triacylglycerols, and free fatty acids on a per organism basis for various larval stages. They found a significant reduction in the quantity of free sterols and free fatty acids in the encysted metacercarial stage compared to the cercarial stage, suggesting that these neutral lipids are used in some way during transformation from cercaria to metacercaria. Cline et al. (181) used HPTLC to study neutral lipids and phospholipids in the economically important marine intertidal snail *Cerithidea californica* infected with three species of larval trematodes. Infection altered the lipid patterns of the snail host; TLC analysis of lipids can be useful in chemotaxonomic studies of snails infected with different species of larval trematodes.

Sphingolipids are implicated in various cellular events such as growth, differentiation, and apoptosis. Bodennec et al. (182) described a procedure to fractionate sphingolipid classes from fish gills and human melanoma tissue by solid-phase extraction (SPE) on aminopropyl cartridges. Individual lipids in the SPE fractions were then identified by chromatography in several TLC systems.

Fried (183) provided a brief but concise review of TLC of lipids. It contained four line drawings of typical TLC separations, eight essential tables related to salient features of the topic, and nine selected references.

Fried et al. (184) used HPTLC to study the lipid content in the digestive gland–gonad complex (DGG) of *Biomphalaria glabrata* snails infected with *Schistoma mansoni* and maintained on either a Romaine lettuce diet or a high fat diet of hen's egg yolk. The HPTLC analysis of neutral lipids showed that the DGG of infected snails fed the yolk diet contained significantly greater amounts of free sterols and cholesteryl esters but not triacylglycerols than that of the infected snails fed the lettuce diet.

Eidam et al. (185) used HPTLC to determine the concentration of lipids in *Biomphalaria glabrata* snails fed the leafy portion of Romaine lettuce versus the midrib portion. HPTLC was also used to analyze the concentrations of lipids in the two diets. The concentrations of lipids were significantly higher in snails fed the leafy diets; likewise, the concentrations of lipids were higher in the leafy portion than in the midrib portion. Muller et al. (186) used HPTLC to examine the effects of adult *Schistosoma mansoni* infection on the neutral lipid profile of experimentally infected laboratory mice. They found that the triacylglycerol and cholesteryl ester levels in the liver and ileum of the mice decreased significantly as the infection progressed. Hossain et al. (187) used HPTLC to study the structural analyses of glycolipids from *Borrelia burgdorferi*, the causative agent of Lyme disease. Lipids made up about 25–30% of the dry cell weight. HPTLC allowed for the separation of lipids into 11 components. Staining of the components revealed two glycolipids and two phospholipids. The glycolipids composed about 50% the total lipids and had only galactose and monosaccharide constituents.

Pintea et al. (188) reported that sea brickthorn (*Hippophae rhamnoides* of the family Elaegnaceae) fruits contain abundant lipids in the fleshy mesocarp but that data on their polar lipids are not available. They noted that polar lipids play important structural and physiological roles in cell membranes and may be useful as emulsifiers and nutrients in cosmetic applications. Polar lipid information was obtained from *H. rhamnoides* fruit by the use of HPTLC and other analytical techniques.

Intercellular lipids in the stratum corneum are responsible for the barrier function of mammalian skin. The main components of stratum corneum lipids are ceramides, cholesterol, and free fatty acids. Wertheim and Ponec (189) developed a method to determine human stratum corneum lipid profiles by tape stripping in combination with HPTLC. Vietzyke et al. (190) used HPTLC to investigate human stratum corneum ceramides. They noted that the stratum corneum requires ceramides, cholesterol esters, and fatty acids to provide a cutaneous permeability barrier. They combined HPTLC and other analytical techniques for detailed ceramide analysis.

IX. CONCLUDING REMARKS

This chapter has examined the more important aspects of qualitative and quantitative TLC of lipids, particularly as related to the various classes of neutral lipids, phosphoglycerides, glycolipids, and gangliosides. Most attention has been paid to the separation and identification of lipids