Supplementary Material

## Supplementary Figures



**Supplementary Figure 1**. (A) Schematic diagram of distant and local resident cell migration. (B) Representative images of the distant cell tracks and local resident cell tracks. (C-D) Quantification of the distant neutrophil tracks and the local resident neutrophil tracks. Statistical analyses were done with 15 and 13 fish, respectively, for each group. Sample size (n): 55, 39. (F-H) Quantification of the distant macrophage tracks and the local resident tracks. Statistical analyses were done with 15 fish for each group. Sample size (n): 73, 41. In all cases, each color indicates a different larva. An unpaired, two-tailed t-test was used to assess significance (ns, non-significance) and data are shown as mean± SD. Scale bar: 50 µm*.*

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**Supplementary Figure 2.**Representative images of the quantification of cell numbers in tail region. The pictures of *tlr2+/+*, *tlr2−/−* **(A)**, *myd88+/+* and *myd88-/-* **(B)** zebrafish larvae were taken at 3 dpf for quantifying the number of neutrophils and macrophages.



**Supplementary Figure 3.**Representative images of the neutrophil and macrophage basal migratory tracks in *tlr2* and *myd88* zebrafish. The cell tracks of 3 dpf *tlr2+/+*, *tlr2−/−* **(A)**, *myd88+/+* and *myd88-/-* **(B)** zebrafish larvae were tracked for 2 h and images were taken every 1 min by using a confocal microscope for quantifying cells basal migratory capability.



**Supplementary Figure 4.**Quantification of localized resident neutrophils behavior in wounded *tlr2* larvae.  
**(A)** Experimental scheme. **(B)** Representative images of local resident neutrophils tracks in the wounded tail fin of 3 dpf *tlr2+/+* or *tlr2−/−* larvae at frame 1, frame 60 and frame 120. Cell tracking movies are shown in Supplementary Movie S17-18). Scale bar: 50 µm.  
**(C)** Distance to the wound. Black dash line represents average distance to the wound. Each color line represents one cell.  
**(D-I)** Quantification of local resident neutrophil tracks, mean speed (D); net displacement (E); Meandering index (F); MSD (G). In panel D-F and H, each color indicates a different larva. Statistical analyses were done with 7 and 5 fish, respectively, for each group. An unpaired, two-tailed t-test was used to assess significance (ns, non-significance) and data are shown as mean± SD. Sample size (n): 21, 18.

**Supplementary Figure 5.**Quantification of localized resident neutrophils behavior in wounded *myd88* larvae  
**(A)** Experimental scheme. **(B)** Representative images of local resident neutrophils tracks in the wounded tail fin of 3 dpf *myd88+/+* or *myd88−/−* larvae at frame 1, frame 60 and frame 120. Cell tracking movies are shown in Supplementary Movie S19-20). Scale bar: 50 µm.  
**(C)** Distance to the wound. Black dash line represents average distance to the wound. Each color line represents one cell.  
**(D-I)** Quantification of local resident neutrophil tracks, mean speed (D); net displacement (E); Meandering index (F); MSD (G). In panel D-F and H, each color indicates a different larva. Statistical analyses were done with 6 and 5 fish, respectively, for each group. An unpaired, two-tailed t-test was used to assess significance (ns, non-significance) and data are shown as mean± SD. Sample size (n): 18, 14



**Supplementary Figure 6.**Quantification of localized resident macrophages behavior in wounded *tlr2* larvae  
**(A)** Experimental scheme. **(B)** Representative images of local resident macrophages tracks in the wounded tail fin of 3 dpf *tlr2+/+* or *tlr2−/−* larvae at frame 1, frame 60 and frame 120. Cell tracking movies are shown in Supplementary Movie S21-22). Scale bar: 50 µm.  
**(C)** Distance to the wound. Black dash line represents average distance to the wound. Each color line represents one cell.  
**(D-I)** Quantification of local resident macrophage tracks, mean speed (D); net displacement (E); Meandering index (F); MSD (G). In panel D-F and H, each color indicates a different larva. Statistical analyses were done with 7 and 5 fish, respectively, for each group. An unpaired, two-tailed t-test was used to assess significance (ns, non-significance) and data are shown as mean± SD. Sample size (n): 19, 18.

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**Supplementary Figure 7.**Quantification of localized resident macrophages behavior in wounded *myd88* larvae  
**(A)** Experimental scheme. **(B)** Representative images of local resident macrophages tracks in the wounded tail fin of 3 dpf *myd88+/+* or *myd88−/−* larvae at frame 1, frame 60 and frame 120. Scale bar: 50 µm.  
**(C)** Distance to the wound. Black dash line represents average distance to the wound. Each color line represents one cell. Cell tracking movies are shown in Supplementary Movie S23-24).  
**(D-I)** Quantification of local resident macrophage tracks, mean speed (D); net displacement (E); Meandering index (F); MSD (G). In panel D-F and H, each color indicates a different larva. Statistical analyses were done with 8 and 8 fish, respectively, for each group. An unpaired, two-tailed t-test was used to assess significance (ns, non-significance) and data are shown as mean± SD. Sample size (n): 33, 23.

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**Supplementary Figure 8.**Quantification of tracks using automatic Viterbi Algorithm.

**(A)** Quantification of neutrophil behavior in wounded *tlr2* larvae. Statistical analyses were done with 7 fish, for each group. Sample size (n): 77, 56.  
**(B)** Quantification of neutrophil behavior in wounded *myd88* larvae. Statistical analyses were done with 9 or 8 fish, respectively, for each group. Sample size (n): 69, 76.  
**(C)** Quantification of macrophage behavior in wounded *tlr2* larvae. Statistical analyses were done with 7 fish, for each group. Sample size (n): 95, 78.  
**(D)** Quantification of macrophage behavior in wounded *myd88* larvae. Statistical analyses were done with 8 fish, for each group. Sample size (n): 119, 85.  
In all cases, an unpaired, two-tailed t-test was used to assess significance (ns, non-significance) and data are shown as mean± SD. To normalize the data, each value was divided by the average value of its wild type sibling group, which was set at 100 percent.