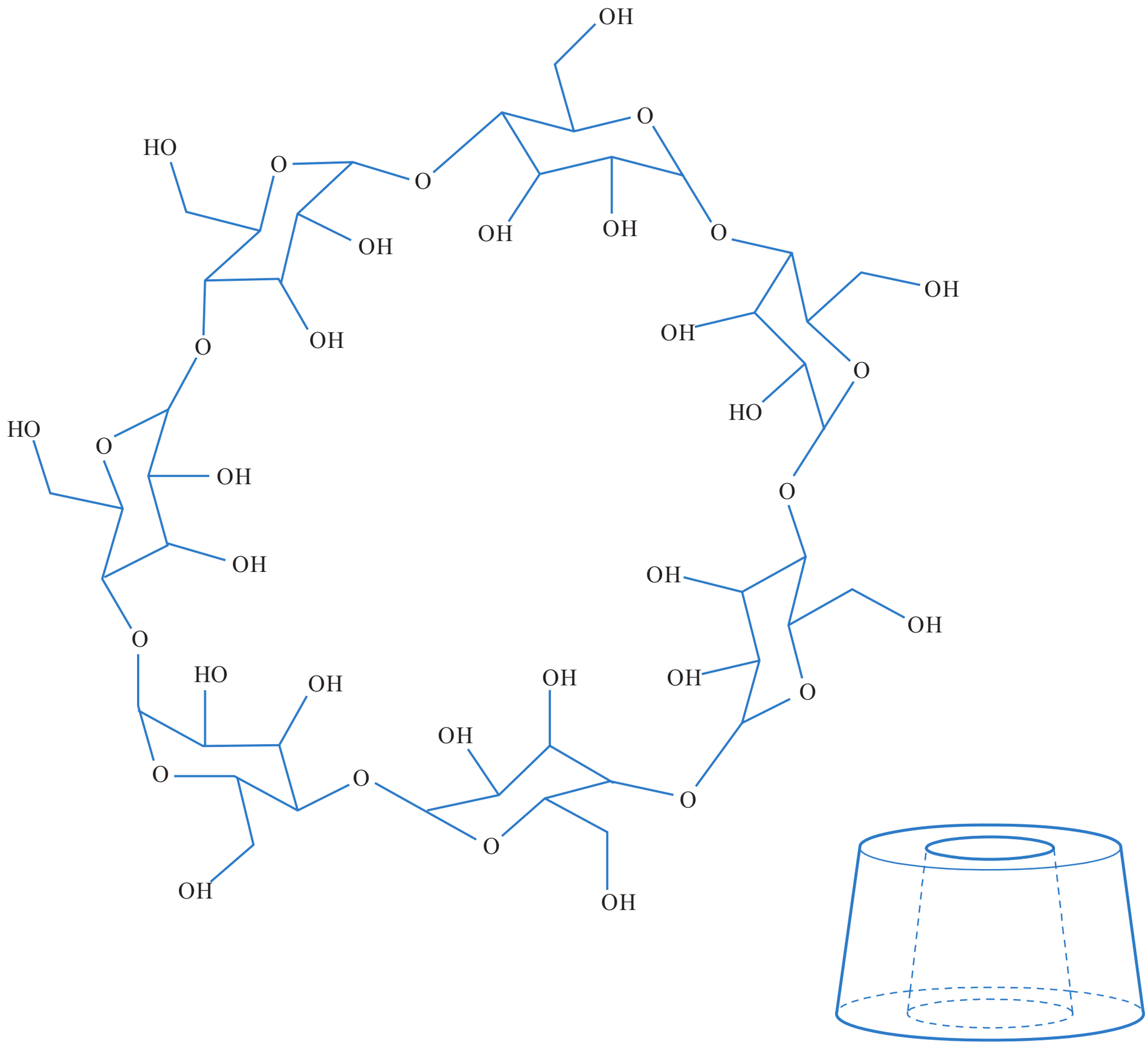

Fig. 24.1 • The structure of a cyclodextrin molecule. The sketch shows both the chemical structure and the three-dimensional physical structure. The inside surface of the structure is hydrophobic while the exterior is hydrophilic.

Each cyclodextrin molecule can form complexes with one or more drug molecules. Drug-CD complexes can also self-associate, and the water-soluble structures formed can further solubilize the drug through non-inclusion complexation.

Upon administration, for example orally, of a solution containing a drug-CD complex, the drug can be released from the CD molecule and the free drug can then be absorbed through the gastrointestinal tract.

Surfactants and micelles

As described in Chapter 5, surfactants (surface-active agents) and amphiphiles are molecules which have two distinct regions in their chemical structure. One region is hydrophilic and the other hydrophobic. Because of this, such molecules tend to accumulate at the boundary between two phases, such as water-air or water-oil interfaces. They reduce the surface tension of liquids, and self-assemble to form micelles once the critical micellar concentration (CMC) is reached. Poorly water-soluble drugs can be solubilized in micelles to enhance their aqueous solubility. The location of the solubilisate (the drug which is solubilized within the micelles) depends on its nature: non-polar solubilisates being located within the micelles' hydrophobic interior cores, solubilisates containing polar groups are oriented with the polar group at the micellar surface, while slightly polar solubilisate partition between the