Structure of the Endoplasmic Reticulum endoplasmic reticulum network of interconnected membranes Figure 1: ER morphology – diagram: the endoplasmic reticulum is shown as a complex interconnected membrane system.For metabolism and detoxification of drugs, toxins, and carcinogens, the lumen will likely contain enzymes such as cytochrome P450s (CYPs) When engaged in calcium ion regulation, calcium ions are stored in the lumen of the endoplasmic reticulum (specifically referred to as the sarcoplasmic reticulum)However, unlike the nucleus, chloroplasts, and mitochondria which have two lipid bilayer membranes (resulting in distinct outer and inner membranes), the endoplasmic reticulum has only one lipid bilayer membrane, similar to the plasma membrane.Nevertheless, the luminal contents vary depending on what is being synthesized (protein or lipid) or carried out (e.g., whether calcium ion regulation or drug/toxin detoxification).For lipid syntheses, such as phospholipids (membrane lipids), phosphatidylcholine, and phosphatidylethanolamine, the lumen will likely contain greater amounts of enzymes involved in the synthesis of such lipids.Similar to other biological membranes, the membrane of the endoplasmic reticulum is a lipid bilayer, which means it has two layers of phospholipids, with various membrane proteins and carbohydrates.When engaged in protein synthesis, the lumen will contain enzymes and chaperone proteins for protein folding, modifications, and initial stages of transport.Image Credit: OpenStax.