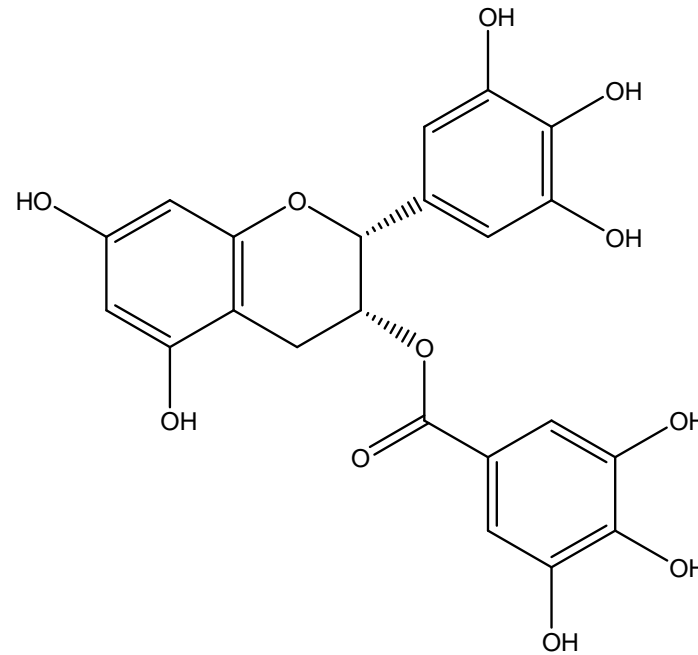


## Polyphenolic Antioxidants

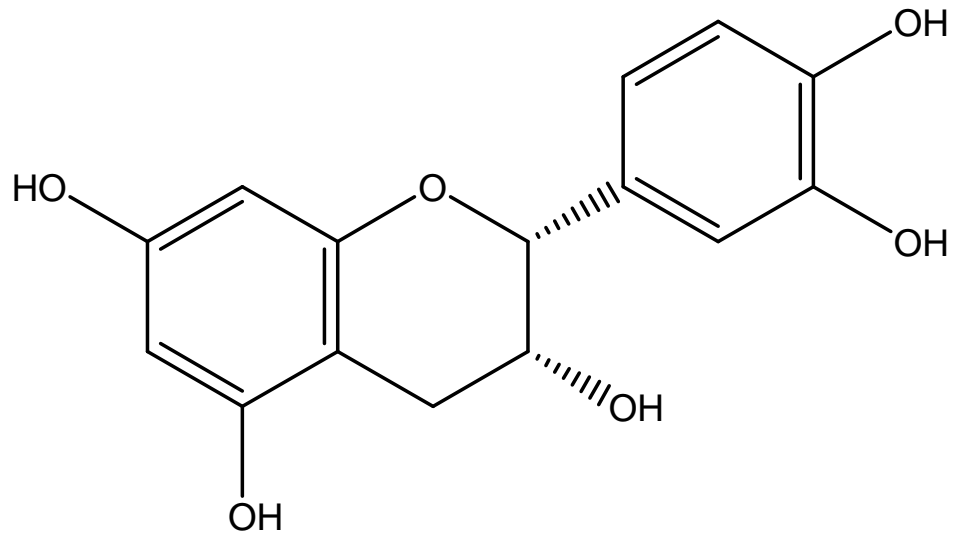
- Flavonoids, tannins and lignins
- Found in high levels in fruit skin
- Act as antioxidants through free radical scavenging and metal chelation

## Epigallocatechin-3-gallate (EGCG)

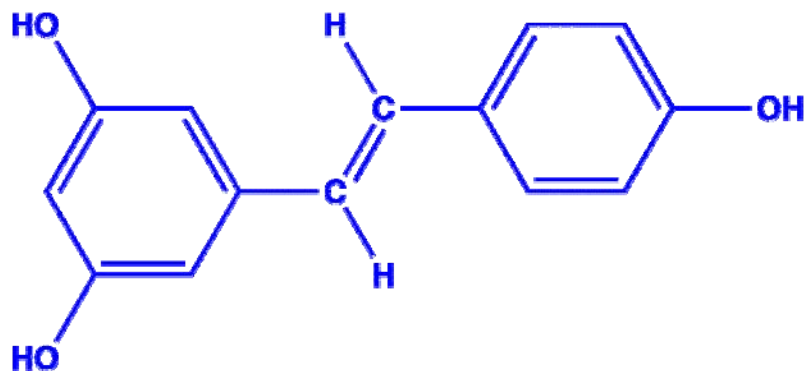


EGCG regulates expression of VEGF, matrix metalloproteinases, uPA, IGF-1, EGFR, cell cycle regulatory proteins and inhibits NFκ B, PI3-K/Akt, Ras/Raf/MAPK and AP-1 signaling pathways, thereby causing strong cancer chemopreventive effects.

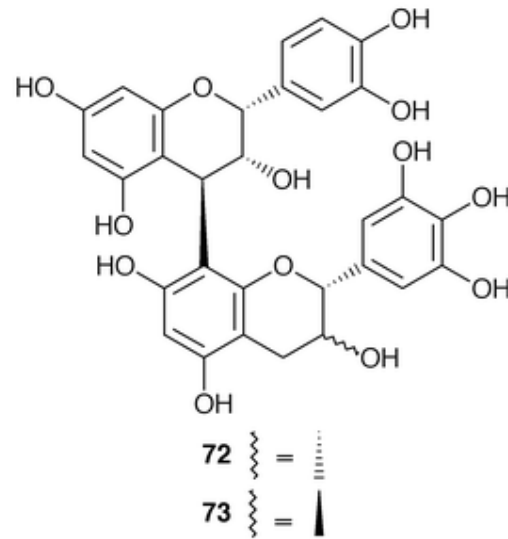
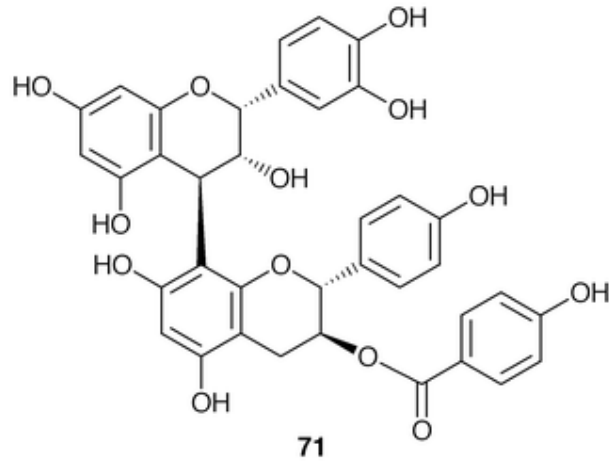
# Epicatechin (EC)



# Resveratrol (3,5,4'-trihydroxyl-trans-stilbene)

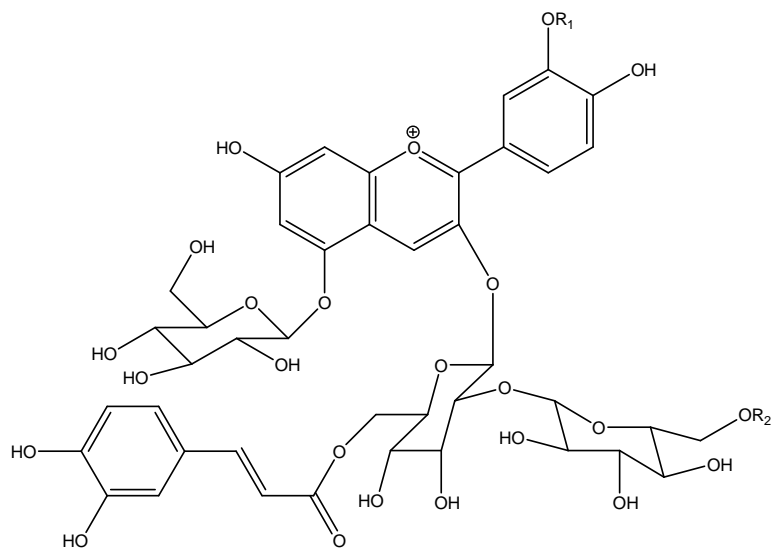


# Procyanidins

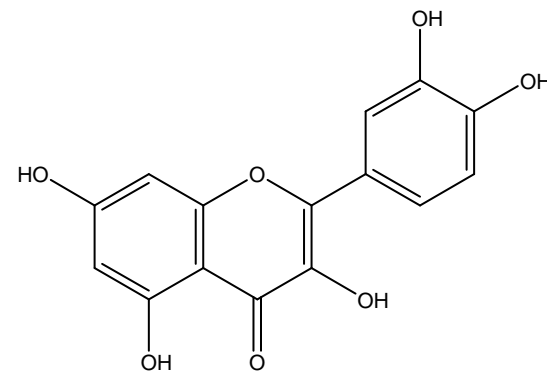


# Flavonoid Polyphenols

## Anthocyanins



## Quercetin



## **Cyclooxygenases (COX) - Most common drug target today**

- Enzymes that “oxygenate” fatty acids to give prostanoid and eicosanoid pro-inflammatory “hormones”
- COX-1a/b (splice variants, constitutive) and COX-2 (inducible, low levels in normal tissue) - differ in a single hydrophobic residue (Isoleucine vs. valine) in their active sites.
- Both catalyze the same chemical reaction but are products of different genes and differently regulated.
- Targeted by Non-Steroidal Anti-Inflammatory drugs (NSAIDs)- eg. Aspirin, Ibuprofen.
- Non-NSAIDs (acetaminophan) usually target Cox-1b

## **“Antioxidant capacity” Assays**

- **ORAC** - Oxygen Radical Absorbance Capacity (measures oxidative degradation of fluorescein ie. reduction in fluorescence through reaction with peroxy radicals; uses trolox as standard control).
- **FRAP** - Ferric Reducing Antioxidant Power (relies on the conversion of ferric ions to ferrous ions at low pH, leading to formation of a colored complex (ferrous tripyridyltriazine). This assay does not measure thiols).
- **TOSC** - Total Oxyradical Scavenging Capacity (measures formation of ethylene gas during the reaction of ROS with keto-methylbutrioc acid (KMBA) which is detected by gas chromatography).