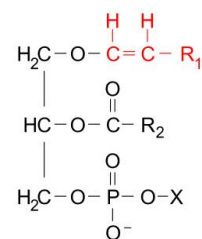
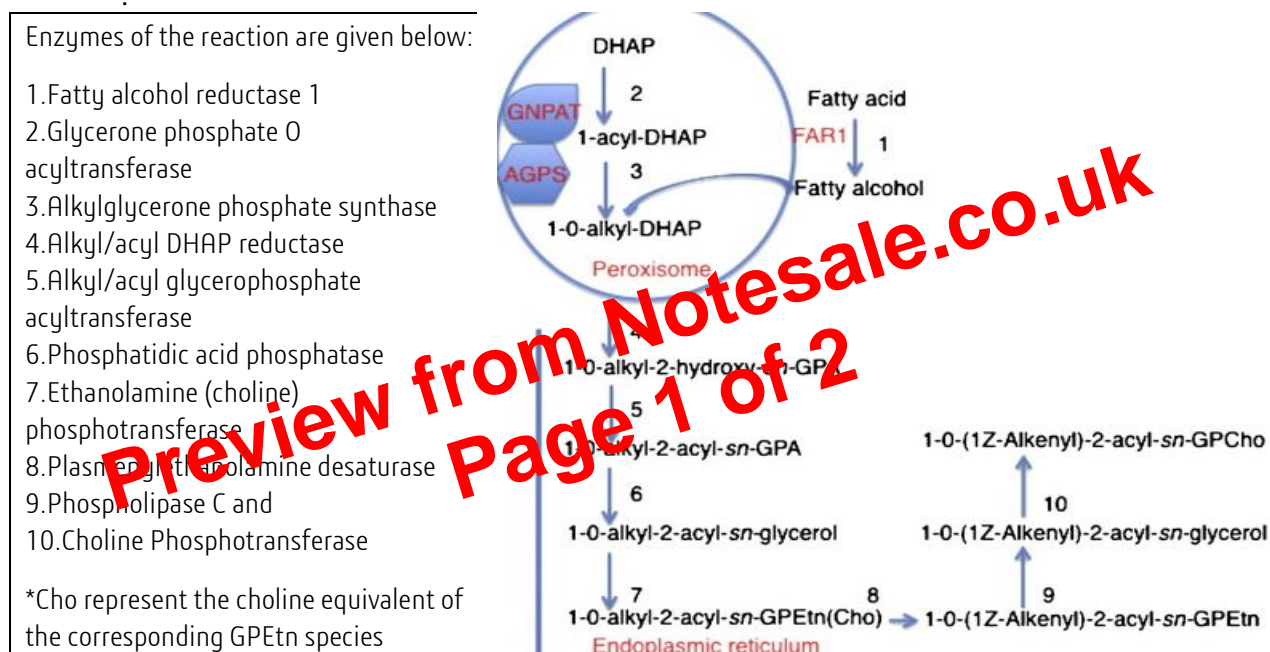


## Plasmalogen

Plasmalogens are a kind of ether phospholipid with a vinyl ether group at the sn-1 position and an ester at the sn-2 position. In mammals, the vinyl ether is mainly derived from saturated C16 (C16:0) or saturated and mono-unsaturated C18 (C18:0, C18:1) fatty alcohols. And the ester gets occupied by polyunsaturated fatty acids (PUFAs). Chemically it is known as 1-0-(1Z-alkenyl)-2-acetyl-sn-GPCho. X denotes for a polar group. Ethanolamine or choline are the most abundant of all Plasmalogen.



- **Distribution of Plasmalogen in our body:** ~15-20% of membrane phospholipid are made of Plasmalogen. It is highly present in brain, heart, muscle, neutrophils and eosinophils. They are highly concentrated in specialized membranes like sarcolemma and myelin, and in secreted membranes like synaptic vesicles, secretory granules etc. Liver contains the lowest amount of Plasmalogen in it.
- **Plasmalogen Biosynthesis:** The biosynthesis process for Plasmalogen is shown here in the chart



- **Regulation:** Formation of fatty alcohol from fatty acid by FAR1 is the rate limiting step which is negatively controlled by a feedback loop in presence of high amount of Plasmalogen by inducing degradation of FAR1 protein. But how Plasmalogen goes to cytoplasm from ER is not known yet.
- **Transportation:** Membrane lipid are transported to organelles and plasma membrane via vesicular transport pathways involving Golgi and other endosomal organelles, or non-vesicular transport pathways using lipid transporter proteins. The non-vesicular pathways depend on availability of ATP and the distance it needs to travel.
- **Biological roles of Plasmalogens:**
  1. **Structural integrity:** It was found that during formation of lipid raft, the amount of Plasmalogen increases ~30% than normal plasma membrane which helps in cell signaling, cell-cell interaction, endocytosis and exocytosis. Also, it helps in decreasing fluidity of membrane.
  2. **Oxidative potential:** Due to low dissociation energy of the hydrogen adjacent to the vinyl ether, it can be easily oxidized in exposure to free radical and ROS and thus it may terminate further lipid oxidation.
  3. **Reservoirs for second messengers:** As Plasmalogens are enriched in AA and DHA, they may function as reservoirs for a second messenger released by PLA2 hydrolysis.