

Description of Additional Supplementary Files

File Name: Supplementary Data 1

Description: Sequenced cells in dataset 1.

Table containing numbers of cells per genotype, dataset and cluster of dataset 1.

File Name: Supplementary Data 2

Description: Expression profile of 14d wildtype clusters.

Expression profile of wildtype clusters calculated using FindAllMarkers on the WT 14d samples of dataset 1.

File Name: Supplementary Data 3

Description: Expression profile of HhOE clusters.

Expression profile of HhOE follicle cell clusters in comparison to the respective WT 14d cluster. Values were calculated using FindMarkers.

File Name: Supplementary Data 4

Description: Wildtype regulons.

Zfh1, Pnt and E2f1 regulons calculated by SCENIC from the WT 14d samples of dataset 1.

File Name: Supplementary Data 5

Description: Expression profile of EGFRCA clusters.

Expression profile of EGFRCA follicle cell clusters in comparison to the respective WT 14d cluster. Values were calculated using FindMarkers.

File Name: Supplementary Data 6

Description: Expression profile of RasV12 clusters.

Expression profile of RasV12 follicle cell clusters in comparison to the respective WT 14d cluster. Values were calculated using FindMarkers.

File Name: Supplementary Data 7

Description: Cell cycle genes.

Table of genes used to score the cell cycle phase.

File Name: Supplementary Data 8

Description: Sequenced cells in dataset 2.

Table containing numbers of cells per genotype, dataset and cluster of dataset 2.

File Name: Supplementary Data 9

Description: Expression profile of 5d wildtype clusters.

Expression profile of wildtype clusters calculated using FindAllMarkers on the WT 5d samples of dataset 2.

File Name: Supplementary Data 10

Description: Expression profile of HhOE, EGFRCA clusters.

Expression profile of FSC, pFC and MB 2-3 HhOE,EGFRCA clusters in comparison to the respective WT 5d cluster of dataset 2. Values were calculated using FindMarkers.

File Name: Supplementary Data 11

Description: Expression profile of HhOE, RasV12 clusters.

Expression profile of FSC, pFC and MB 2-3 HhOE,RasV12 clusters in comparison to the respective WT 5d cluster of dataset 2. Values were calculated using FindMarkers().

File Name: Supplementary Movie 1

Description: Hh overactivation affects follicle cell migration.

Movies of live ovarioles of *109-30^{ts}* driving the WT control (left) or Hh^{OE} (right). Images were taken every 10 minutes.

File Name: Supplementary Movie 2

Description: Hh overactivation sustains stalk cell migration.

Movies of germaria with stalk regions during intercalation of *109-30^{ts}* driving the WT

control (left) or Hh^{OE} (right). Pairs of intercalating cells are outlined. Images were taken every 10 minutes.

File Name: Supplementary Movie 3

Description: Hh overactivation promotes invasive migration of MB cells into germline cysts.

Movies of follicle cysts of *109-30^{ts}* driving the WT control (left) or Hh^{OE} (right). MB cells showing invasive movements towards the germline cyst are marked by dots. Images were taken every 10 minutes.