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Localized bioconvection of Euglena caused by phototaxis in the lateral direction

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Euglena, a swimming micro-organism, exhibited a characteristic bioconvection that was localized at the center of a sealed chamber under bright illumination to induce negative phototaxis. This localized pattern consisted of high-density spots, in which convection was found. These observations were reproduced by a mathematical model that was based on the phototaxis of individual cells in both the vertical and lateral directions. Our results indicate that this convection is maintained by upward swimming, as with general bioconvection, and the localization originates from lateral phototaxis.

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