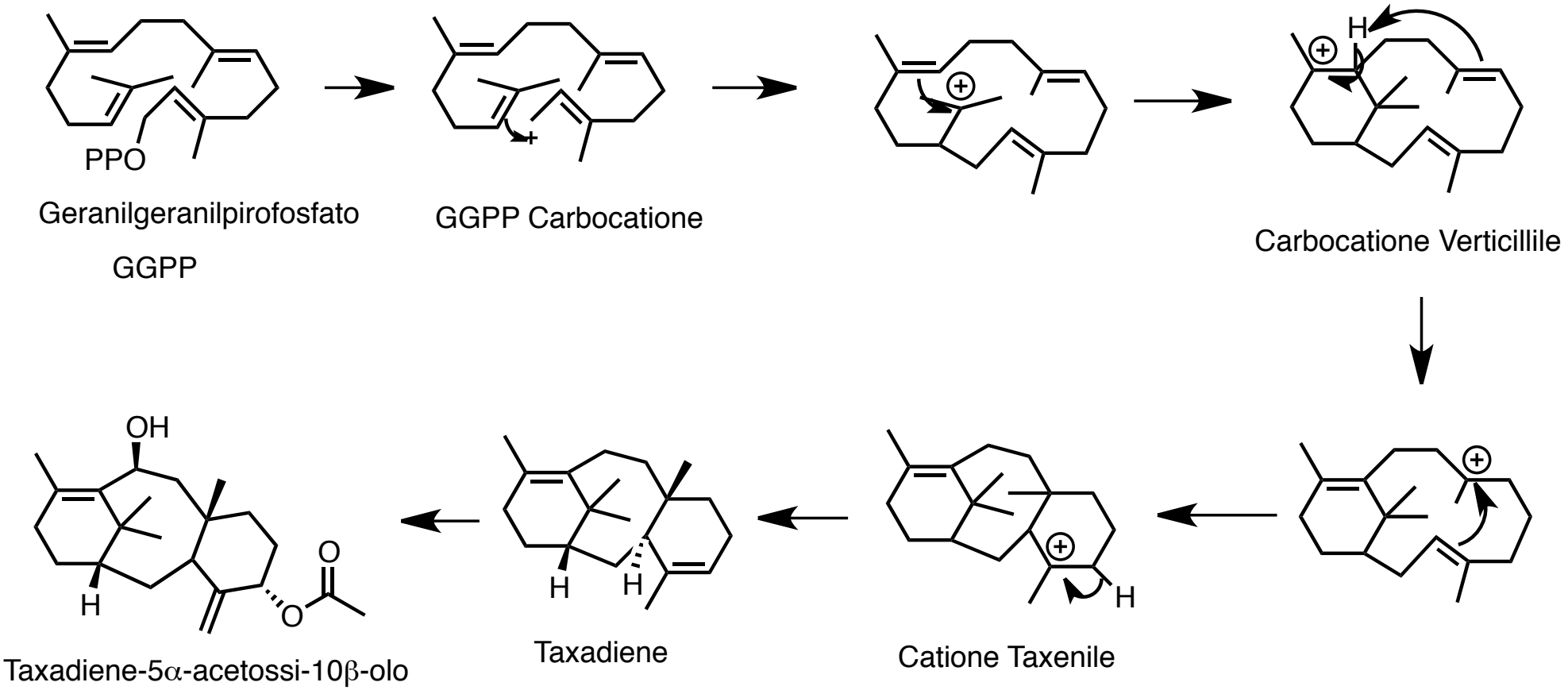
chlorophyll *a*

BIOSINTESI DEI DITERPENI: Tassolo (*Taxus brevifolia*)

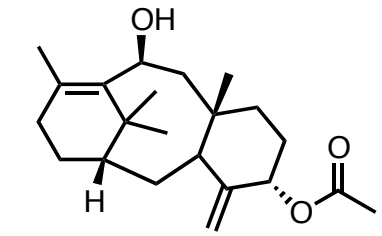




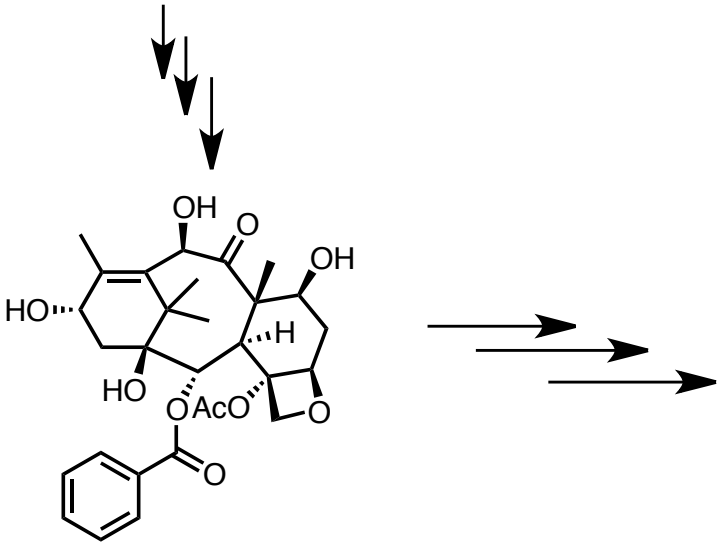
BIOSINTESI DEI DITERPENI

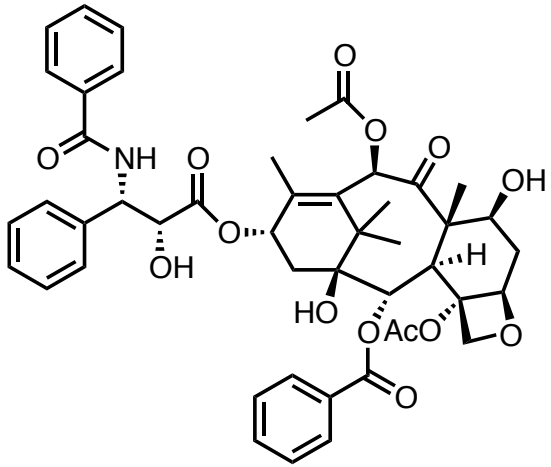


BIOSINTESI DEI DITERPENI

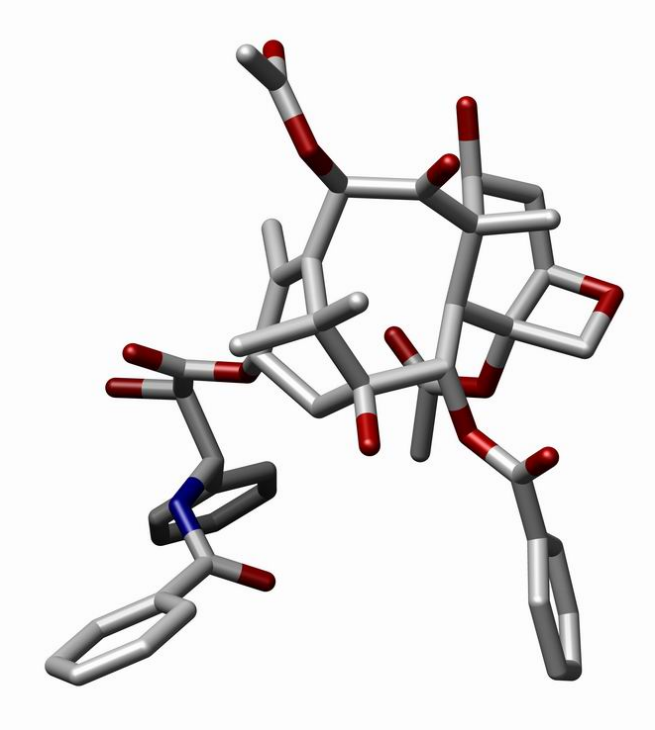


Taxadiene-5α-acetossi-10β-olo

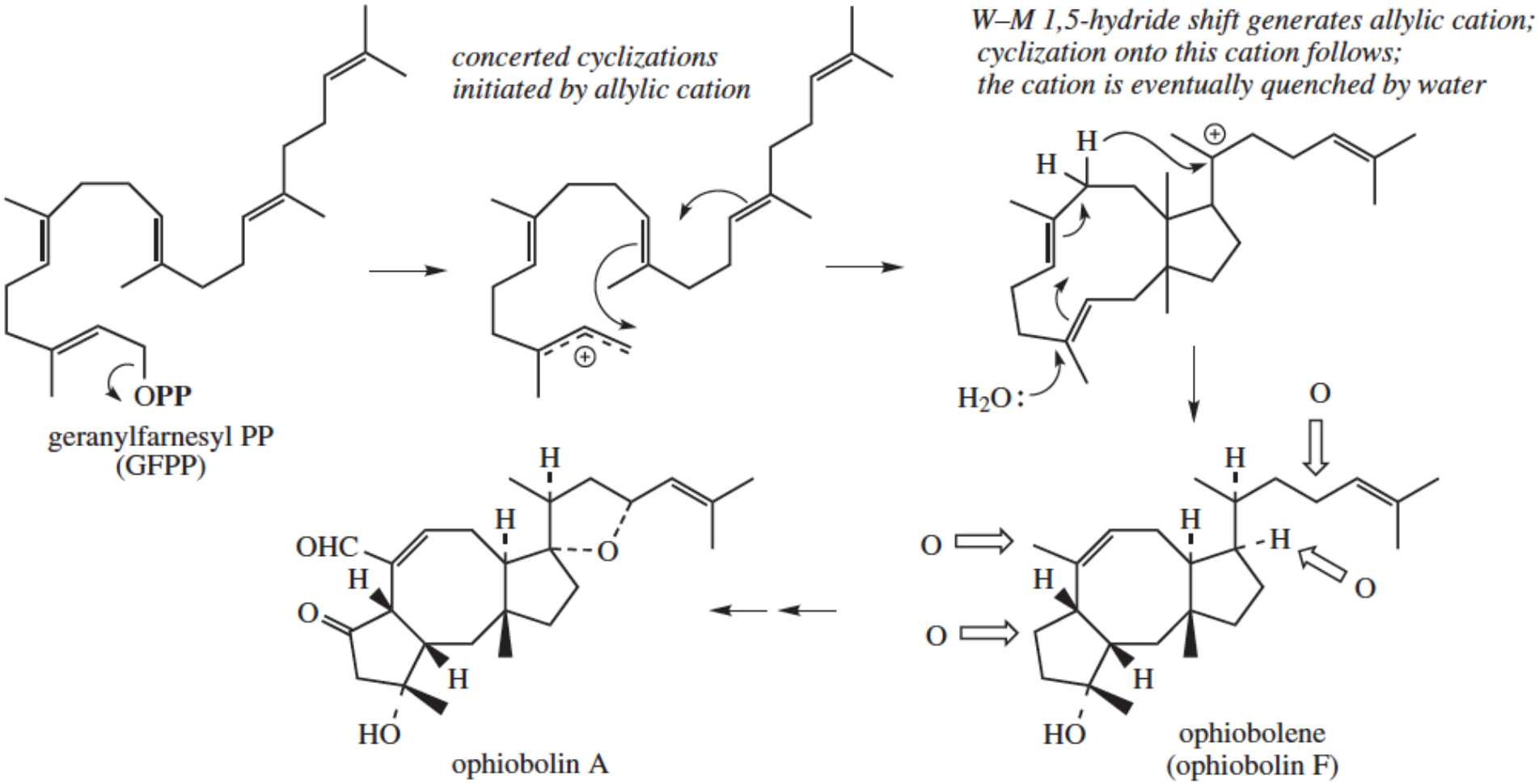




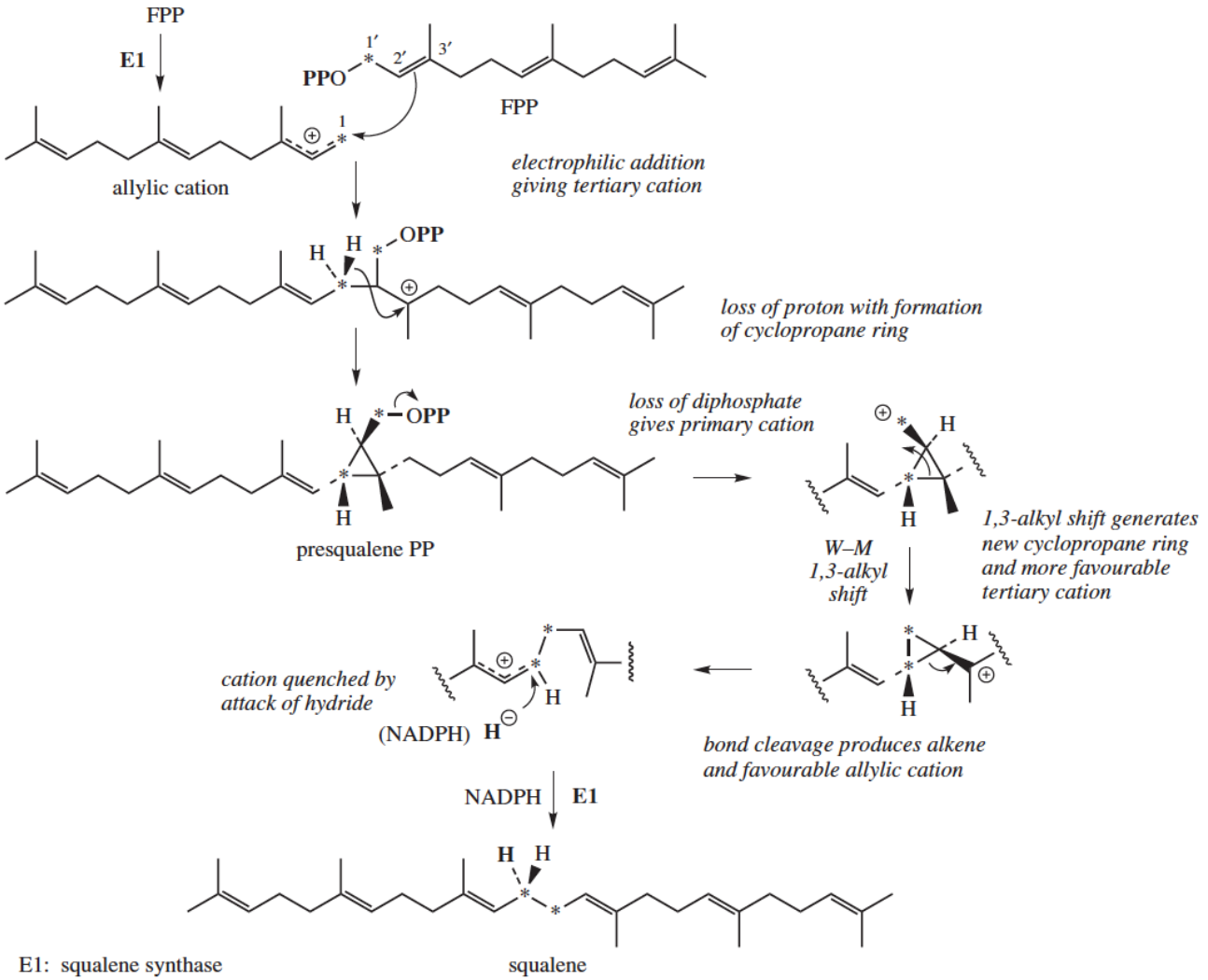
TASSOLO (PACLITAXEL)



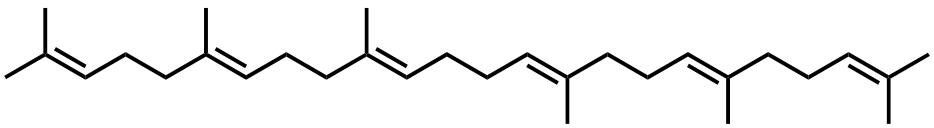
BIOSINTESI DEI SESTERPENITERPENI C25



BIOSINTESI DEI TRITERPENI C30

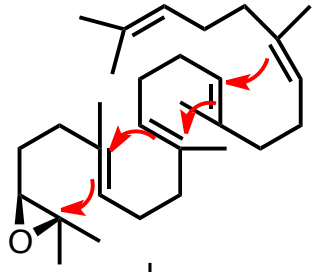


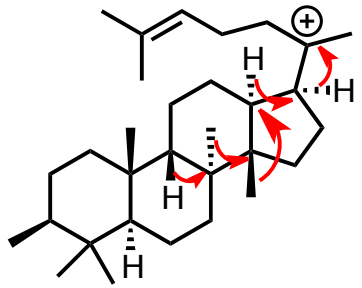
BIOSINTESI DEGLI STEROIDI



Squalene

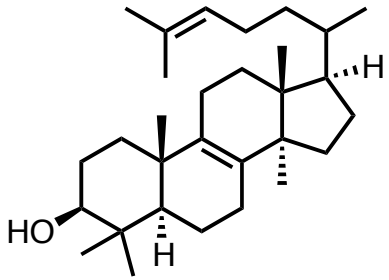
Squalene epossidasi



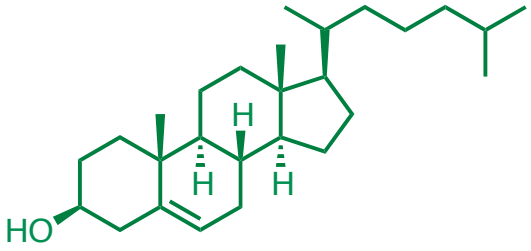


Catione Protosterile

Wagner -Merweein



Lanosterolo (C30)

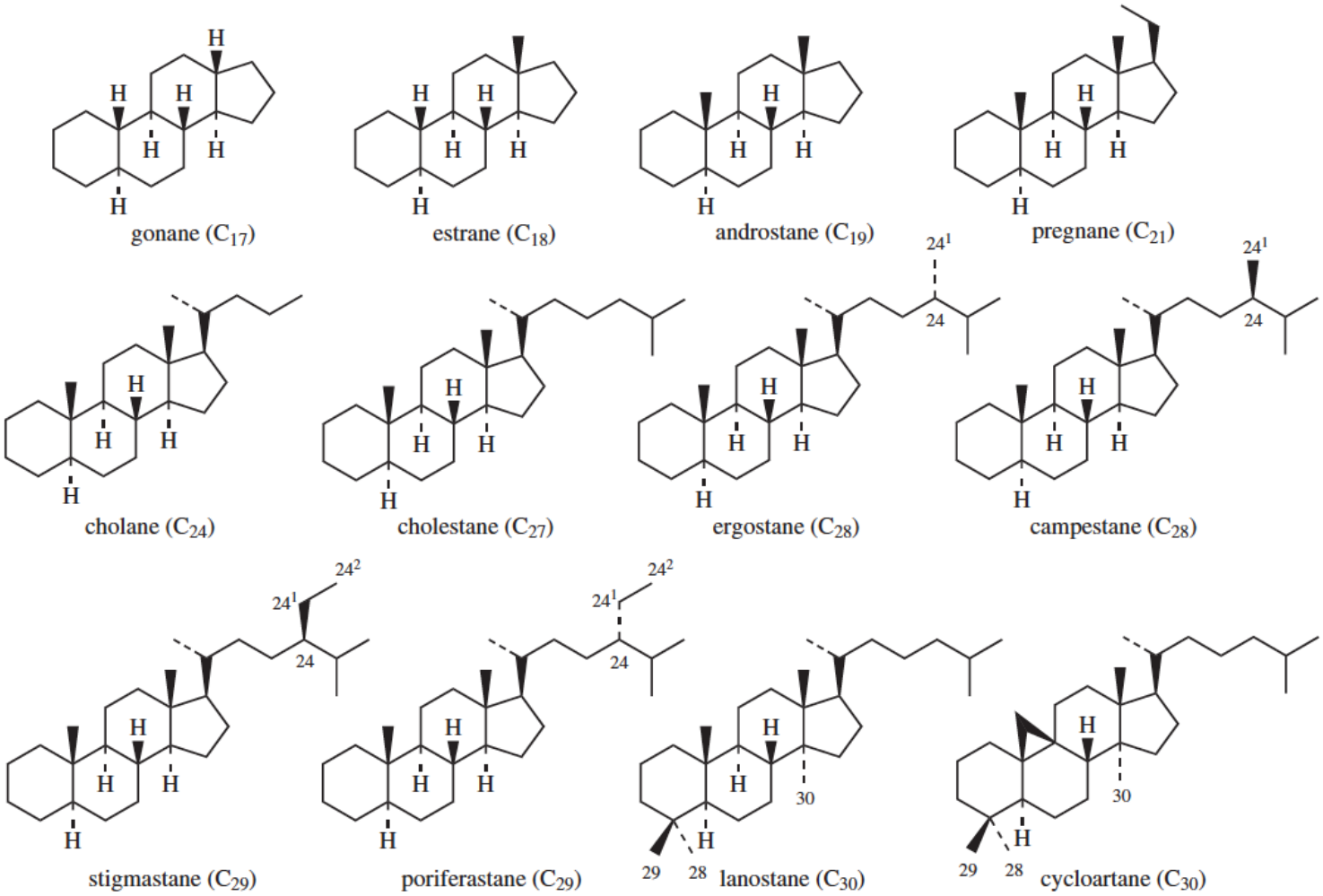


Colesterolo (C27)

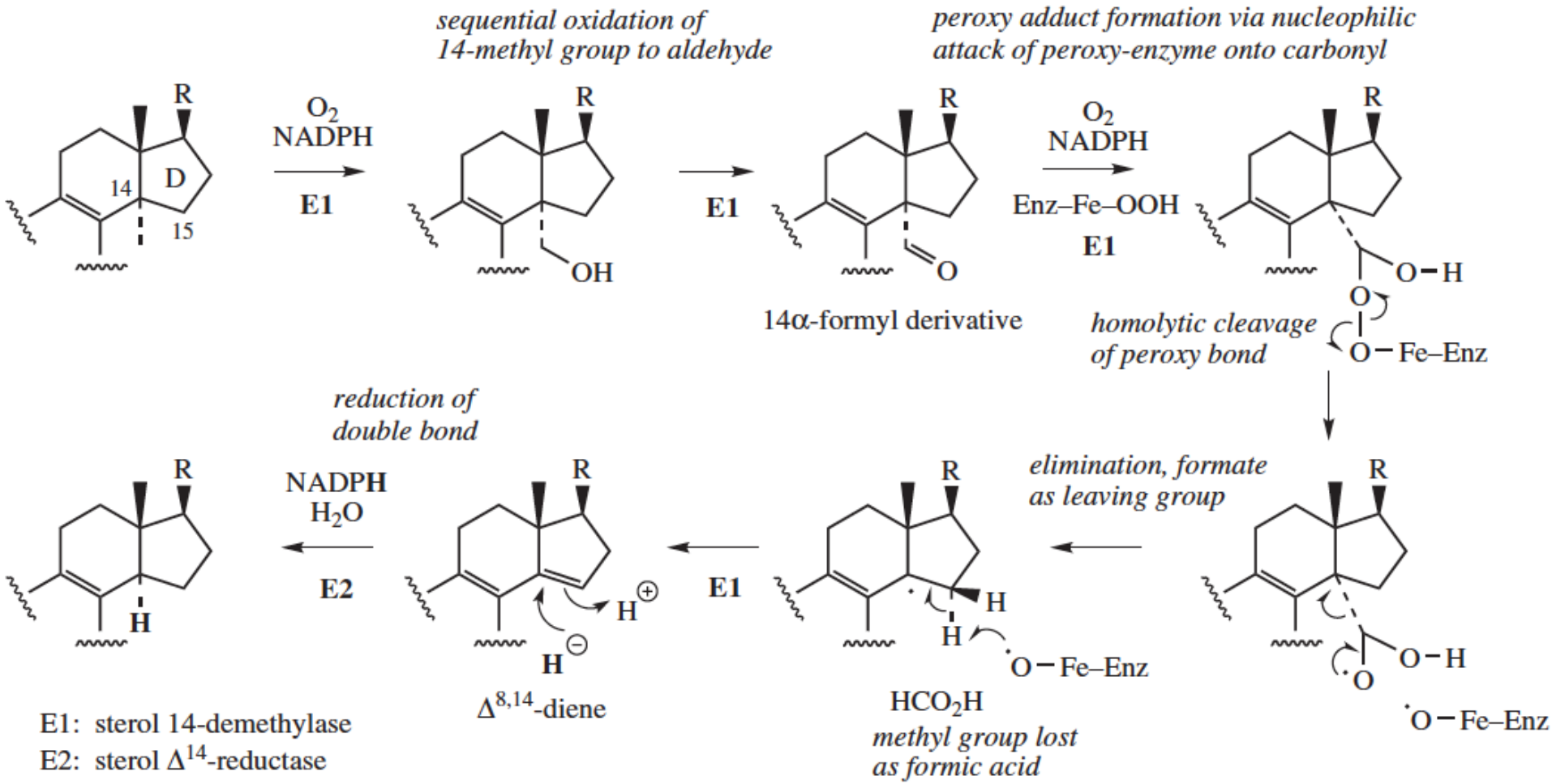
trans-Decalina

cis-Decalina

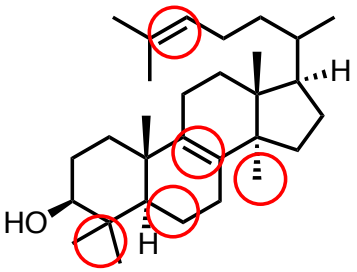
BIOSINTESI DEGLI STEROIDI



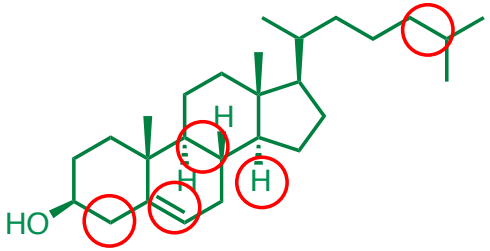
BIOSINTESI DEGLI STEROIDI: COLESTEROLO



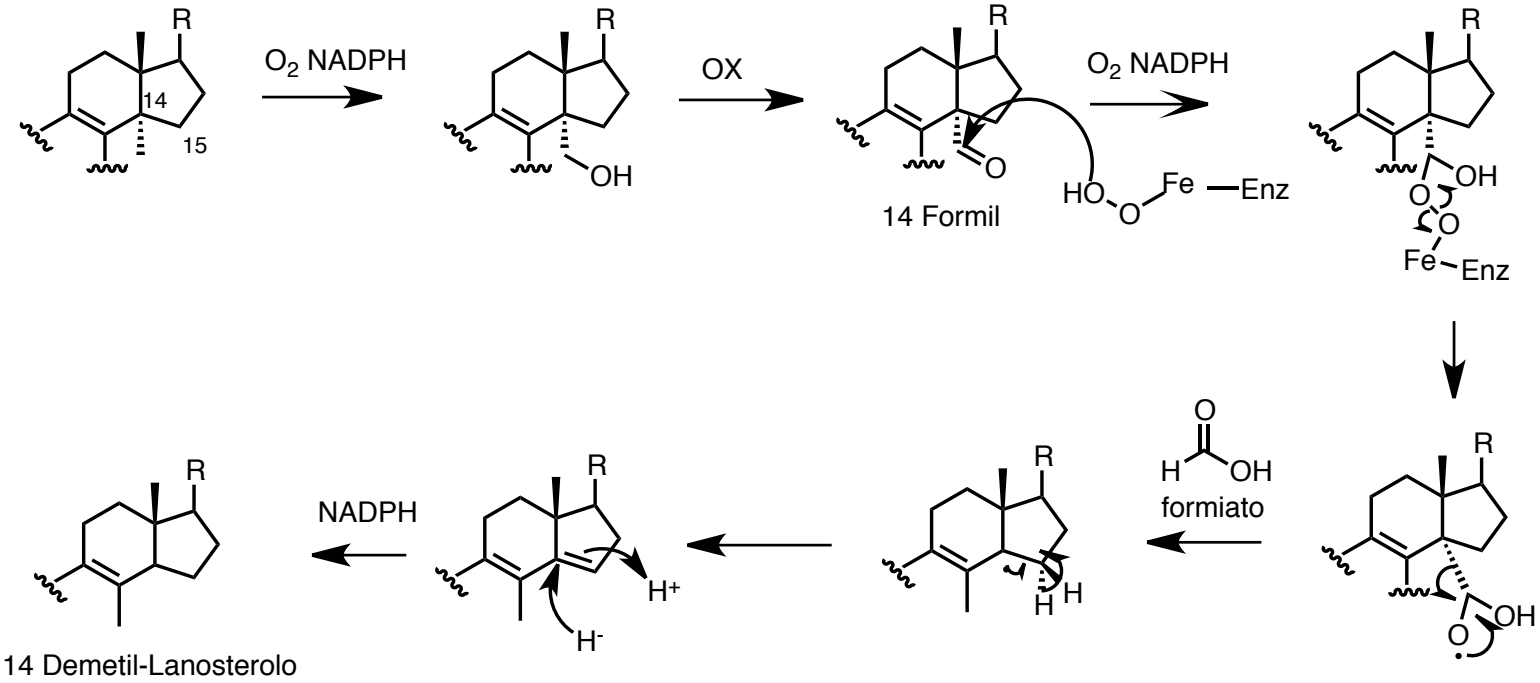
BIOSINTESI DEL COLESTEROLO



Lanosterolo (C30)

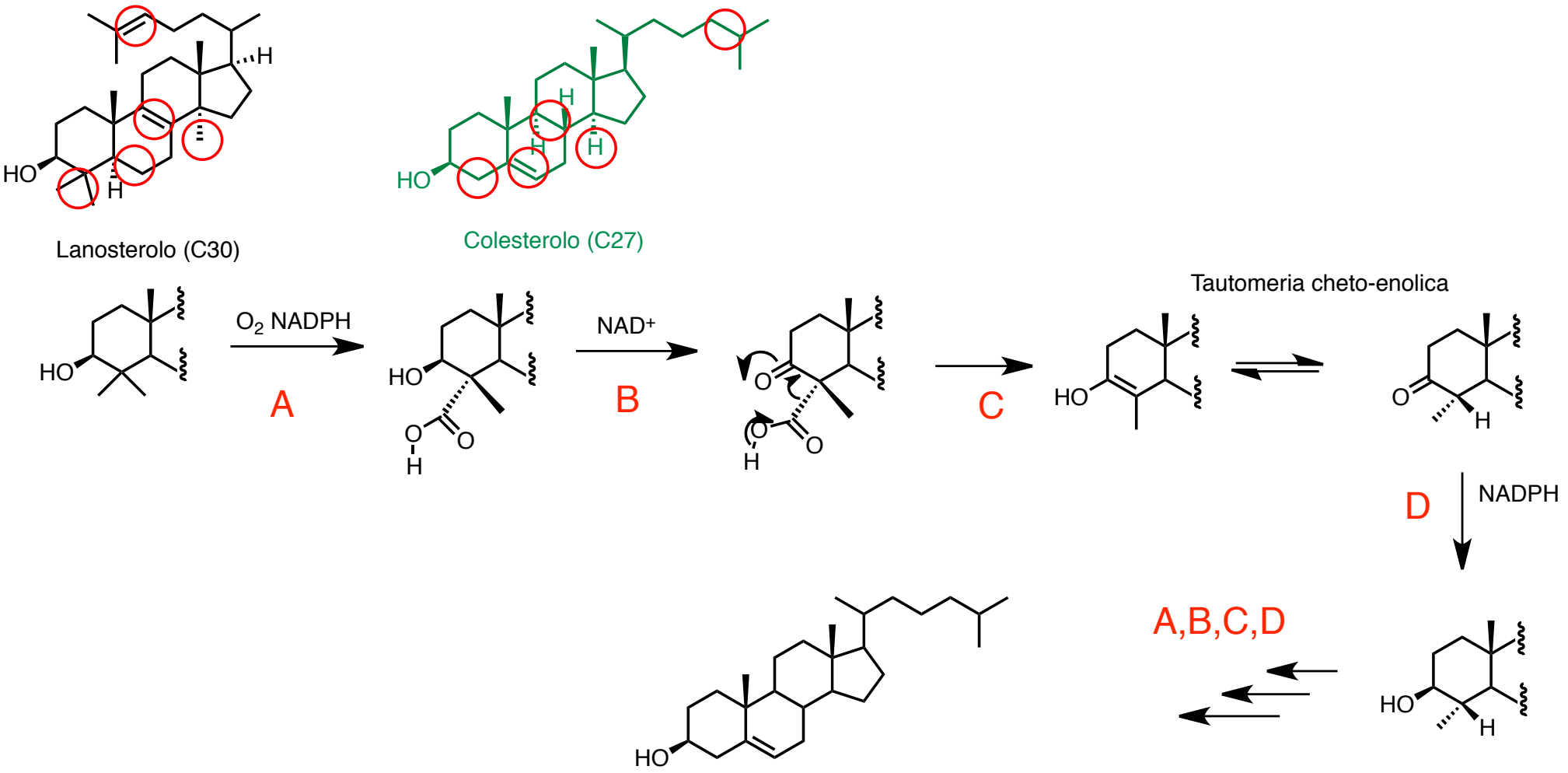


Colesterolo (C27)

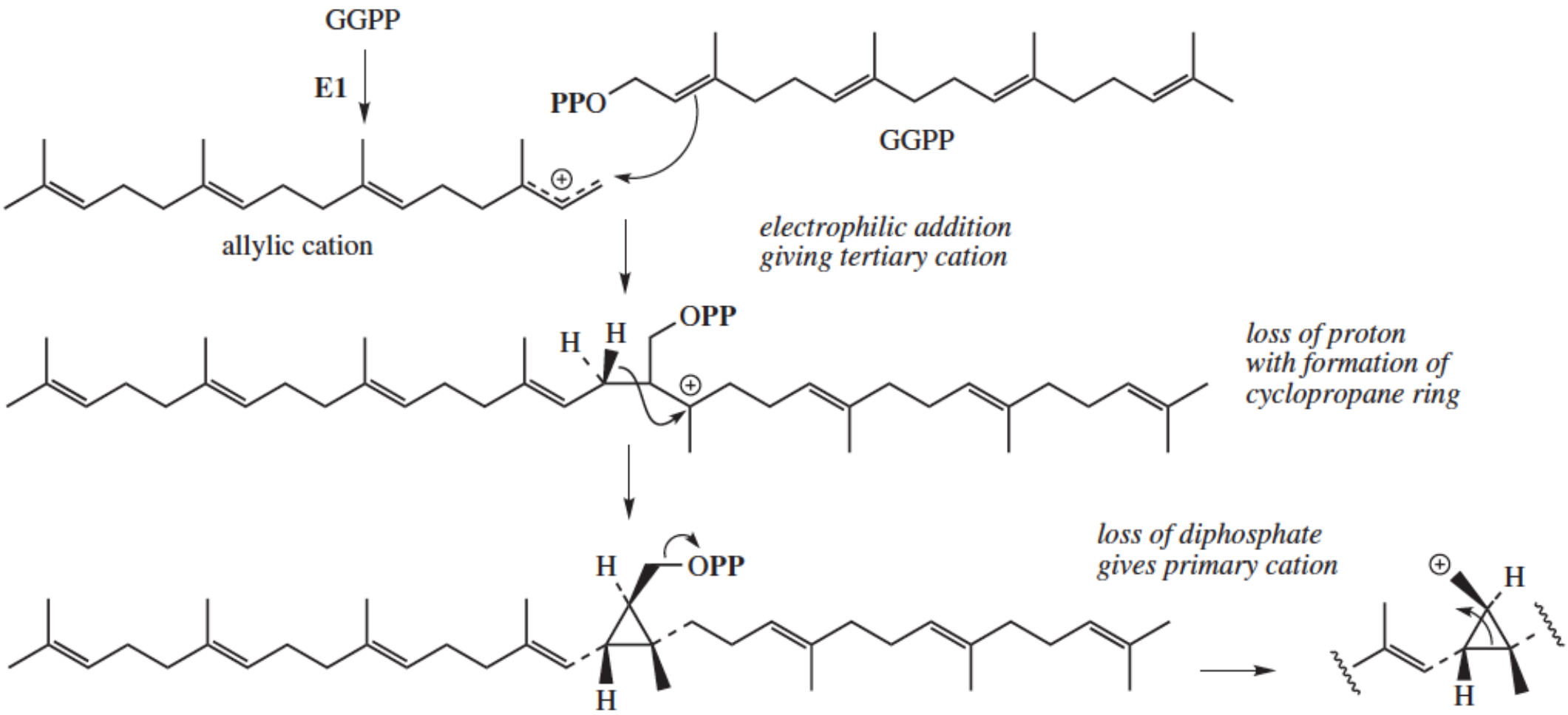


14 Demetil-Lanosterolo

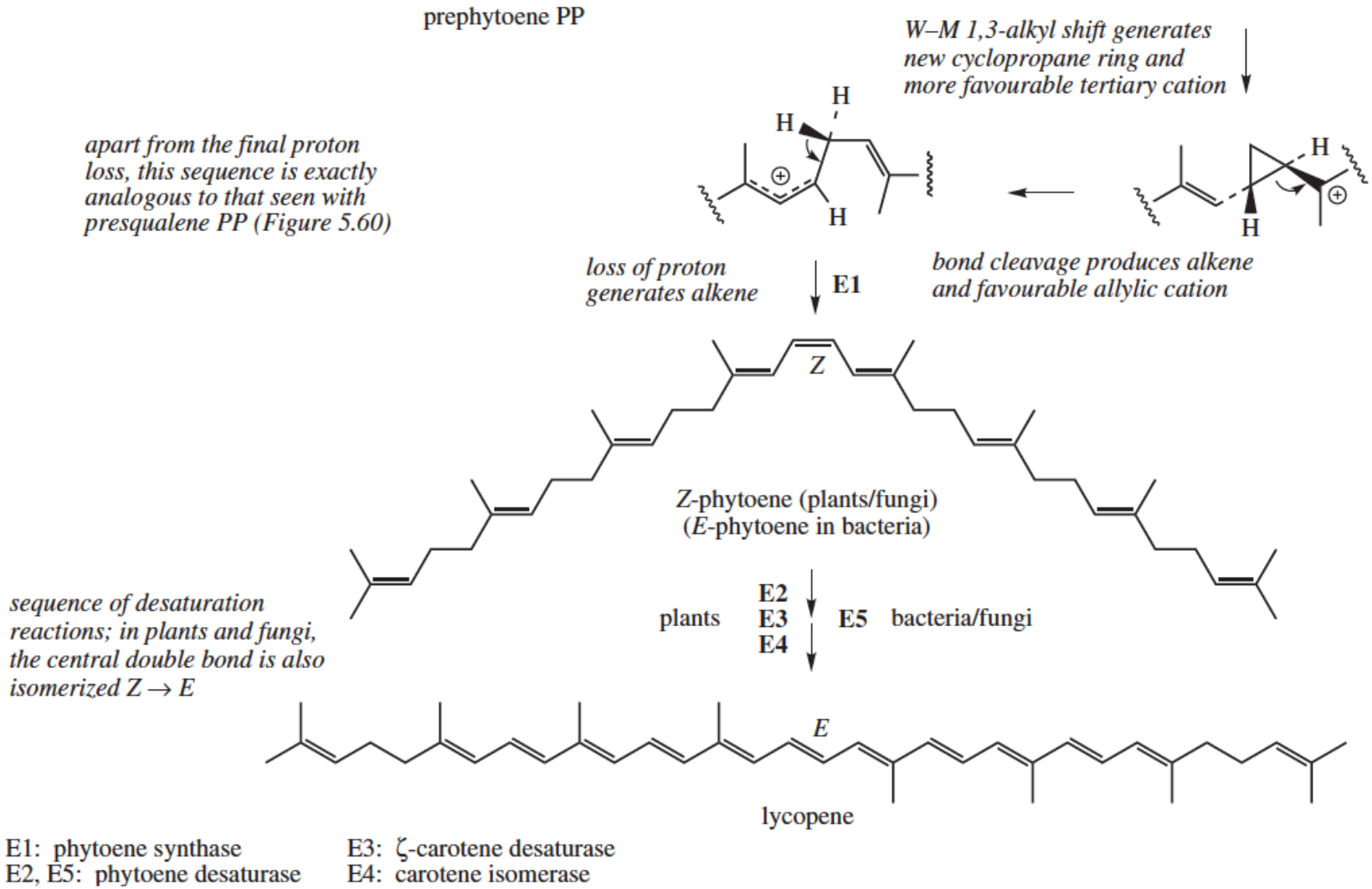
BIOSINTESI DEL COLESTEROLO



BIOSINTESI DEI TETRATERPENI C40



BIOSINTESI DEI TETRATERPENI



BIOSINTESI DEI TETRATERPENI