Spatial organization of the pigeon tectorotundal pathway: An interdigitating topographic arrangement

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The retinotectofugal system is the main visual pathway projecting upon the telencephalon in birds and many other nonmammalian vertebrates. The ascending tectal projection arises exclusively from cells located in layer 13 of the optic tectum and is directed bilaterally toward the thalamic nucleus rotundus. Although previous studies provided evidence that different types of tectal layer 13 cells project to different subdivisions in Rt, apparently without maintaining a retinotopic organization, the detailed spatial organization of this projection remains obscure. We reexamined the pigeon tectorotundal projection using conventional tracing techniques plus a new method devised to perform small deep-brain microinjections of crystalline tracers. We found that discrete injections involving restricted zones within one subdivision retrogradely label a small fraction of layer 13 cells that are distributed throughout the layer, covering most of the tectal representation of the contralateral visual