Effects of Cabbage Phospholipase D on the Lipids and Enzyme Activities of Rat Liver Microsomal Fraction

By C. L. Kapoor, Rajendra Prasad and N. K. Garg (Division of Biochemistry, Central Drug Research Institute, Lucknow, India)

Phospholipase A cleaves fatty acid chains and phospholipase C removes polar groups (phosphorylcholine, phosphorylethanolamine and phosphorylsersine) from membrane phospholipids. The activities of certain membrane-bound enzymes of isolated mitochondrial and microsomal membranes are profoundly affected under the action of these phospholipases in vitro (Awasthi et al., 1969; Poulter et al., 1971). The specificity of the action of phospholipase is now beginning to prove useful in obtaining and understanding the role of polar and non-polar regions of phospholipid molecules in the maintenance of structure and function in biological membranes.

Phospholipase D specifically removes only bases from isolated phospholipids (Kates, 1965; Davidson & Long, 1958; Talwalkar et al., 1969) and also mediates transphosphatidylation in the presence of choline, ethanolamine, serine, glycerol etc. (Yang et al., 1966). Its action on biological membranes does not seem to have been adequately studied.

The action of partially purified phospholipase D of savoy cabbage on rat liver microsomal fraction has been studied. Evidence is presented for the degradation of membrane phospholipids with concomitant loss of glucose 6-phosphatase and adenosine triphosphatase activities in phospholipase D-treated microsomal fraction and release of phospholipid bases, cholesterol, uncharacterized lipid and protein (including glucose 6-phosphatase and adenosine triphosphatase) into the medium. The results obtained indicate a role for phospholipid bases in the binding of membrane cholesterol and protein.
