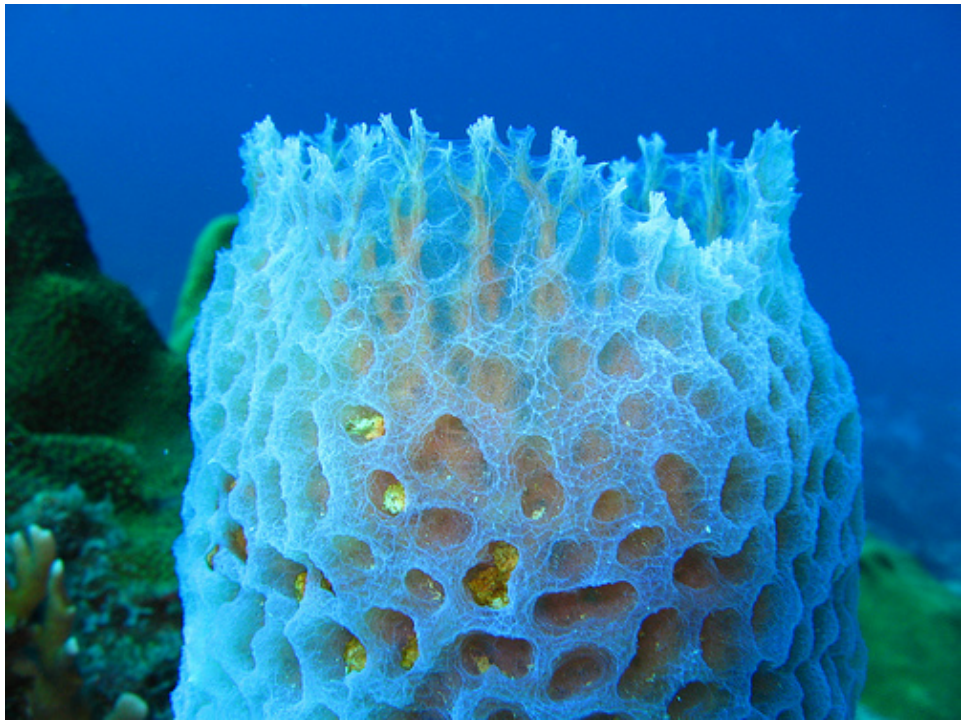
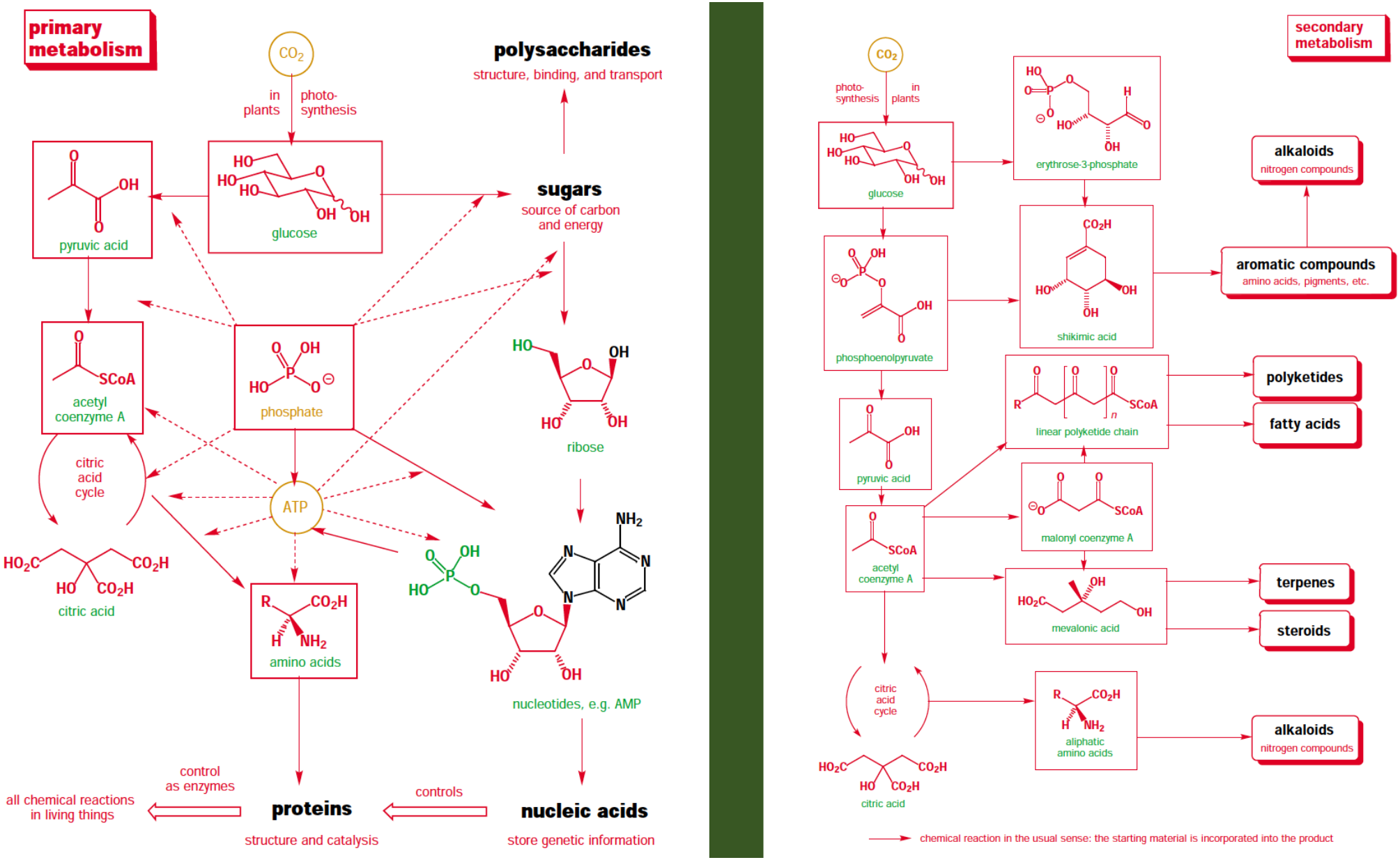
CHIMICA DELLE SOSTANZE ORGANICHE NATURALI

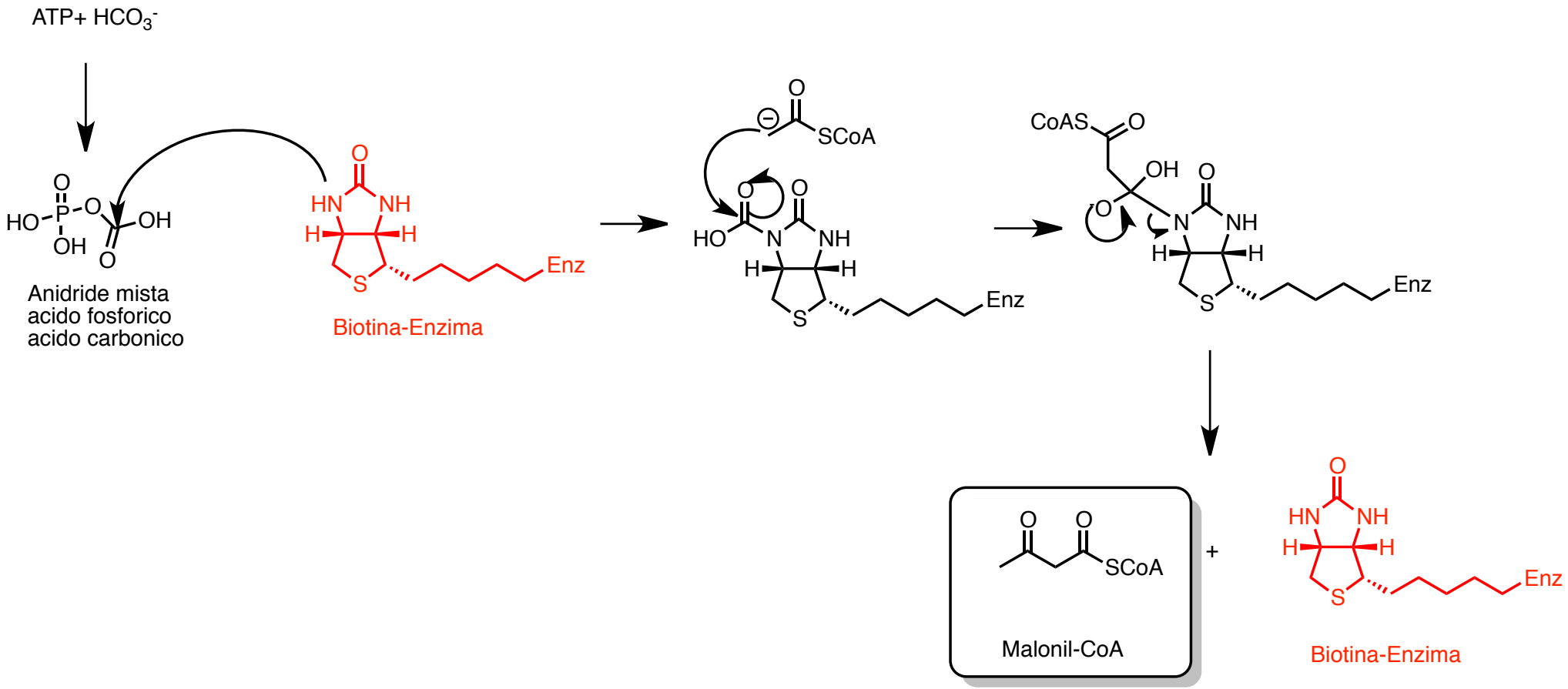


DISCODERMIA DISSOLUTA

LA VIA DELL'ACETATO: ACIDI GRASSI E POLICHETIDI

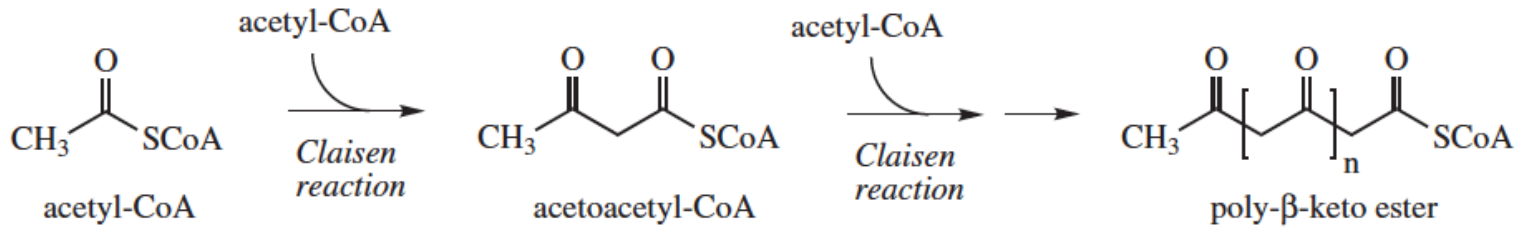

primary metabolism
CO_2
in plants
photo-synthesis
polysaccharides
structure, binding, and transport
sugars
source of carbon and energy
pyruvic acid
glucose
acetyl coenzyme A
phosphate
ribose
citric acid cycle
ATP
citric acid
amino acids
nucleotides, e.g. AMP
control as enzymes
all chemical reactions in living things
proteins
structure and catalysis
controls
nucleic acids
store genetic information
secondary metabolism
photo-synthesis
in plants
glucose
erythrose-3-phosphate
alkaloids
nitrogen compounds
phosphoenolpyruvate
shikimic acid
aromatic compounds
amino acids, pigments, etc.
pyruvic acid
linear polyketide chain
polyketides
fatty acids
acetyl coenzyme A
malonyl coenzyme A
terpenes
mevalonic acid
steroids
citric acid cycle
aliphatic amino acids
alkaloids
nitrogen compounds
citric acid
chemical reaction in the usual sense: the starting material is incorporated into the product

Biosintesi MALONIL-CoA

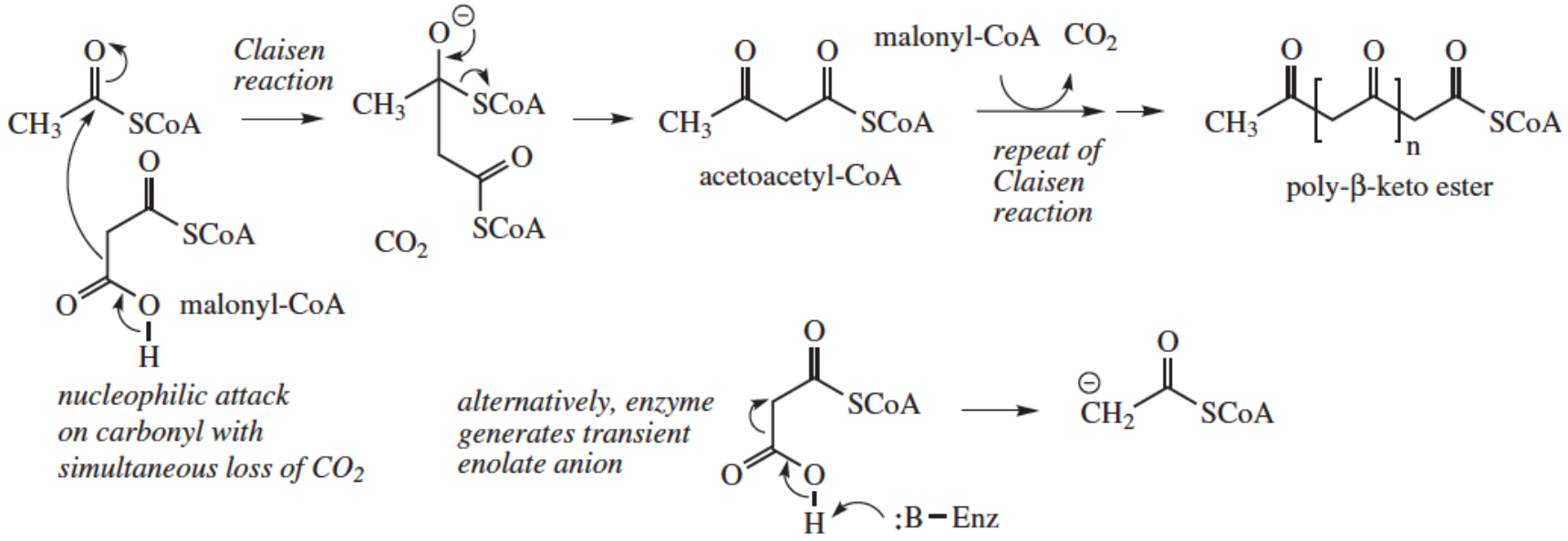


Biosintesi degli acidi grassi

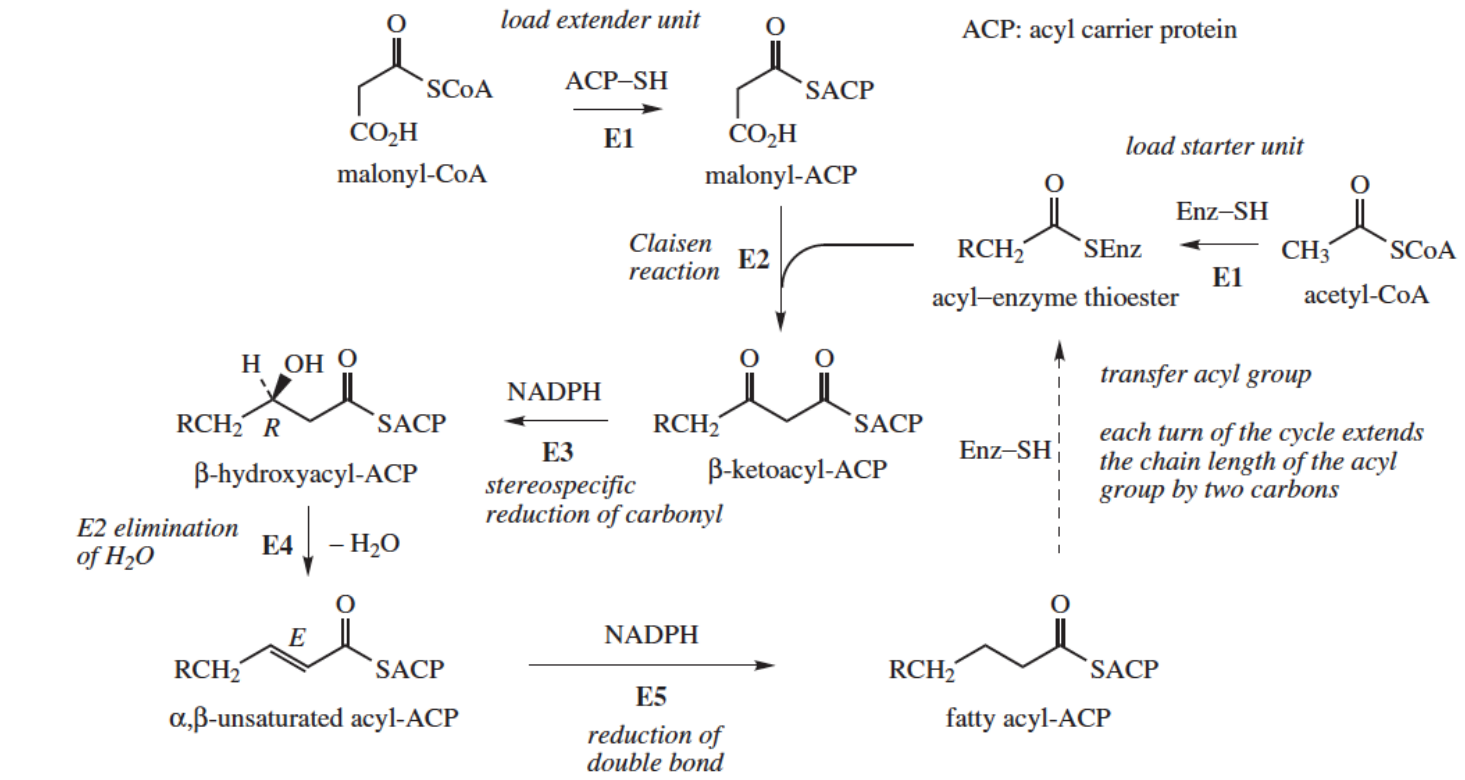
Claisen reaction: acetyl-CoA



Claisen reaction: malonyl-CoA



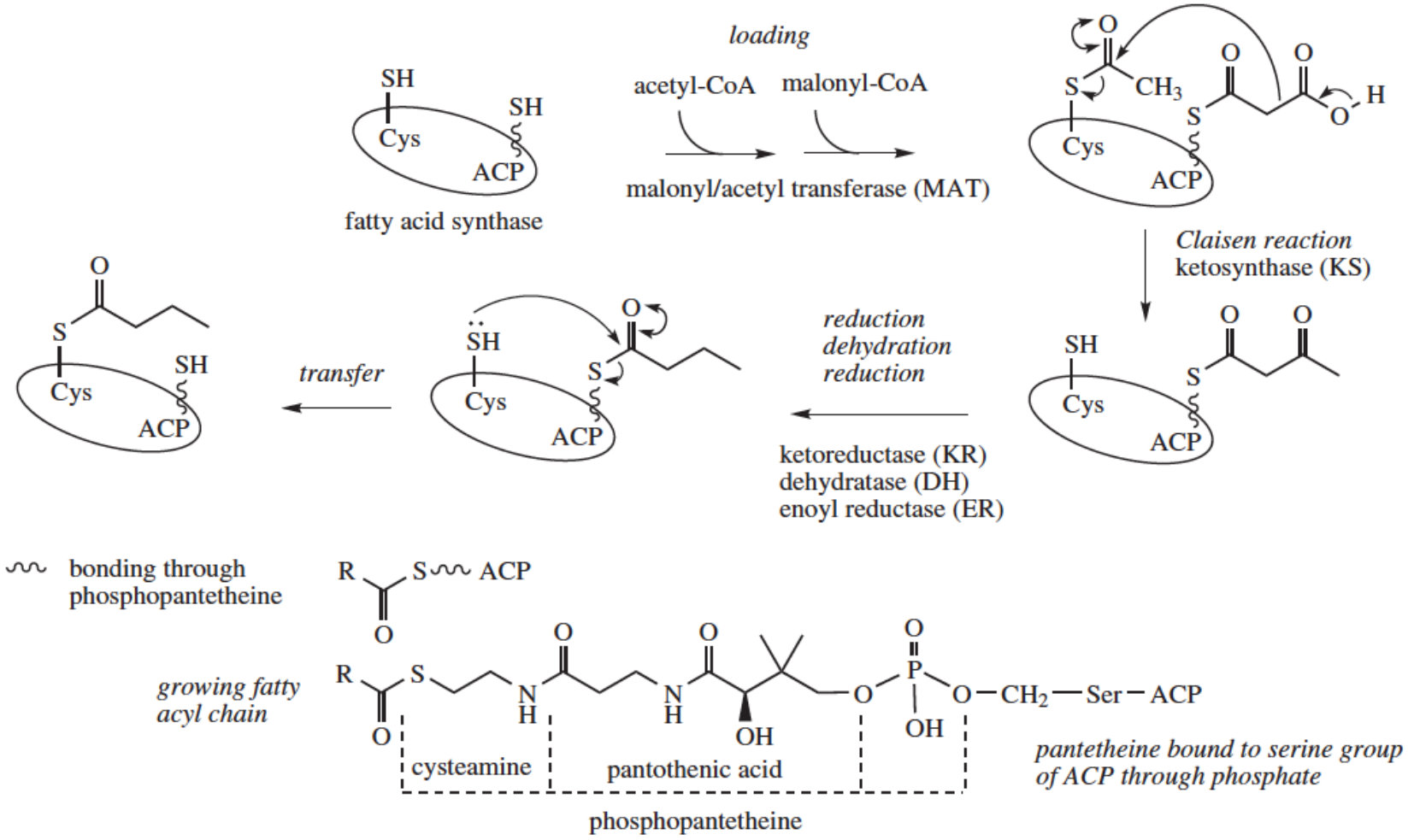
Biosintesi degli acidi grassi



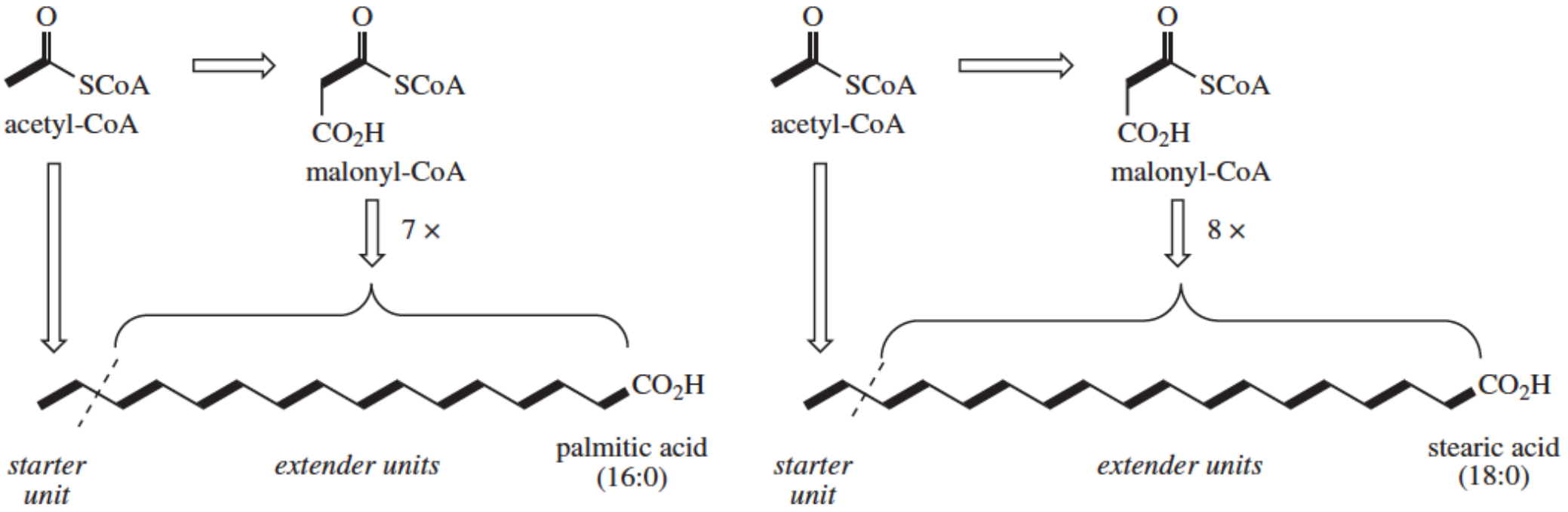
Enzyme activities of mammalian fatty acid synthase

E1: malonyl/acetyl transferase (MAT; malonyl-CoA/acetyl-CoA-ACP-transacylase)
E2: ketosynthase (KS; β-ketoacyl synthase)
E3: ketoreductase (KR; β-ketoacyl reductase)
E4: dehydratase (DH)
E5: enoyl reductase (ER; β-enoyl reductase)
E6: thioesterase (TE)

Biosintesi degli acidi grassi



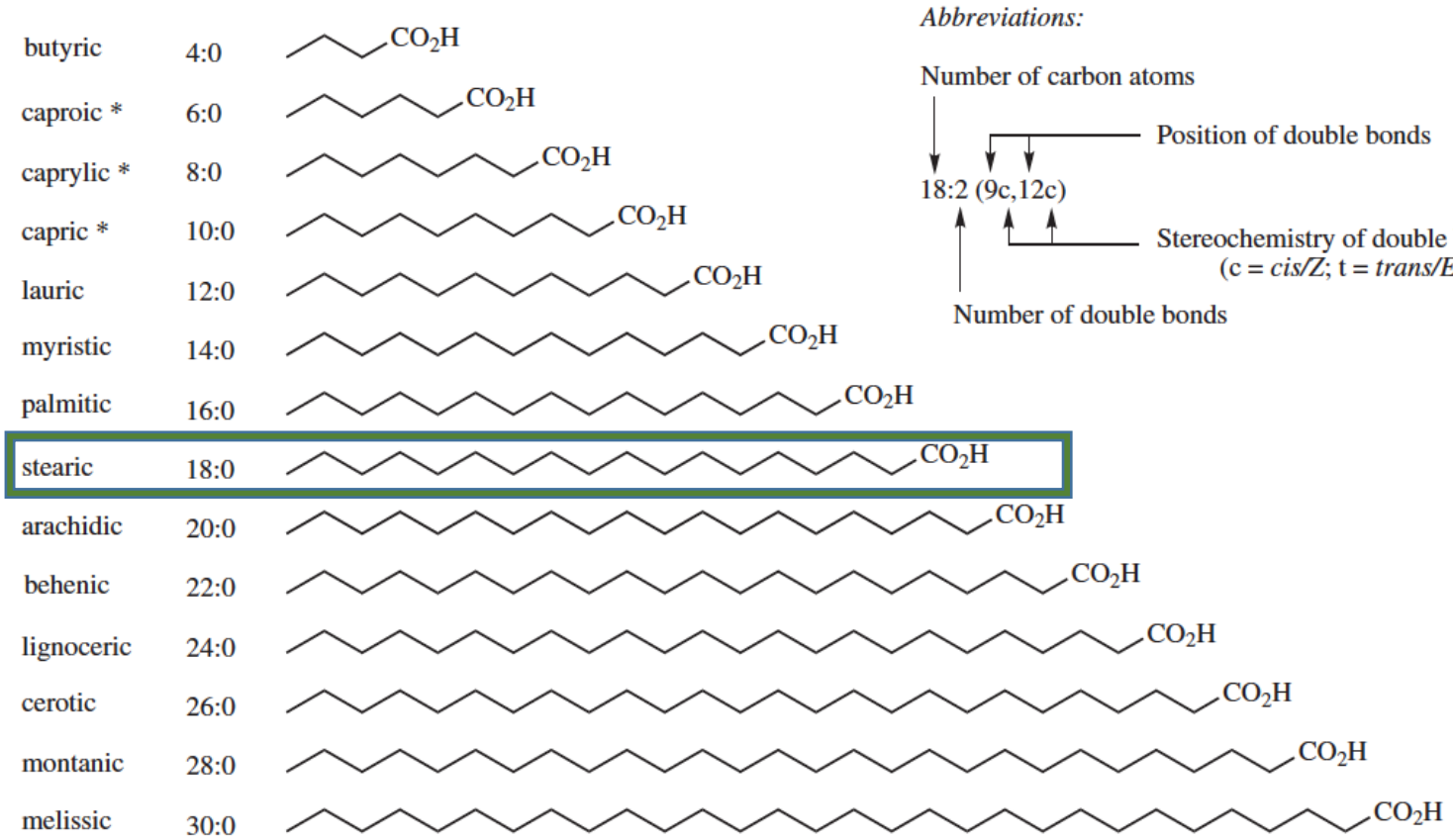
Biosintesi degli acidi grassi



Biosintesi degli acidi grassi

Common naturally occurring fatty acids

Saturated



Abbreviations:

Number of carbon atoms

Position of double bonds

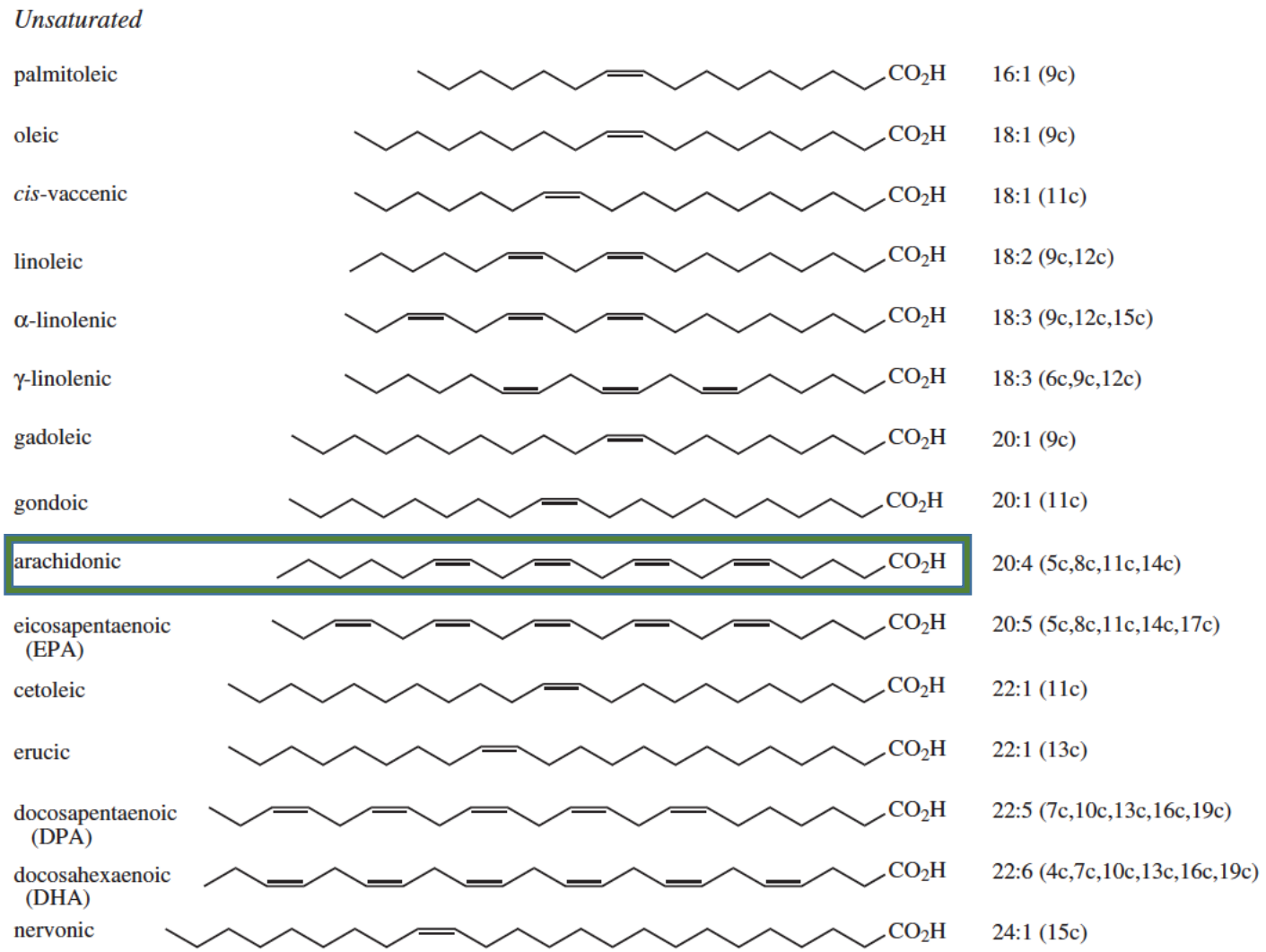
18:2 (9c,12c)

Stereochemistry of double bonds
(c = *cis/Z*; t = *trans/E*)

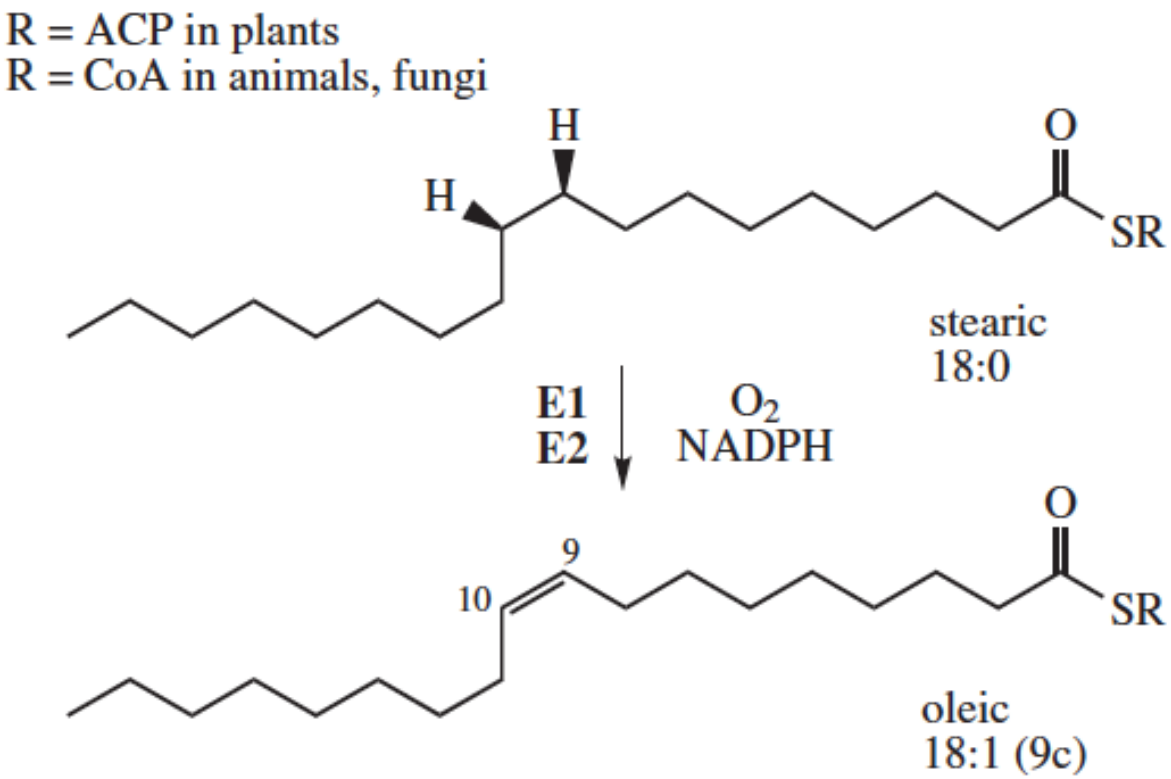
Number of double bonds

* To avoid confusion, systematic nomenclature (hexanoic, octanoic, decanoic) is recommended

Biosintesi degli acidi grassi

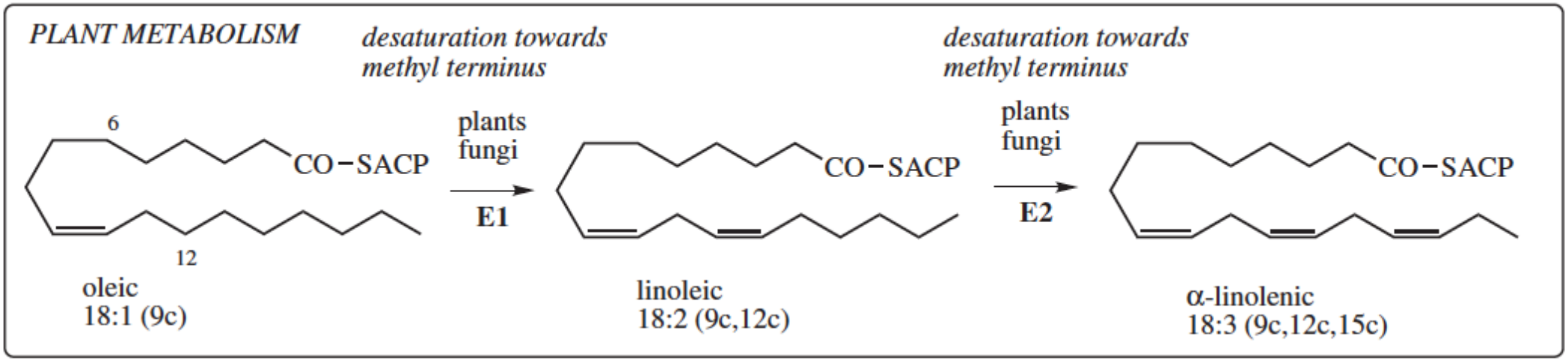


Biosintesi degli acidi grassi

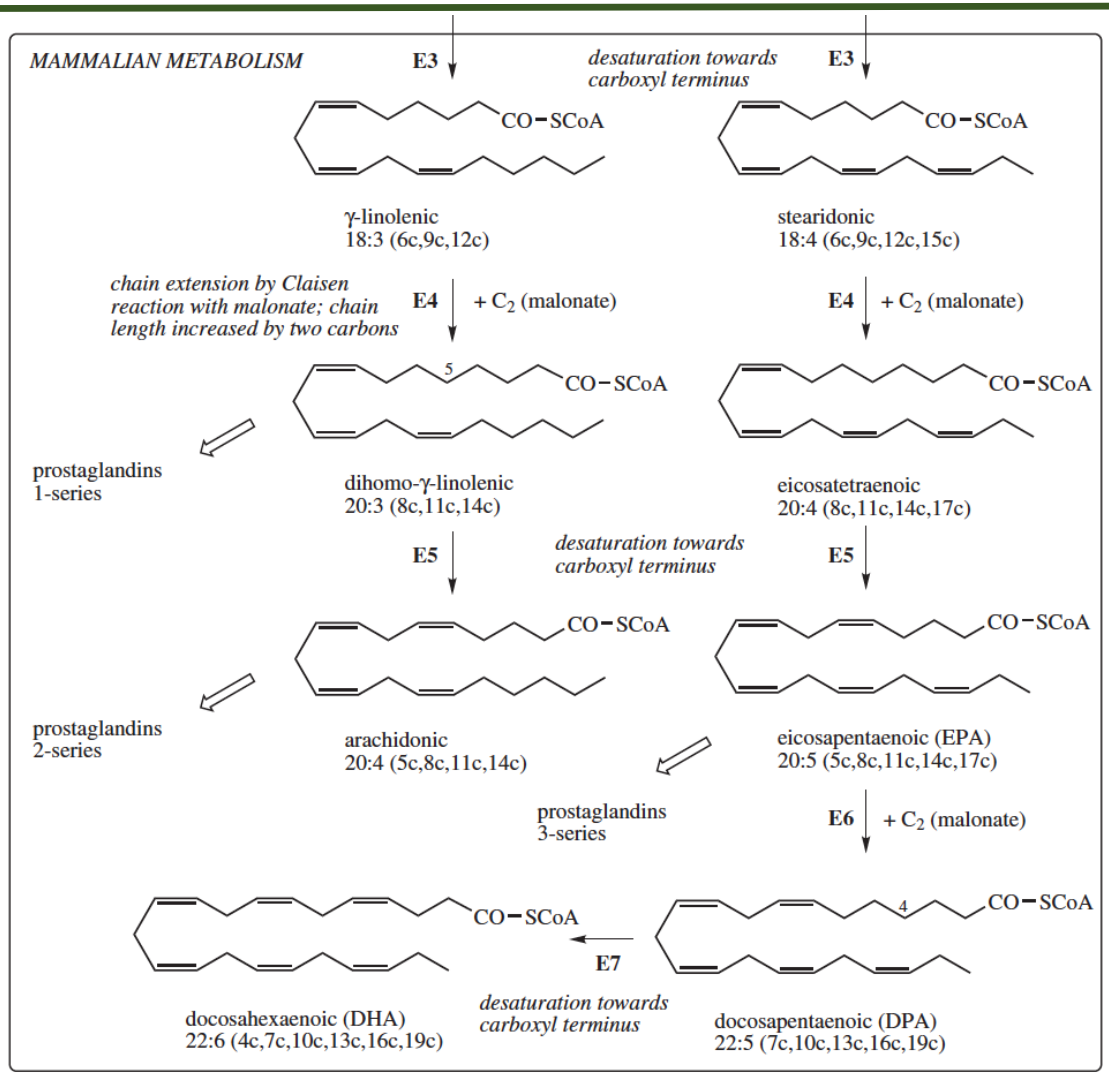


E1: stearoyl-ACP Δ^9-desaturase
E2: stearoyl-CoA Δ^9-desaturase

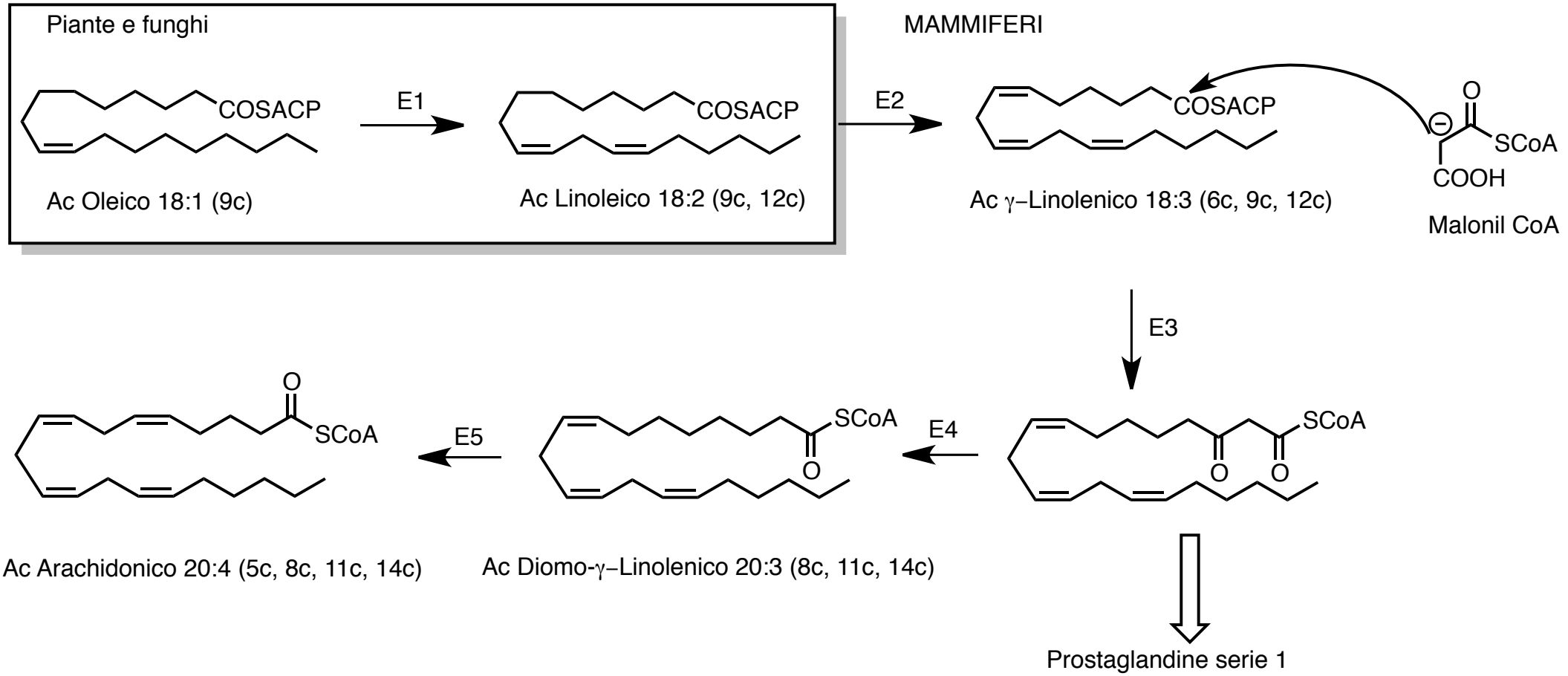
Biosintesi degli acidi grassi



Biosintesi degli acidi grassi

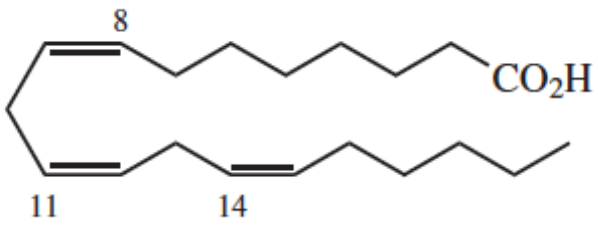


Biosintesi degli acidi grassi

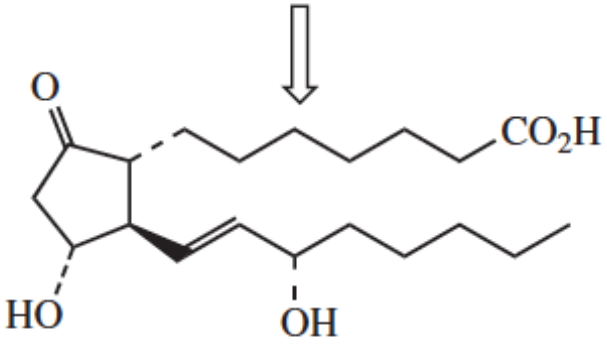


ENZIMI: E1 Δ^{12} Desaturasi; E2 Δ^{6} Desaturasi; E3 C_{18} Elongasi; E4 NADPH, Deidratasi, Reduttasi; E5 Δ^{5} Desaturasi.

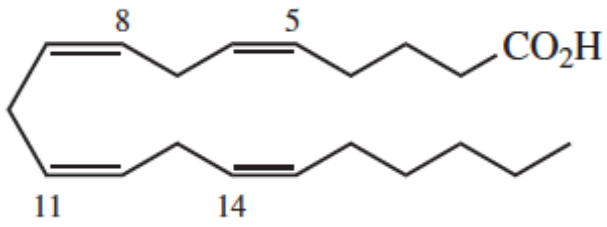
Biosintesi PROSTAGLANDINE SERIE 2



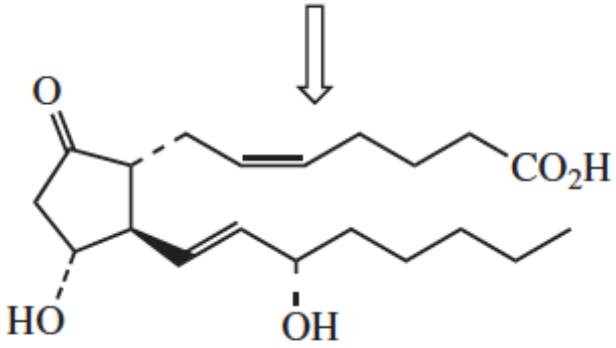
dihomo-γ-linolenic ($\Delta^{8,11,14}$)



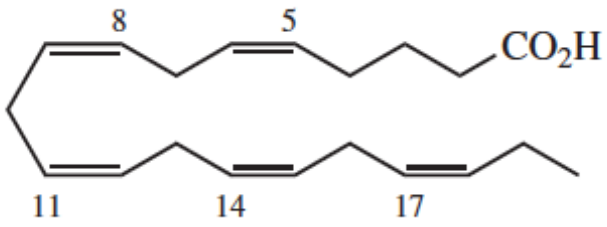
PGE_1



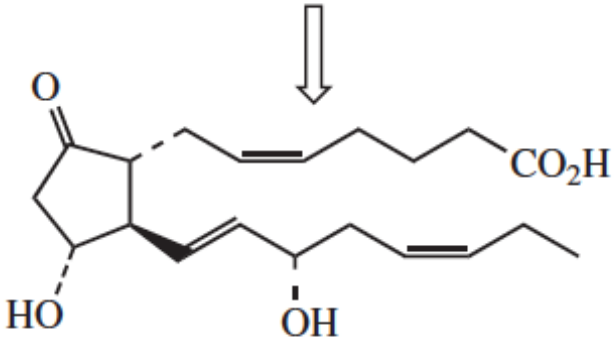
arachidonic ($\Delta^{5,8,11,14}$)



PGE_2

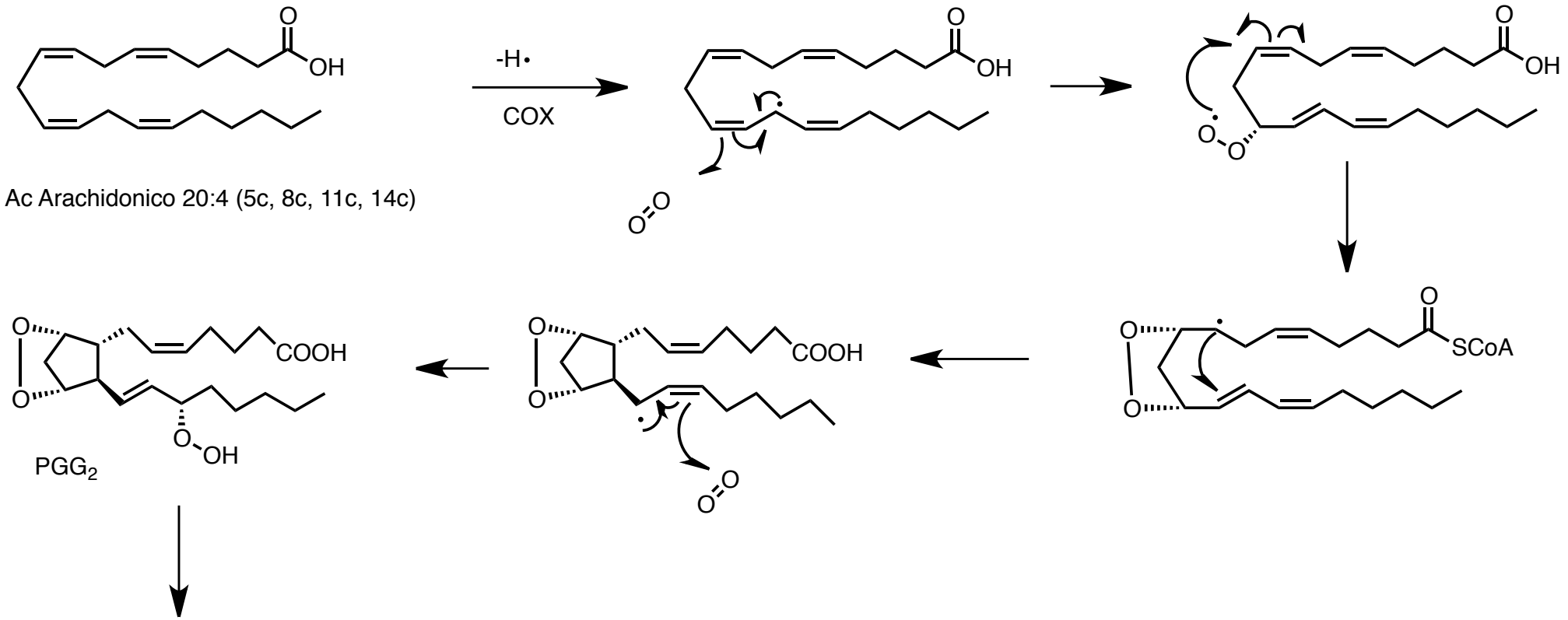


eicosapentaenoic ($\Delta^{5,8,11,14,17}$)

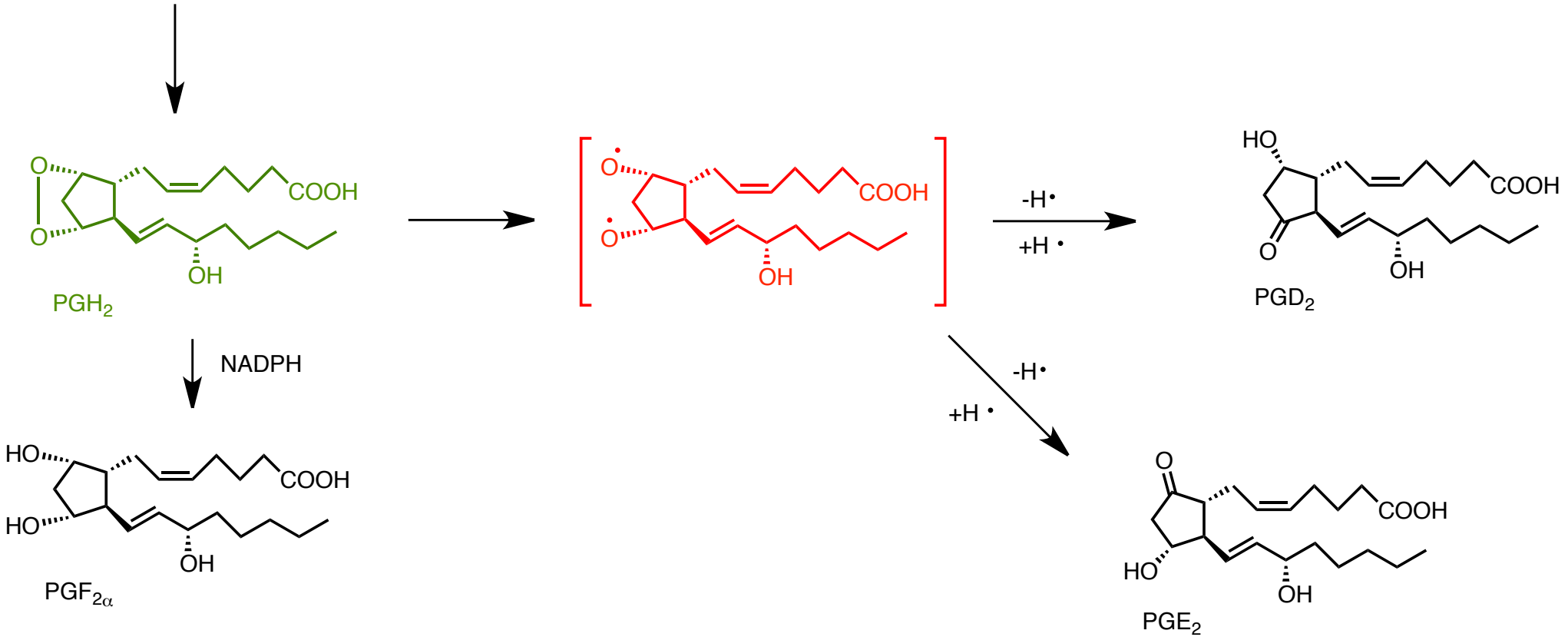


PGE_3

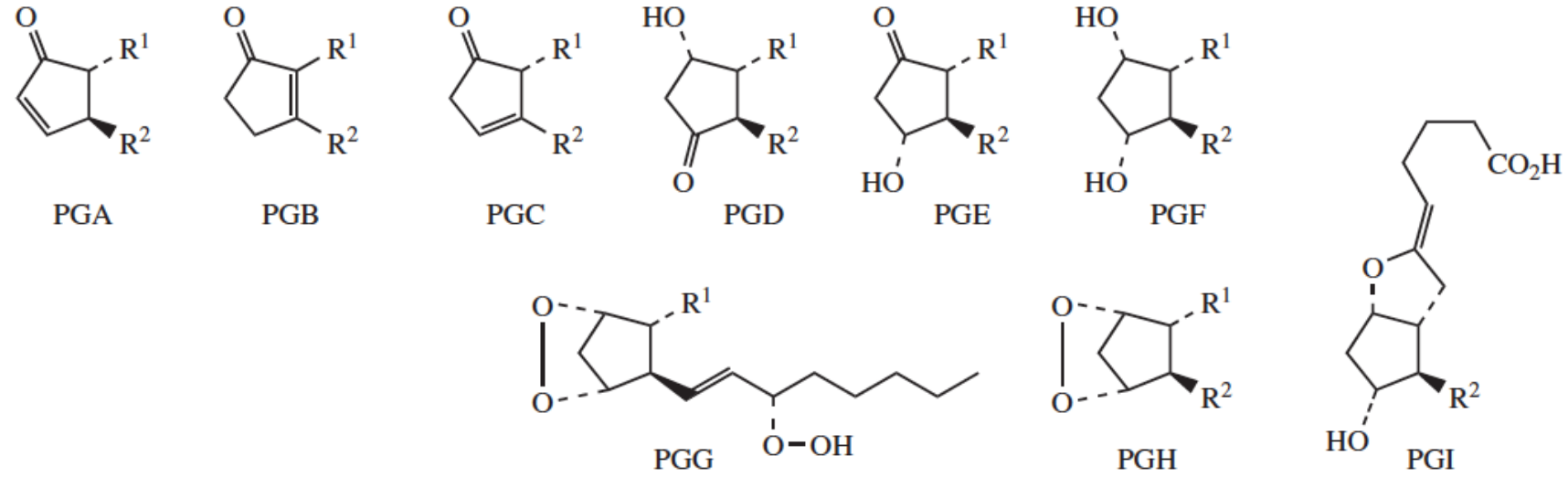
Biosintesi PROSTAGLANDINE SERIE 2

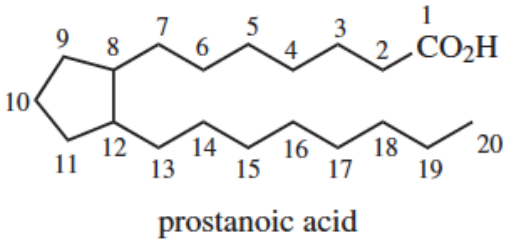


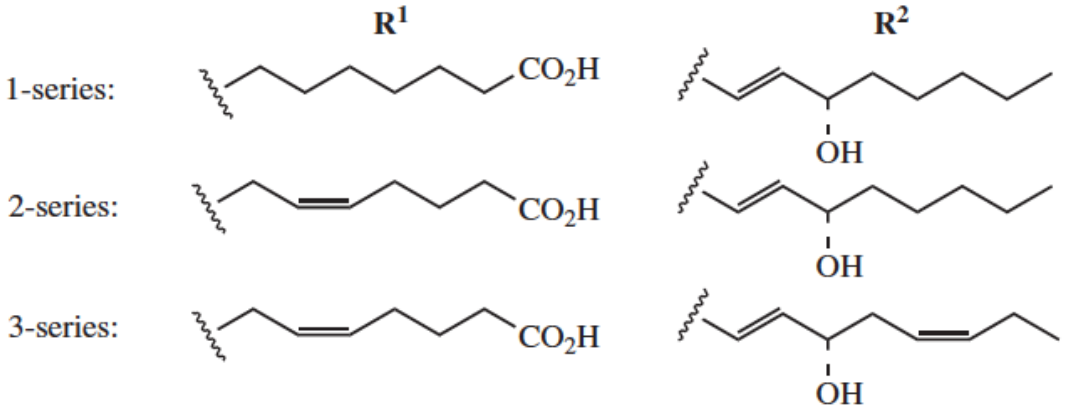
Biosintesi PROSTAGLANDINE SERIE 2



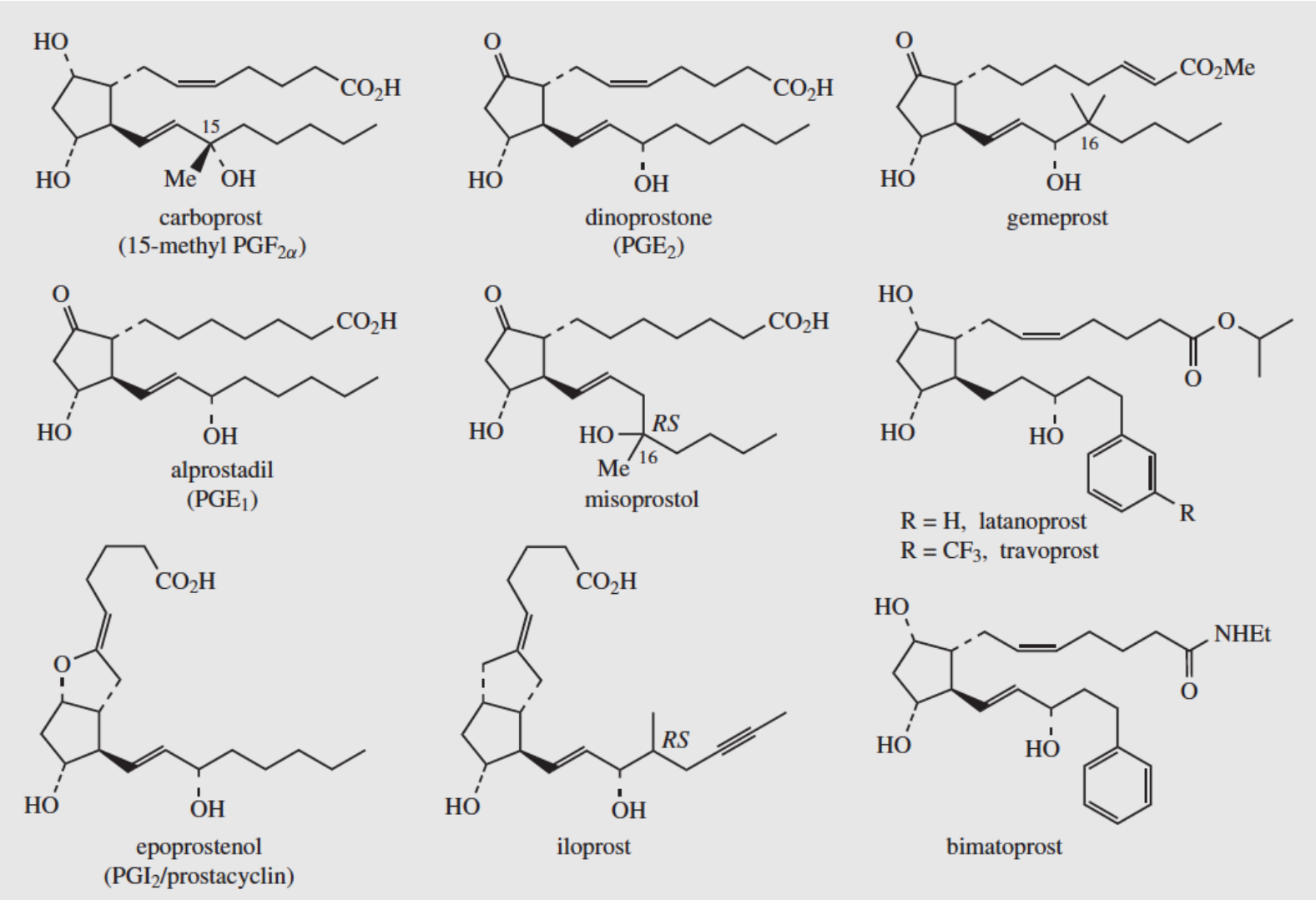
Biosintesi PROSTAGLANDINE SERIE 2



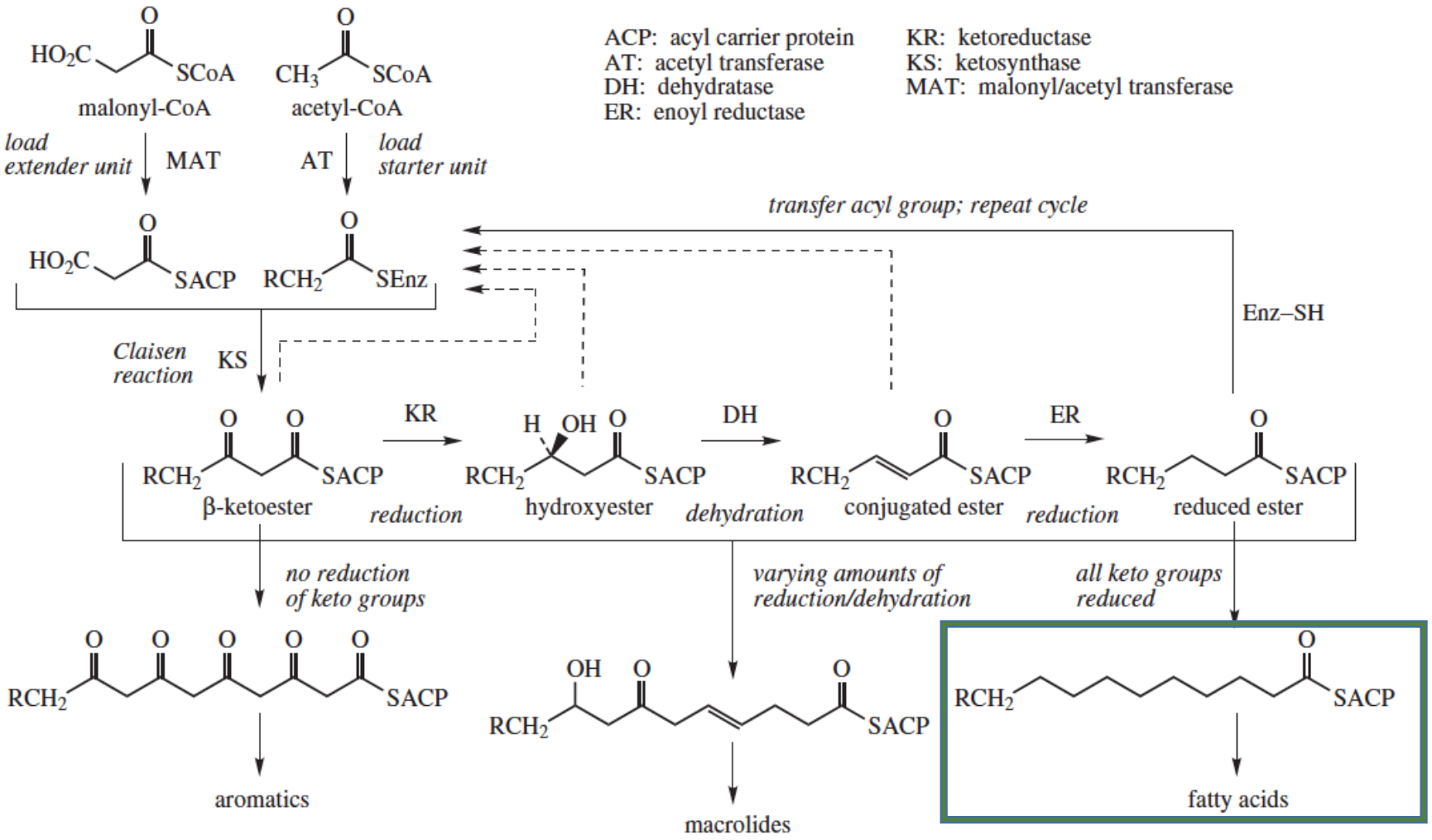




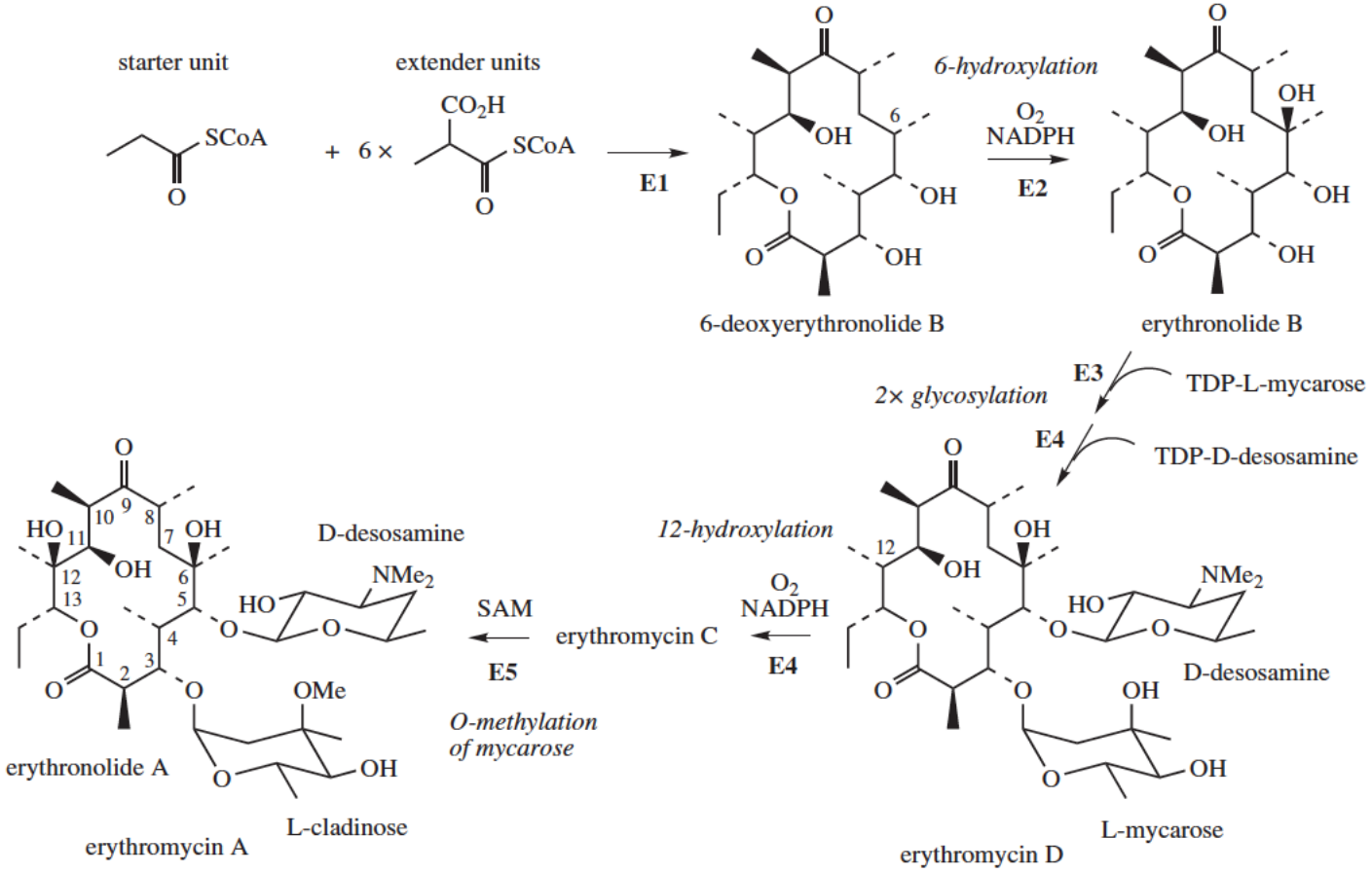
PROSTAGLANDINE in terapia



POLICHETIDI, MACROLIDI, ACIDI GRASSI

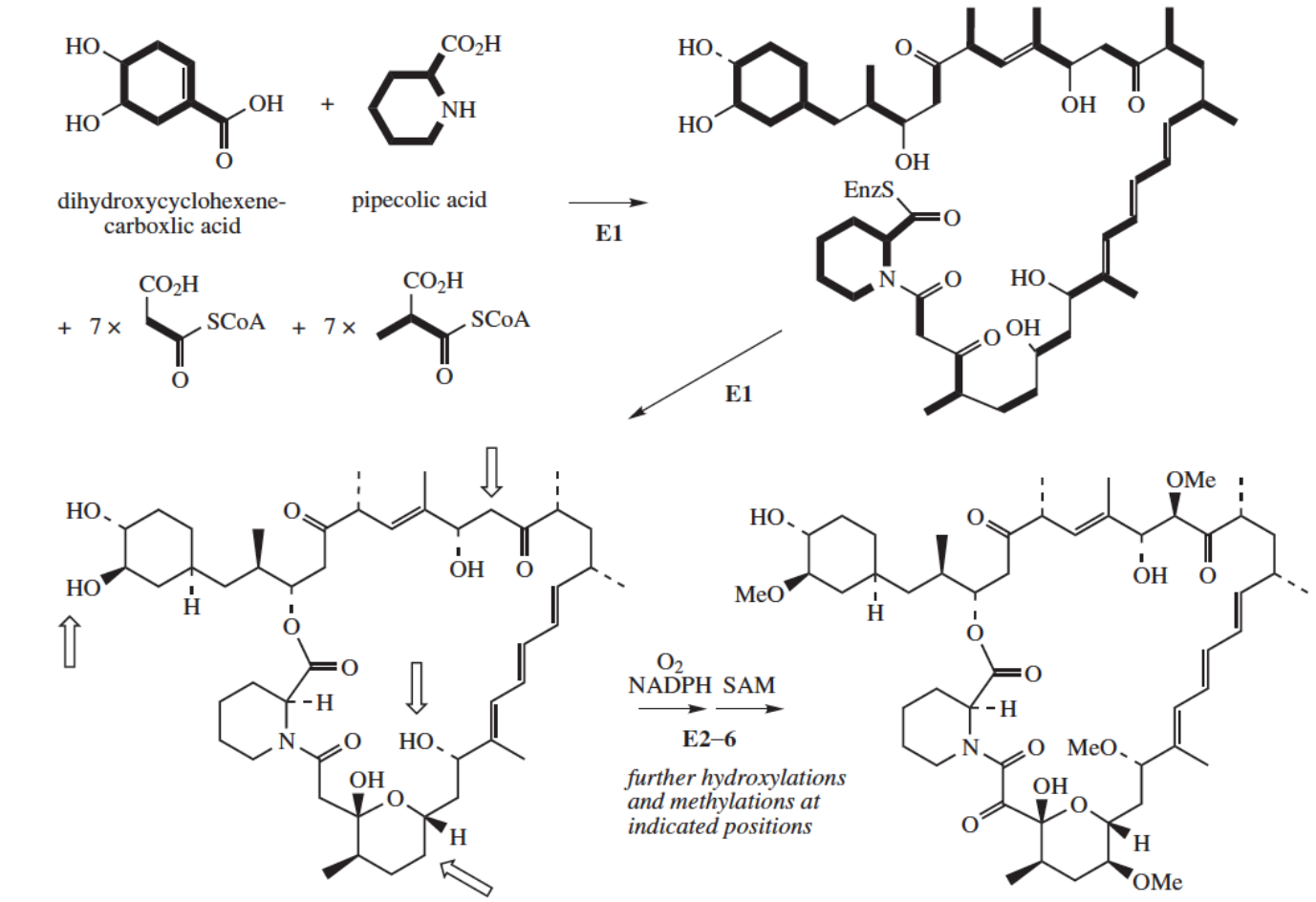


Biosintesi ERITROMICINA A



E1: EryA (6-deoxyerythronolide B synthase; DEBS)
E2: EryF (6-deoxyerythronolide B hydroxylase)
E3: EryBV (mycarosyl transferase)
E4: EryCIII (desosaminyl transferase)
E5: EryK (erythromycin 12-hydroxylase)
E6: EryG (methyltransferase)

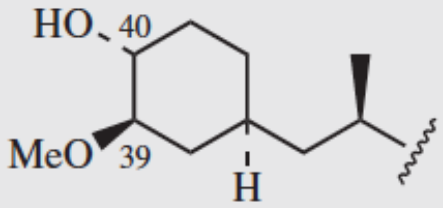
Biosintesi RAPAMICINA



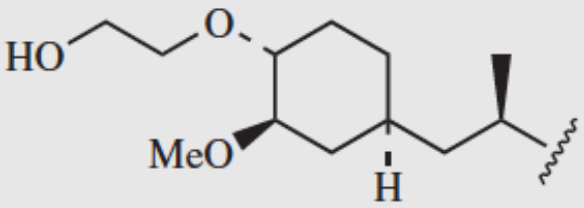
E1: rapamycin PKS (rapA–C, rapP)
E2, E3: rapJ, rapN (hydroxylases)
E4–6: rapI, rapM, rapQ (methyltransferases)

DERIVATI IN TERAPIA

rapamycin derivatives

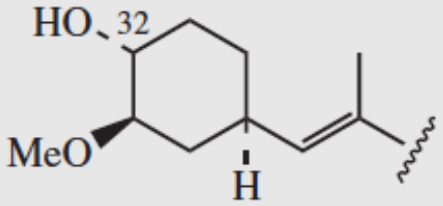


rapamycin
(sirolimus)

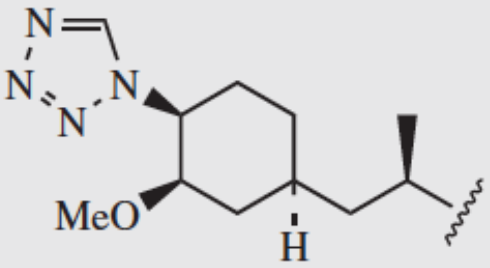


everolimus

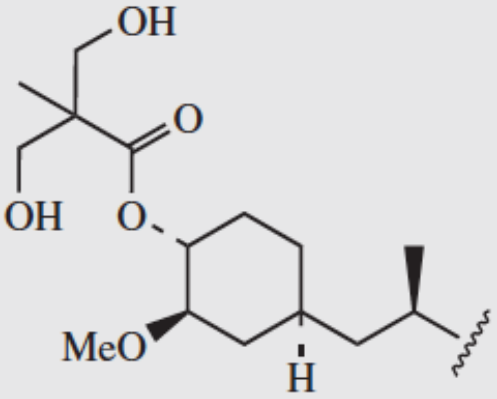
ascomycin derivatives



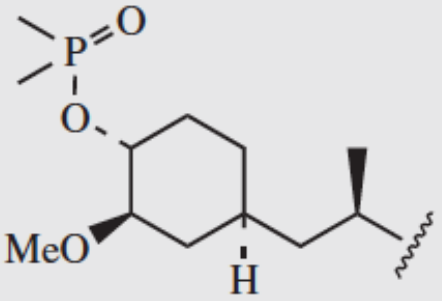
ascomycin



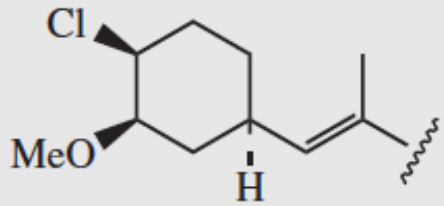
zotarolimus



temsirolimus

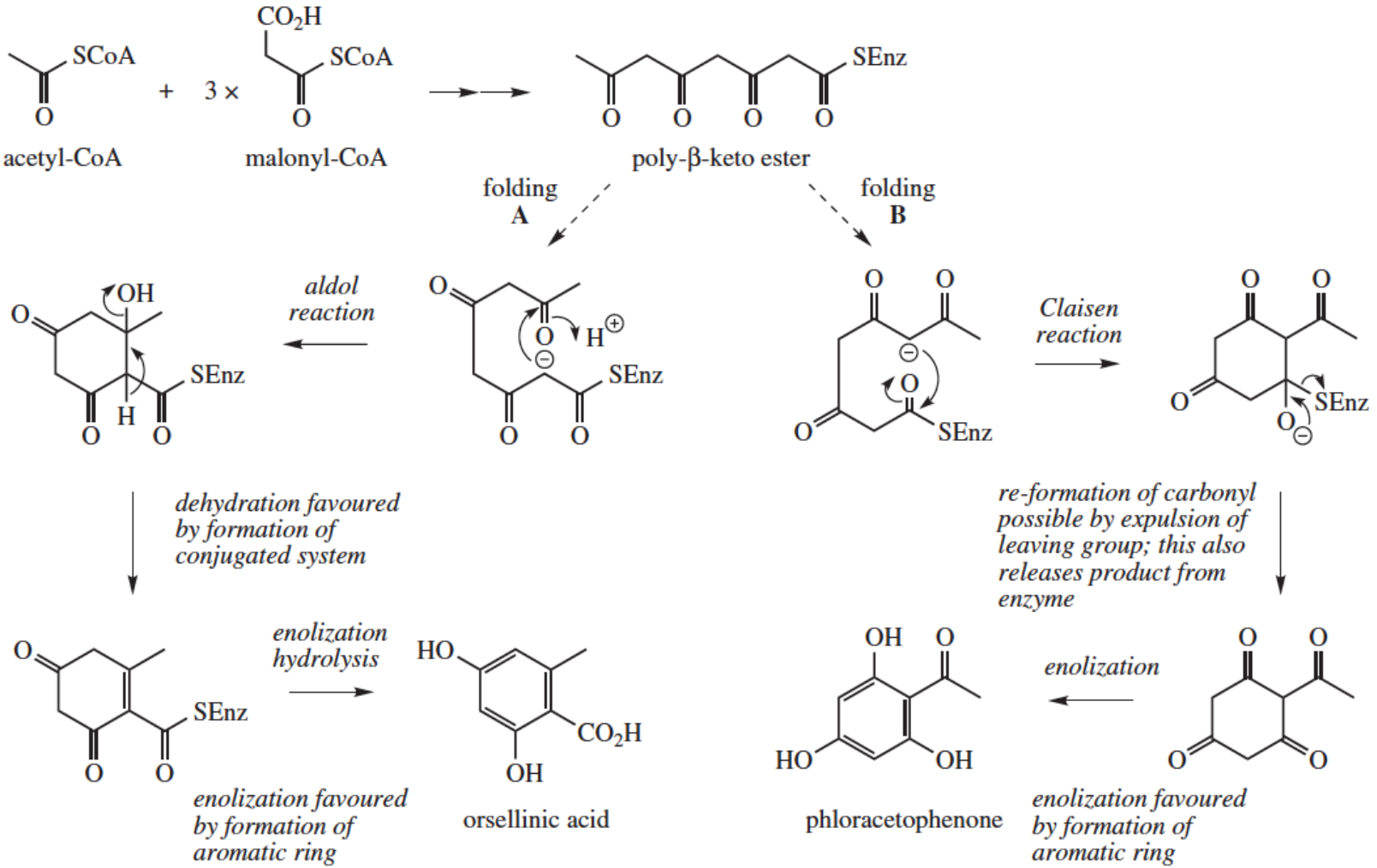


deforolimus

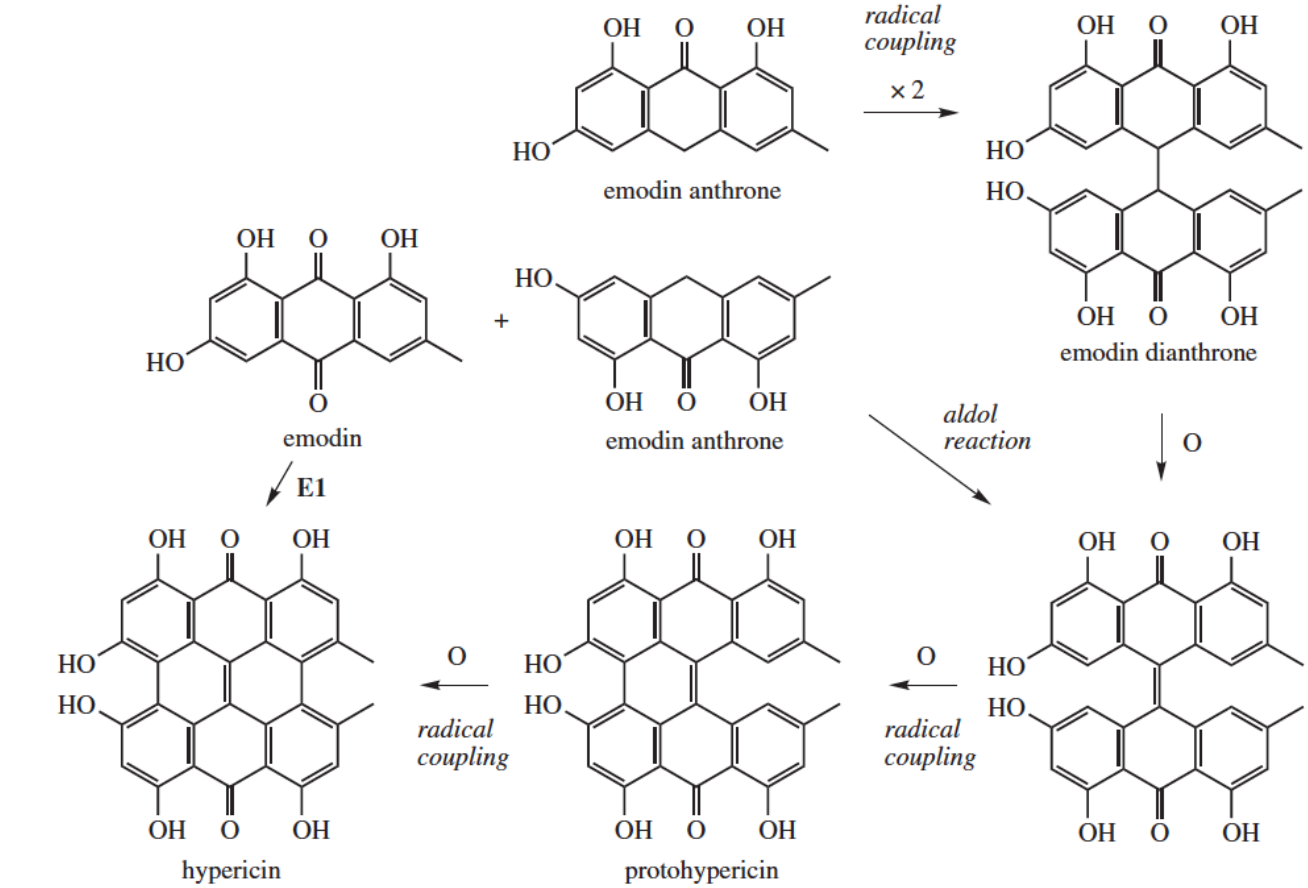


pimecrolimus

Biosintesi ACIDO ORSELLINICO E FLORACETOFENONE

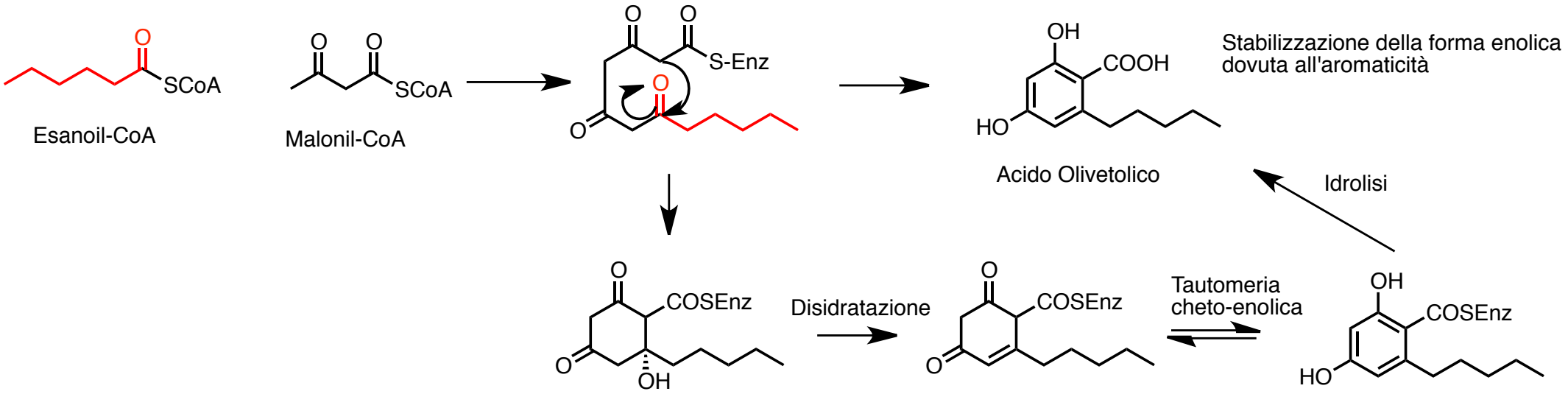


Biosintesi IPERICINA Erba di S. Giovanni (Iperico *Hipericum perforatum*)

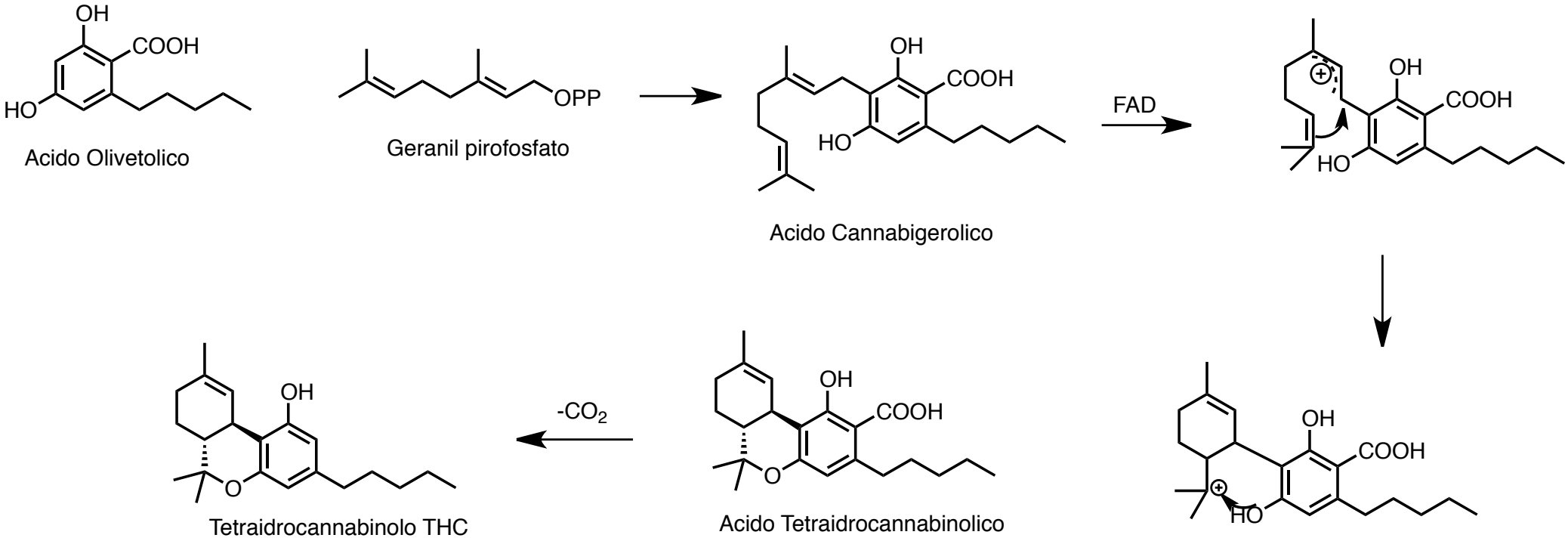


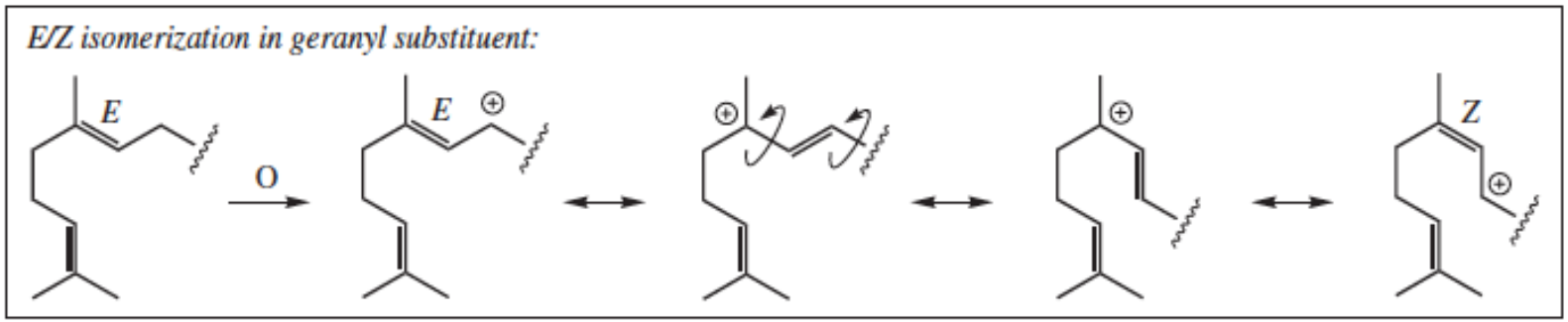
E1: Hyp-1
(emodin is substrate)

Biosintesi TETRAIDROCANNABINOLO

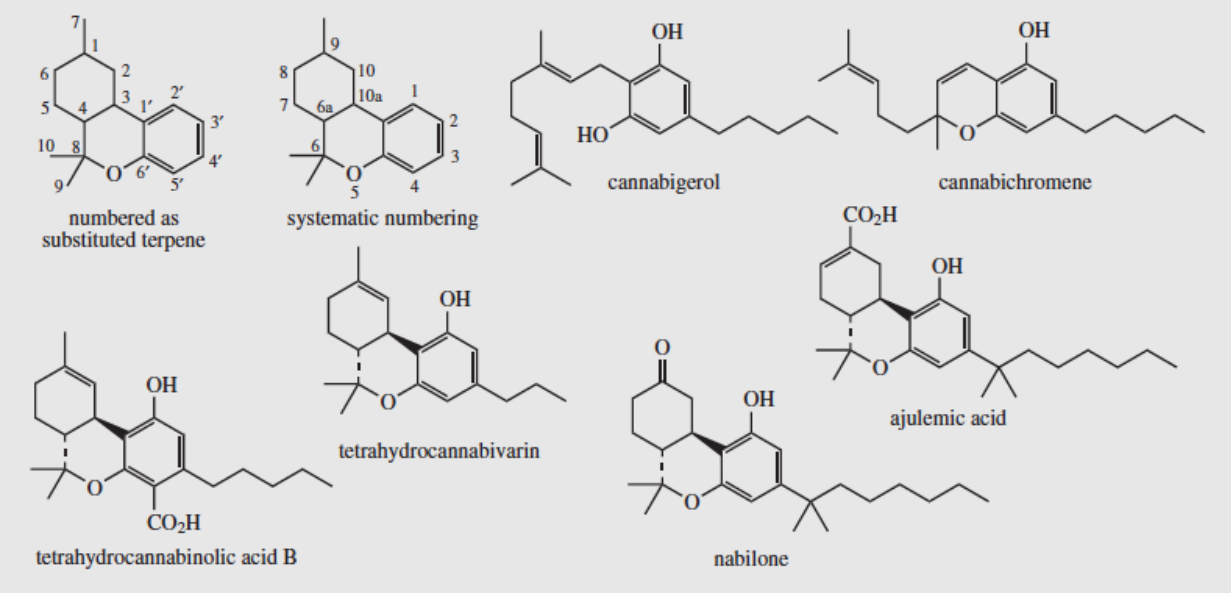


Biosintesi TETRAIDROCANNABINOLO



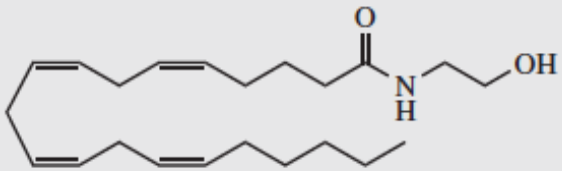


Biosintesi TETRAIDROCANNABINOLO

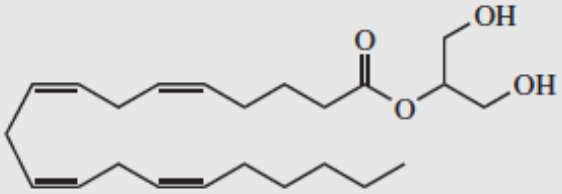


Biosintesi TETRAIDROCANNABINOLO

Two main cannabinoid receptors have been identified: CB_1, predominantly in the central nervous system, and CB_2, expressed mainly in the immune system. This was followed by discovery in animal brain tissue of a natural ligand for CB_1, namely anandamide (Figure 3.95), which is arachidonoylethanolamide; ananda is the Sanskrit word for bliss. Anandamide mimics several of the pharmacological properties of THC. The natural ligand of CB_2 is 2-arachidonoylglycerol (Figure 3.95); this also interacts with CB_1, and since levels of 2-arachidonoylglycerol in the brain are some 800 times higher than those of anandamide, it is now thought to be the physiological ligand for both receptors, rather than anandamide. These two compounds are the main ligands, but other related natural compounds from mammalian brain also function in the same way. These include polyunsaturated fatty acid ethanolamides, namely dihomo-γ-linolenoyl- (20:3) and adrenoyl- (22:4) ethanolamides, *O*-arachidonoylethanolamine (virodhamine) and 2-arachidonylglyceryl ether (noladin ether). The identification of these endogenous materials may open up other ways of exploiting some of the desirable pharmacological features of cannabis.



anandamide
(arachidonoylethanolamide)



2-arachidonoylglycerol