Rearing of gnotobiotic Drosophila on Holidic Media (HM) for feeding behavior assays

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Abstract

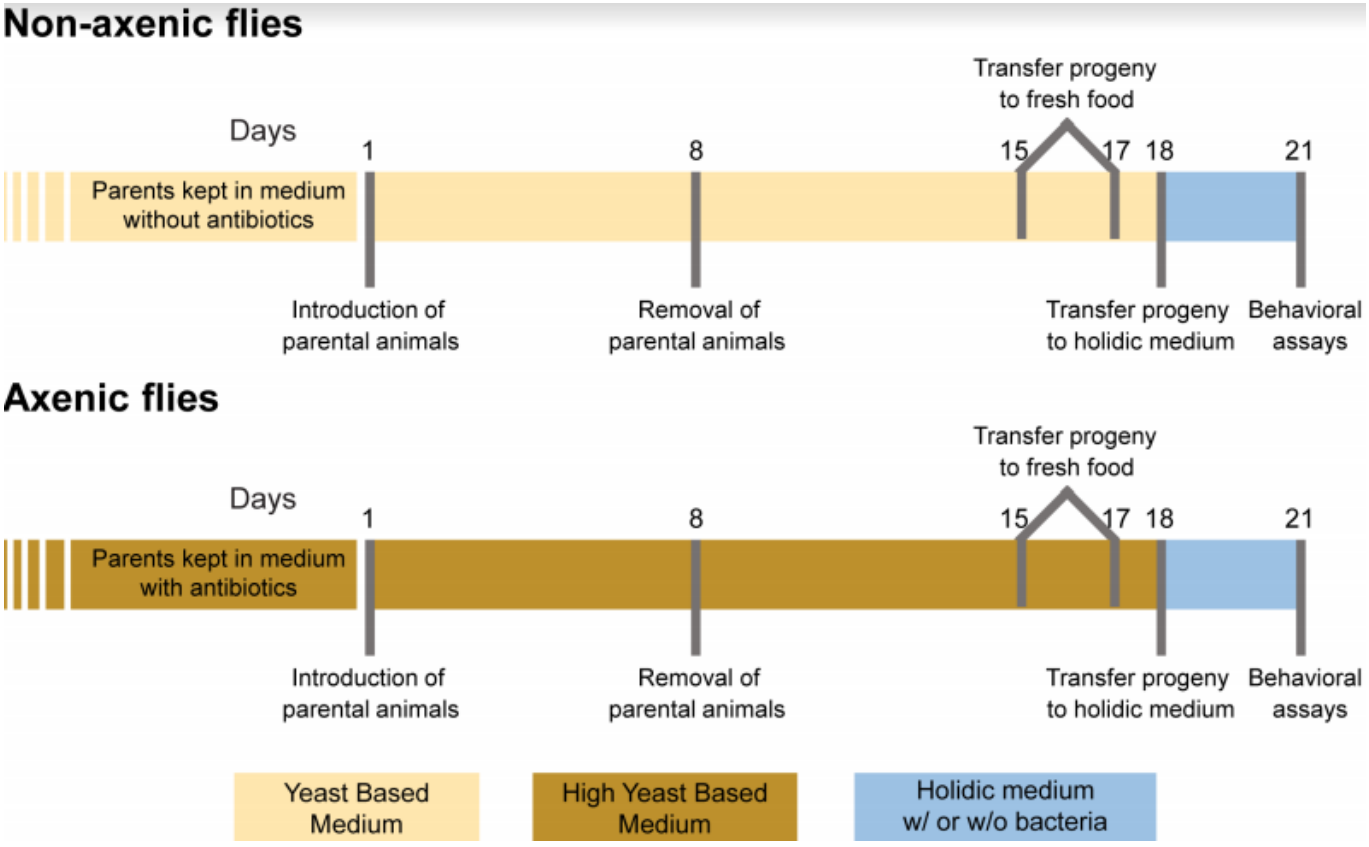
This protocol is part of the manuscript: Gonçalves et al. Commensal bacteria and essential amino acids control food choice behavior and reproduction. Plos Biology. 2017 Apr 18.

Citation: Zita Santos, Patrícia Francisco, Ricardo Leitão-Gonçalves, Margarida Anjos, Célia Baltazar, Ana Paula Elias, Gabriela Tondolo Fioreze, Margarida Anjos, Célia Baltazar, Ana Paula Elias, Pavel M. Itskov, Matthew D. W. Piper, Carlos Ribeiro Rearing of gnotobiotic Drosophila on Holidic Media (HM) for feeding behavior assays. **protocols.io**

dx.doi.org/10.17504/protocols.io.hhdb326

Published: 25 Apr 2017

Guidelines



Prepare high yeast-based medium (HYBM) **WITHOUT** antibiotics and **NO** yeast granules for rearing the experimental flies as follows:

- mix 8 g agar, 80 g barley malt syrup, 22 g sugar beet syrup, 80 g corn flour, 10 g soya flour, **41.67 g instant yeast**, 8 ml propionic acid, and 12 ml nipagin (15% in 96% ethanol) and fill up to 1000 ml using milliQ filtered water
- autoclave before pouring into polypropylene fly culture vials (VWR, #734-2261)
- **DO NOT supplement the food with live instant yeast granules on the surface**

Perform all fly rearing, maintenance, and behavioral testing at 25°C in climate-controlled chambers at 70% relative humidity in a 12-hr-light-dark cycle (Aralab, FitoClima 60000EH).

Before start

Prepare the required fly and bacterial media.

Protocol

Step 1.

Prepare High Yeast-based Medium (HYBM) without antibiotics according to the Guidelines.

NOTES
Carlos Ribeiro 30 Mar 2017

This step can be prepared in advance as HYBM can be stored at 18ºC up to 3 days before use.

Fly culture
Step 2.

Set up fly cultures using 6 females and 4 males per vial to ensure a homogenous density of offspring among experiments. Experimental flies are generated by crossing parental flies on sterile HYBM **WITHOUT** antibiotics and **NO** live yeast granules. Parental flies come from HYBM containing antibiotics (check protocol for Generating and Rearing Axenic Drosophila).

Fly culture
Step 3.

Keep the crosses in a dedicated incubator at 25º C, 70% relative humidity, and a 12-hr-light-dark cycle. Remove parental flies after 3 to 7 days and wait 14 days (since the day the crosses were set up) to obtain adult flies.

If you are using temperature sensitive alleles adjust rearing temperature accordingly and plan your experiments to account for the delay in the development.

Preparing adult flies to be tested for feeding behavior

Step 4.

Sort the progeny according to the desired genotype, and collect 16 females into fresh HYBM **WITHOUT** antibiotics and **NO** live yeast granules. Add 5 wild-type males to ensure that the females are mated. When testing males collect 20 males into fresh HYBM **WITHOUT** antibiotics and **NO** live yeast granules.

Preparing adult flies to be tested for feeding behavior

Step 5.

To generate gnotobiotic flies start the liquid bacterial cultures following the protocol Growing Drosophila gut bacteria**.**

Preparing adult flies to be tested for feeding behavior

Step 6.

To ensure a well-fed state, transfer the flies to fresh HYBM **WITHOUT** antibiotics and **NO** live yeast granules after 48 hours.

Preparing adult flies to be tested for feeding behavior

Step 7.

After 24 hours on fresh HYBM tansfer the flies to the different HM. For this prepare all the different HM needed according to the Holidic media (HM) preparation protocol. If required innoculate HM with the commensal bacteria following the Inoculation of Holidic Media (HM) with bacteria protocol.

Preparing adult flies to be tested for feeding behavior

Step 8.

Keep the flies on HM (with or withouth commensal bacteria) for 72 hours, and immediately test for feeding behavior.