

## Triple hemifield input to the visual cortex in a patient with chiasmal hypoplasia

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Normally, each hemisphere in humans comprises an overlay of two retinotopic maps from the contralateral visual field. Here, we determined the cortical organization in a rare individual with chiasma hypoplasia, where visual cortex plasticity is challenged to accommodate three hemifield maps. Using sub-millimetre fMRI at 7T and diffusion-weighted MRI at 3T, we found three hemiretinal inputs, instead of the normal two, to converge onto the left hemisphere. fMRI-based population receptive field mapping of the left V1-V3 at 3T revealed three superimposed hemifield maps in the left visual cortex. In addition, the investigation of the submillimeter fMRI-data in the left calcarine sulcus indicated the segregation of two neuronal populations with different eye preference. Strikingly, the effects of this gross abnormality on visual function in every-day life are not easily detected. We conclude that cortical developmental plasticity is instrumental to support the coexistence of three hemifield maps in one hemisphere. This important insight into the extensive scope of neuroplasticity may lead to novel therapeutic possibilities.