Supporting Information

Yamanaka and Kondo 10.1073/pnas.1315416111

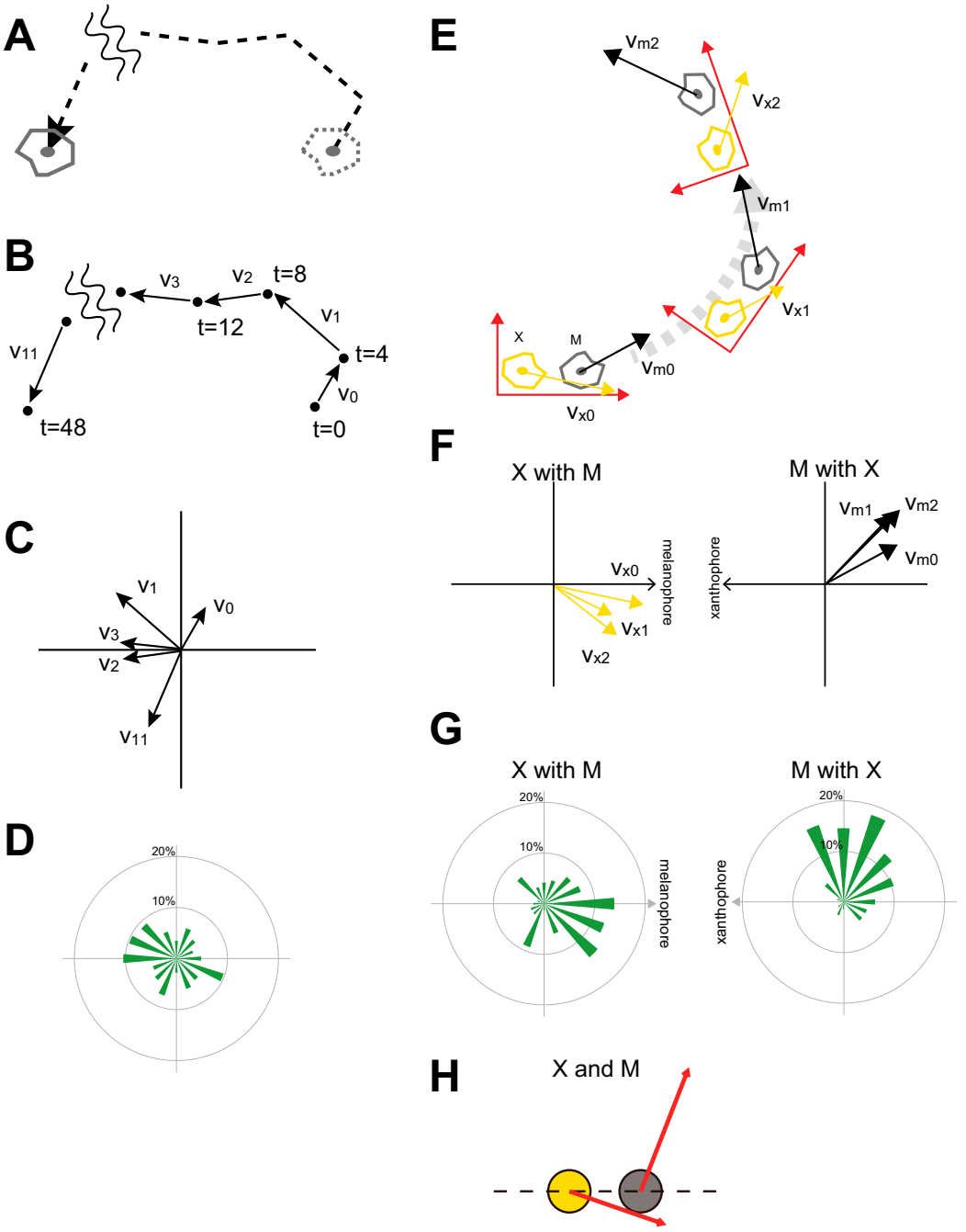


Fig. S1. Analysis of cell movement in the isolated or paired condition. (*A*) The cell movements of the isolated pigment cells were recorded for 48 h. (*B*) The track of 48 h is separated into 12 movements of every 4 h (v_0–v_{11}). (*C*) Each direction and the length of the movements are plotted on the coordinate. (*D*) The rose diagram is made from the plotted data. The length of the fan represents the percentage of cell movement to the direction of fan. (*E*) Analysis of cell movements of paired cells. As an example, the case where a xanthophore (X) and a melanophore (M) move is represented. The movements every 4 h are used for analysis as movement vectors (vm_0–vm_2 for M and vx_0–vx_2 for X). These movement vectors are rotated to make each position's axis (indicated with red arrows) fit the same axis. This manipulation makes the cell movement vectors standardized to the movement from the constant condition. (*F*) The rotated movement vectors are plotted on the coordinate. The direction of the interacting partner cell is shown in the axis. (*G*) The rose diagram is made from the plotted data. (*H*) The sum of the movement vectors is calculated as the mean of movement vector. The mean movement vectors are represented by red arrows. The arrows represent the typical cell movement of paired cells.

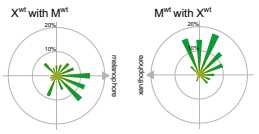
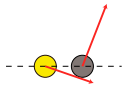
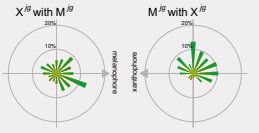
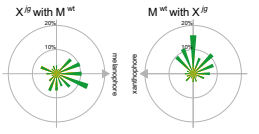
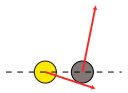
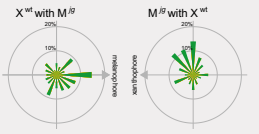
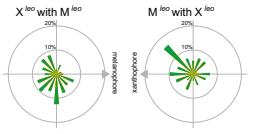
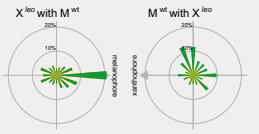
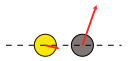
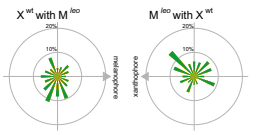
cell type	migration profile	mean movement vector
wild-type xanthophore		
wild-type melanophore		
jaguar xanthophore		
jaguar melanophore		
jaguar xanthophore		
wild-type melanophore		
wild-type xanthophore		
jaguar melanophore		
leopard xanthophore		
leopard melanophore		
leopard xanthophore		
wild-type melanophore		
wild-type xanthophore		
leopard melanophore		

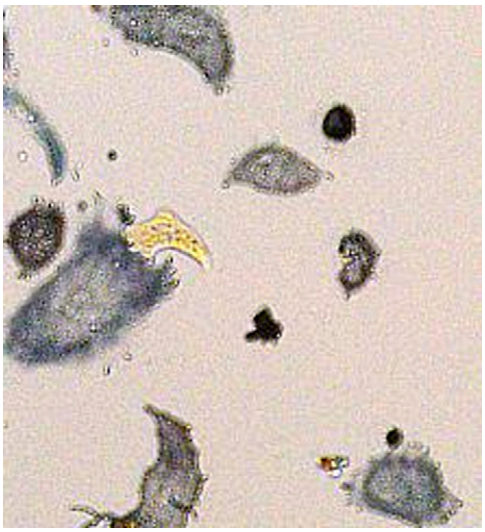
Fig. S2. Summary of the cell movement of paired cells. The rose diagrams represent the migration profile of each cell. Red arrows, which represent the mean movement vector, show typical movement of the paired cells.

Movie S1. The behaviors of WT melanophores in vitro (related to Fig. 2). Melanophores moved randomly and changed direction frequently. Some of them showed spontaneous adhesive interactions between melanophores. [We recorded cell movement every 10 min for 48 h. The recorded images were integrated as a movie file (avi file; 20 frames/s).]

Movie S1

Movie S2. The behaviors of WT xanthophores in vitro (related to Fig. 2). Xanthophores moved in random directions. Some xanthophores extended fine pseudopodia. Xanthophores had a tendency to disperse to keep distance between cells.

Movie S2

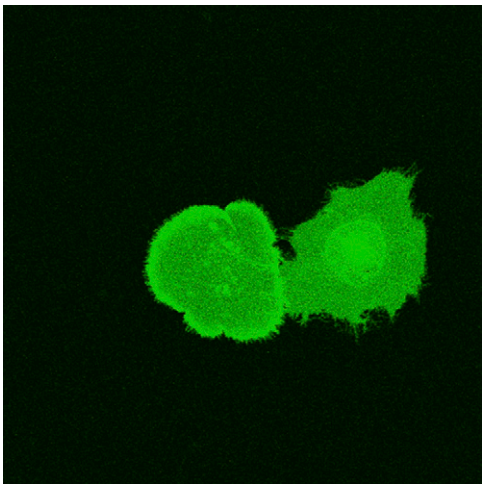


Movie S3. The interactions between WT xanthophores and melanophores in a mixed culture (related to Fig. 2*A*). A melanophore and a xanthophore exhibited the run-and-chase movement. The xanthophore extended several pseudopodia to the melanophore, the touched part of the melanophore shrank, and the melanophore showed repulsive movements. The xanthophore keep chasing it.

Movie S3

Movie S4. The interactions between WT xanthophores and melanophores that were paired manually (related to Fig. 2*D*). A melanophores and a xanthophore exhibited the run-and-chase movement like in the mixed culture. The xanthophore obviously changed the direction to the melanophore. This observation indicated that run-and-chase movement was an active movement.

Movie S4



Movie S5. The pigment cells keep contact during interaction (related to Fig. 2*E*). The pigment cells were obtained from transgenic fish, which carry mitfa promoter EGFP-caax. The cell membrane of pigment cells was visualized by the membrane-targeted EGFP. The behaviors of the pigment cells are assumed to be similar to the behaviors of WT cells, because the transgenic fish have WT stripe patterns. The xanthophore extended many pseudopodia to the melanophore. The pseudopodia kept contact with the surface of the melanophore during interaction.

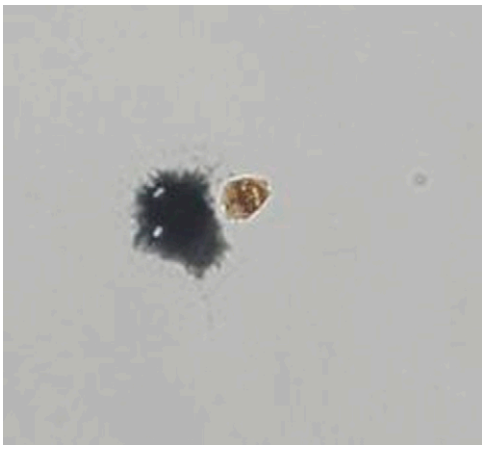
Movie S5

Movie S6. The WT xanthophores and melanophores exhibited in an anticlockwise spiral trajectory (related to Fig. 3 *G* and *H*). The melanophore showed repulsive movement against the xanthophore. The movement was biased to the anticlockwise direction from the xanthophore. Because the xanthophore chased the moving melanophore, the two cells moved around anticlockwise.

Movie S6

Movie S7. The interactions between *jaguar* xanthophore and *jaguar* melanophore (related to Fig. 4 *C–E*). The *jaguar* melanophore showed inhibited repulsive movement compared with WT. As a result, the melanophore failed to run away from the xanthophore and only moved around the xanthophore.

Movie S7

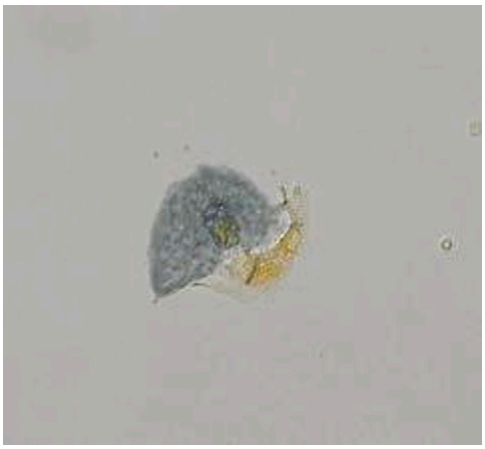


Movie S8. The interactions between *jaguar* xanthophore and WT melanophore (related to Fig. 4 *F–H*). The *jaguar* xanthophore extended pseudopodia to the WT melanophore, and the melanophore showed repulsive response.

Movie S8

Movie S9. The interactions between WT xanthophore and *jaguar* melanophore (related to Fig. 4 *I–K*). The melanophore of *jaguar* showed inhibited repulsive response to the touching by WT xanthophore. Because the melanophore did not move from the xanthophore, the xanthophore could not chase it.

Movie S9



Movie S10. The interactions between *leopard* xanthophore and melanophore (related to Fig. 5 *C–E*). The xanthophore actively extended pseudopodia to the melanophore. However, the melanophore did not show any repulsive response to it.

Movie S10

Movie S11. The interactions between *leopard* xanthophore and WT melanophore (related to Fig. 5 *F–H*). The *leopard* xanthophore extended pseudopodia to the WT melanophore. The movement of the xanthophore seemed to be inhibited. The melanophore showed obvious repulsive response.

Movie S11

Movie S12. The interactions between WT xanthophore and *leopard* melanophore (related to Fig. 5 *I–K*). The WT xanthophore touched *leopard* melanophore. However, the melanophore did not show repulsive response.

Movie S12