

Chapter 8

Comparative Pulvinar Organization Across Different Primate Species

Immunohistochemical studies have revealed five similar pulvinar subdivisions (PI_P, PI_M, PI_C, PI_L, and PI_{LS}) in the macaque, capuchin, and squirrel monkeys (Table 1.1 and Fig. 3.3), which include the entire PI but which also encompass parts of the PL and PM (Cusick et al. 1993; Gutierrez et al. 1995; Gray et al. 1999; Adams et al. 2000; Soares et al. 2001). The similarities in chemoarchitecture contrast with the distinct connectivity patterns and the different visuotopic organizations found across species. In the capuchin monkey, Soares et al. (2001) were unable to clearly segregate P1 from P2 based on pulvinar connectivity with V1, V2, MT, and V4, as it is the case in the macaque monkey (Ungerleider et al. 1983). This contrasts with the fact that capuchin and macaque monkeys share a very similar chemoarchitecture. Areas V2 and V4 in the capuchin monkey have preferential connections with the P1 field, which may correspond to the ventrolateral complex of the pulvinar described by Gattass et al. (1978a) and would correspond to both P1 and P2 of the macaque monkey, as described by Ungerleider et al. (1983). A similar partitioning was described by Cusick et al. (1993) and Stepniewska and Kaas (1997), who also established that the subdivisions of PI that receive ascending projections from the SC are distinct from the PI subdivision that projects to area MT. Inasmuch as the PI (P1, P2, and P3) is the only tecto-recipient region of the pulvinar (Partlow et al. 1977), the function of its connections with V4 may include modulating tectal input to this cortical area.