CBG
Max Planck Institute
of Molecular Cell Biology
and Genetics

MAX-PLANCK-GESELLSCHAFT

13.09.2017

Embryos tune into the right channel

How zebrafish emerge from noisy beginnings

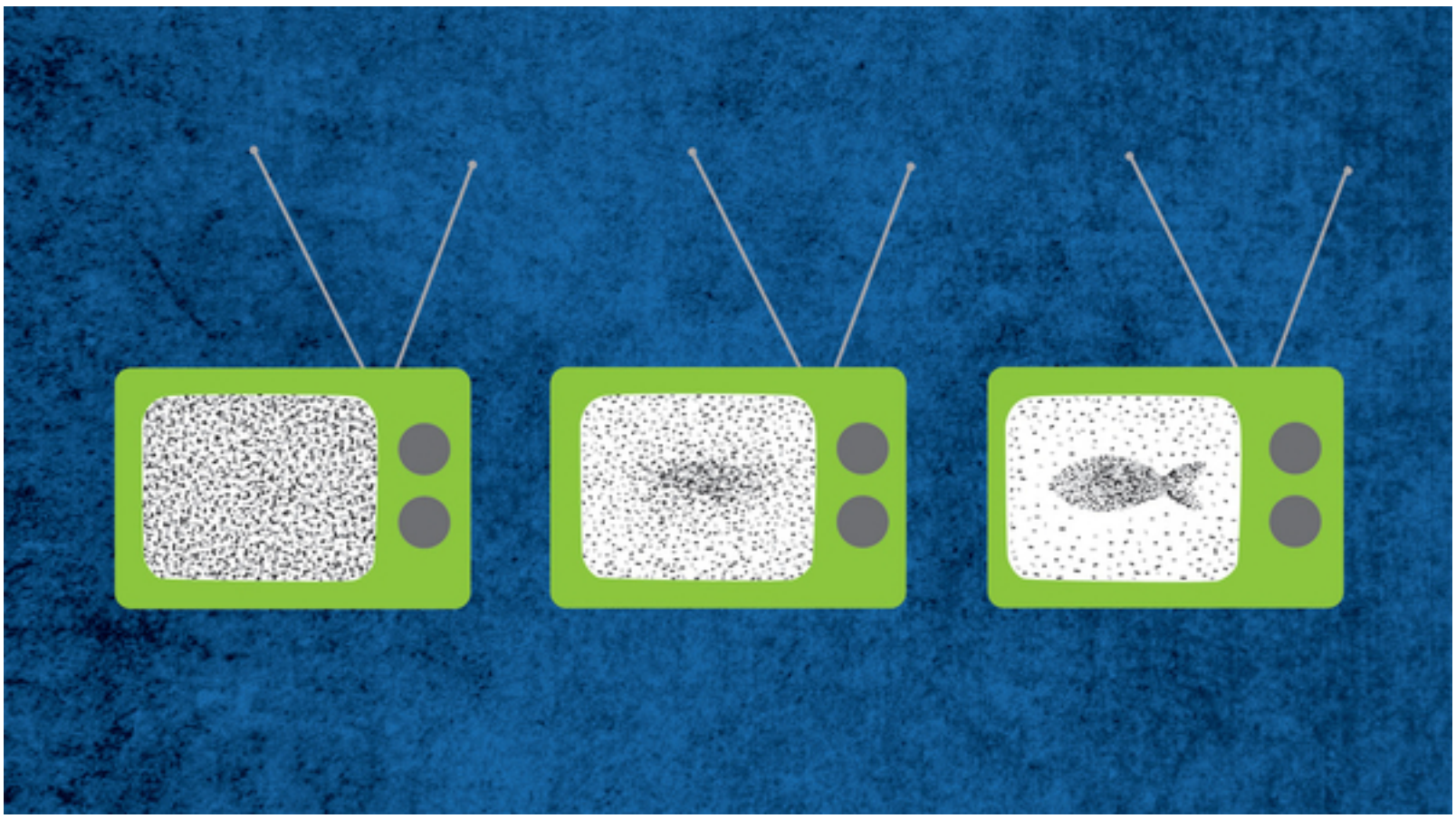

Illustration: Julia Eichhorn

Transcription is the first step of gene expression, the process by which the instructions in our DNA are converted into functional products, such as proteins. Transcription is a ‘noisy’ process, which means that it does not occur in all cells at the same time, even when cells receive the same signals. This is seemingly incompatible with the importance of gene expression. But zebrafish embryos don't seem to care much about noisy transcription; they just wait until the effects of noise fade, and live happily ever after.

The Vastenhouw lab at the MPI-CBG collaborated with the research group of Christoph Zechner at the neighboring Center for Systems Biology Dresden to address an important question in developmental biology: How do embryos deal with transcriptional noise? Using a quantitative imaging approach and computational modeling, the Vastenhouw lab discovered that although transcription activation is noisy during the development of a zebrafish, the effects of this noise are quickly reduced by cell cycle lengthening and the accumulation of transcription events in each cell.

“The mechanisms we discovered are very simple and could easily apply to other genes and in different developmental contexts” says Carine Stapel, the lead author of the paper. “They might thus provide a general context in which we can understand how embryos develop into healthy animals despite noisy transcription”.

Publication:

L. Carine Stapel, Christoph Zechner and Nadine L. Vastenhouw Uniform gene expression in embryos is achieved by temporal averaging of transcription noise
(http://m.genesdev.cshlp.org/content/early/2017/09/13/gad.302935.117.short)
Genes and Development 13. September 2017

This publication is on the cover of the current issue of Genes and Development (http://genesdev.cshlp.org/).

Max Planck Institute of Molecular Cell Biology and Genetics
(MPI-CBG)

Pfotenhauerstraße 108
01307 Dresden, Germany
+49 351 210-0

Information Office
info@mpi-cbg.de
+49 351 210-2080

We are a member of the research alliance