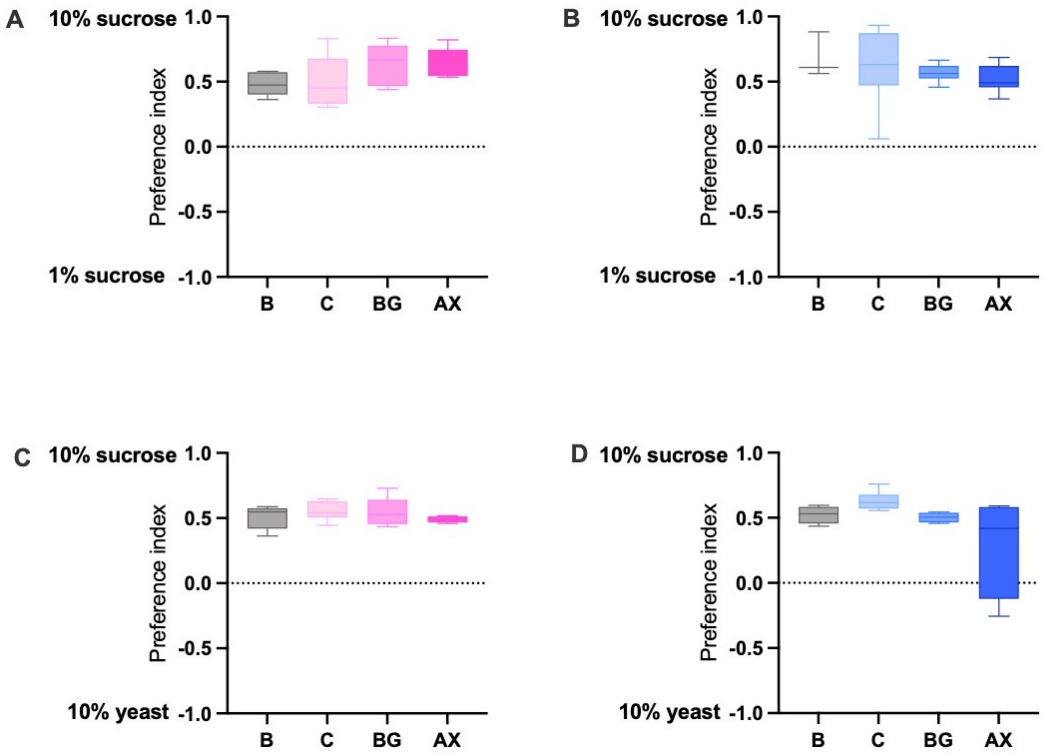
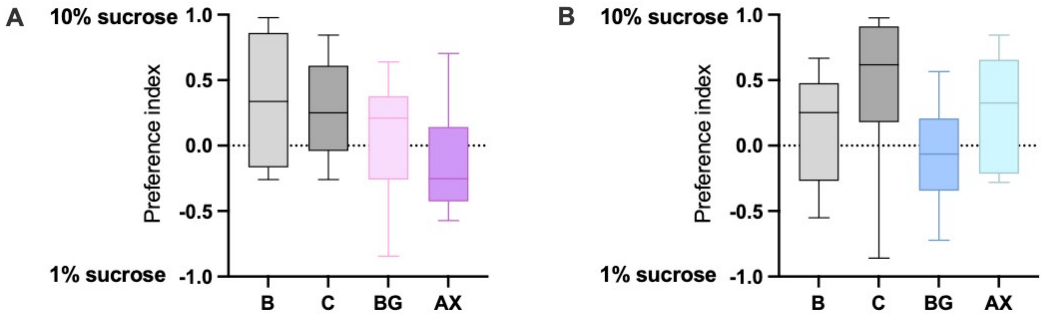


Supplementary Figure S1. Short-term sucrose preference following β-glucan and arabinoxylan intervention

(A-B) Short-term preference indices for high-sucrose (10% sucrose) versus low-sucrose (1% sucrose) diets in mated female (A) and male (B) flies.

(C-D) Short-term preference indices for sucrose (10% sucrose) versus yeast (10% yeast) diets in mated female (C) and male (D) flies.

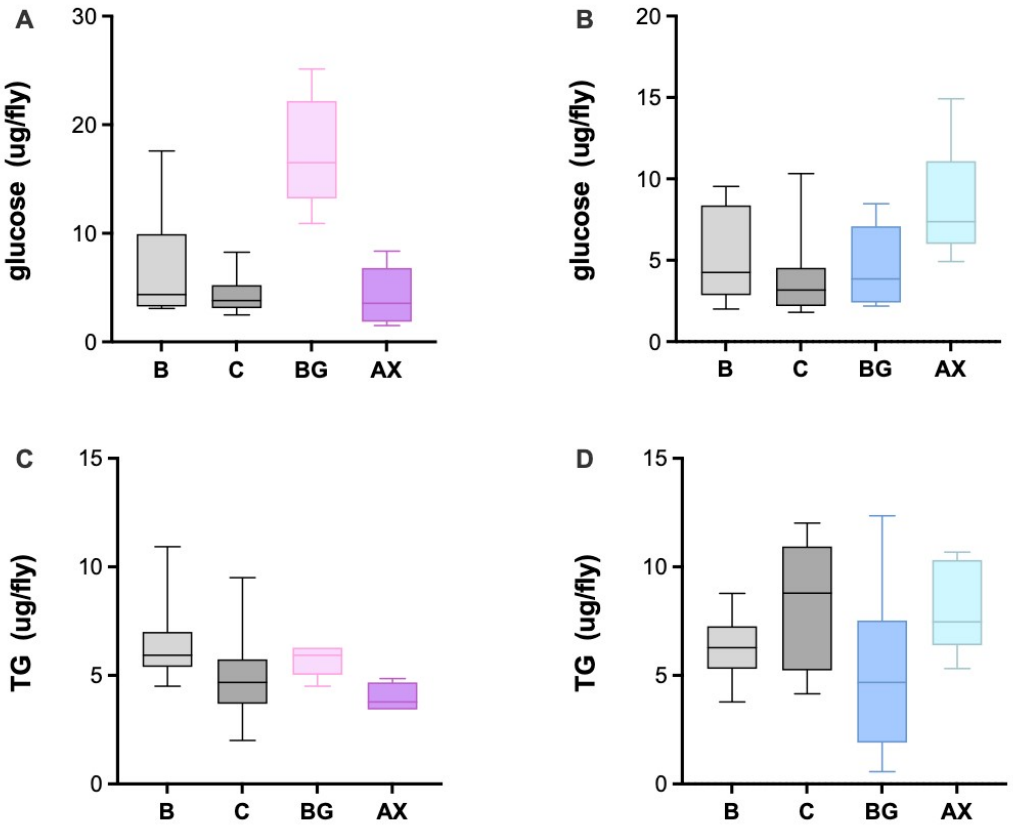
Dietary groups include B, C, BG and AX. Preference indices were calculated as described in the Methods. Data are presented as box-and-whisker plots showing the median, interquartile range, and minimum to maximum values. B, blank group; C, corn starch control group; BG, β-glucan group; AX, arabinoxylan group.



Supplementary Figure S2. Long-term sucrose preference following β-glucan and arabinoxylan intervention

(A-B) Long-term preference indices for high-sucrose (10% sucrose) versus low-sucrose (1% sucrose) in mated female (A) and male (B) flies following continuous dietary intervention.

Dietary groups include B, C, BG and AX. Data are presented as box-and-whisker plots showing the median, interquartile range, and minimum to maximum values. B, blank group; C, corn starch control group; BG, β-glucan group; AX, arabinoxylan group.

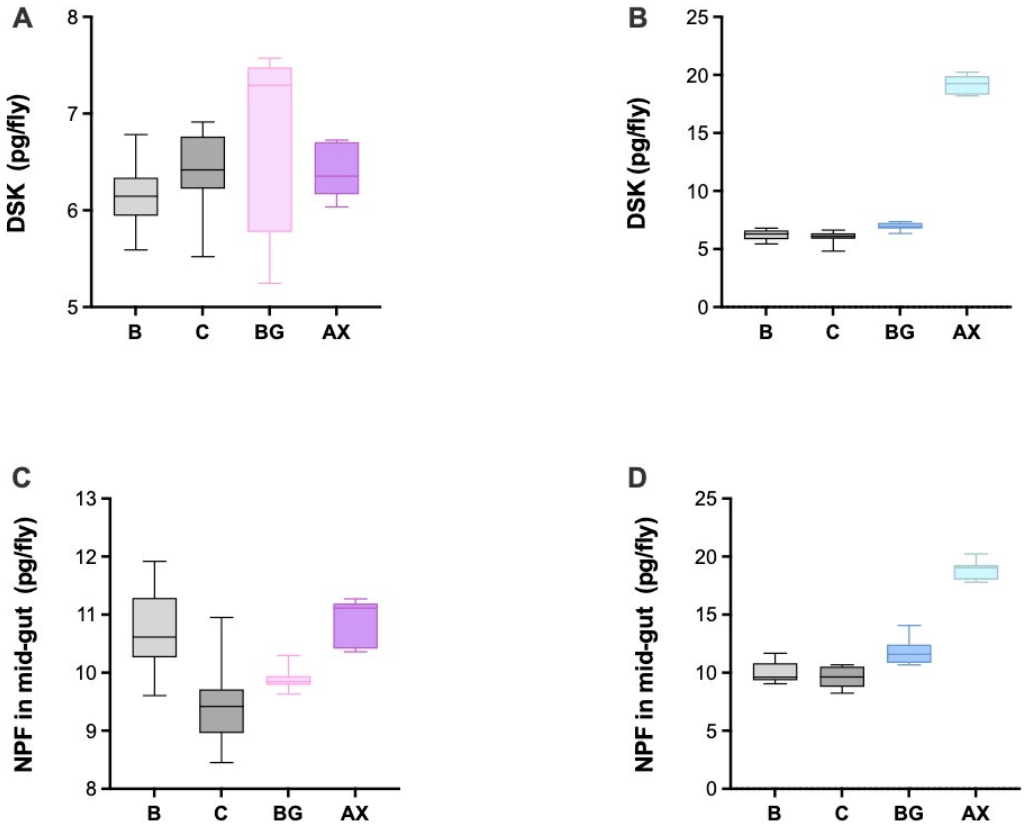


Supplementary Figure S3. Effects of dietary fiber on circulating glucose and TG levels

(A-B) Circulating glucose levels in mated female (A) and male (B) flies following dietary intervention.

(C-D) Whole-body TG levels in mated female (C) and male (D) flies.

Dietary groups include B, C, BG and AX. Data are presented as box-and-whisker plots showing the median, interquartile range, and minimum to maximum values. B, blank group; C, corn starch control group; BG, β-glucan group; AX, arabinoxylan group.

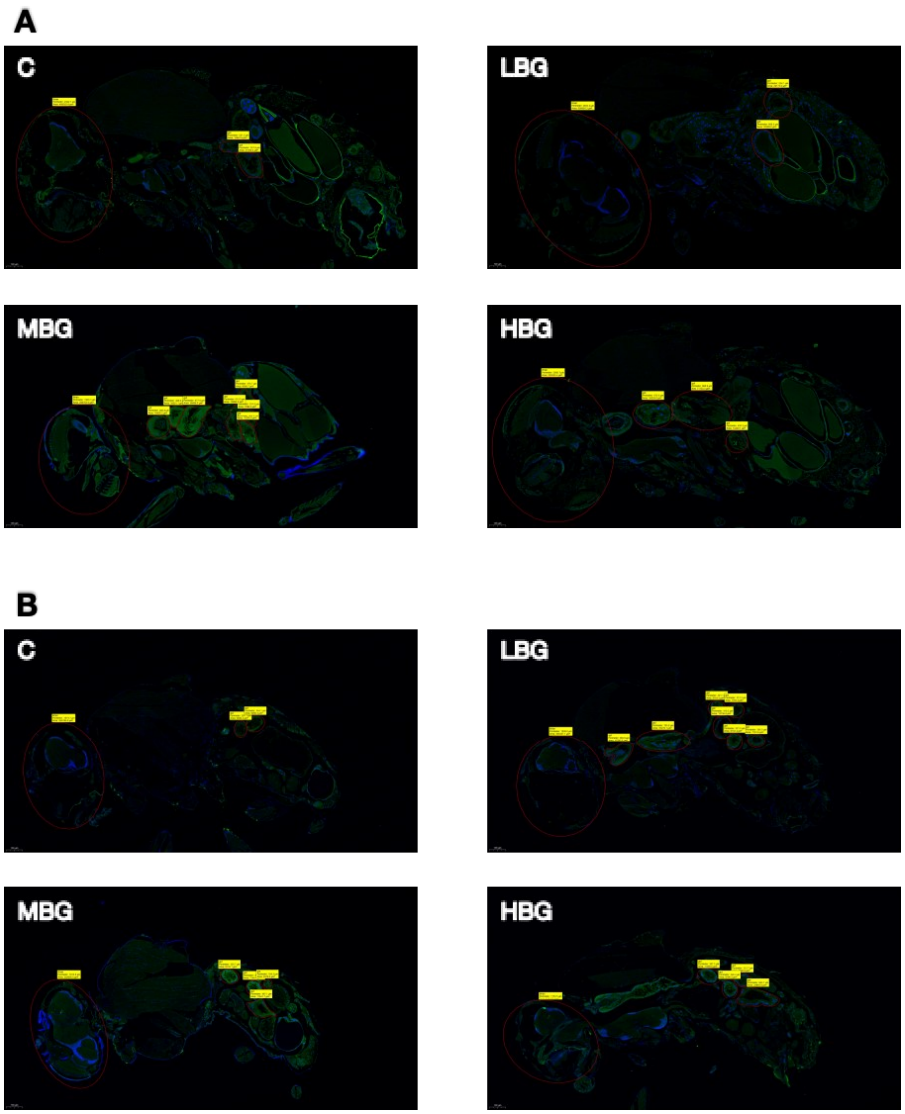


Supplementary Figure S4. Effects of dietary fiber on DSK and NPF levels

(A-B) Whole-body DSK levels in mated female (A) and male (B) flies following dietary intervention.

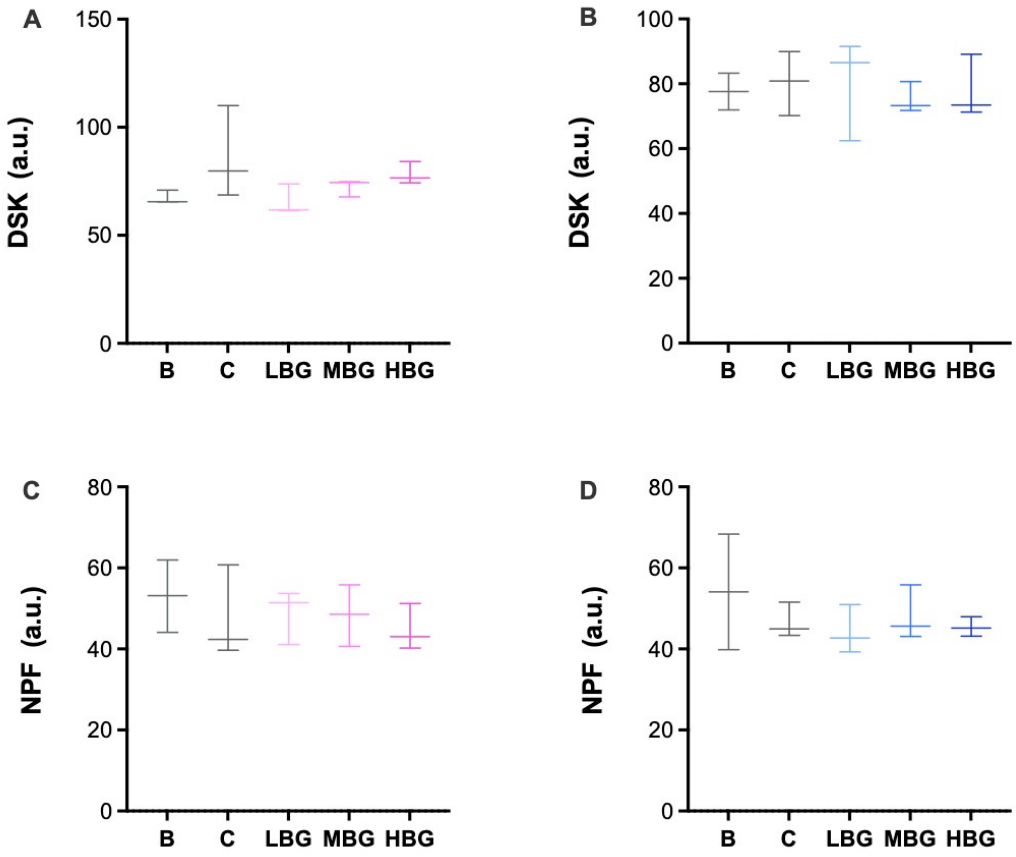
(C-D) Midgut-derived NPF levels in mated female (C) and male (D) flies.

Dietary groups include B, C, BG and AX. Data are presented as box-and-whisker plots showing the median, interquartile range, and minimum to maximum values. DSK, Drosulfakinin; NPF, Neuropeptide F; B, blank group; C, corn starch control group; BG, β-glucan group; AX, arabinoxylan group.



Supplementary Figure S5. Representative immunofluorescence images of DSK and NPF localization

Representative sagittal sections of whole-body Drosophila showing immunofluorescence staining of DSK and NPF following dietary intervention.
Representative images from mated female (A) and male (B) flies.
Green fluorescence indicates DSK or NPF immunoreactivity, and blue fluorescence indicates DAPI nuclear counterstaining. Highlighted regions correspond to the brain (cephalic region) and midgut (abdominal region). DSK, Drosulfakinin; NPF, Neuropeptide F.

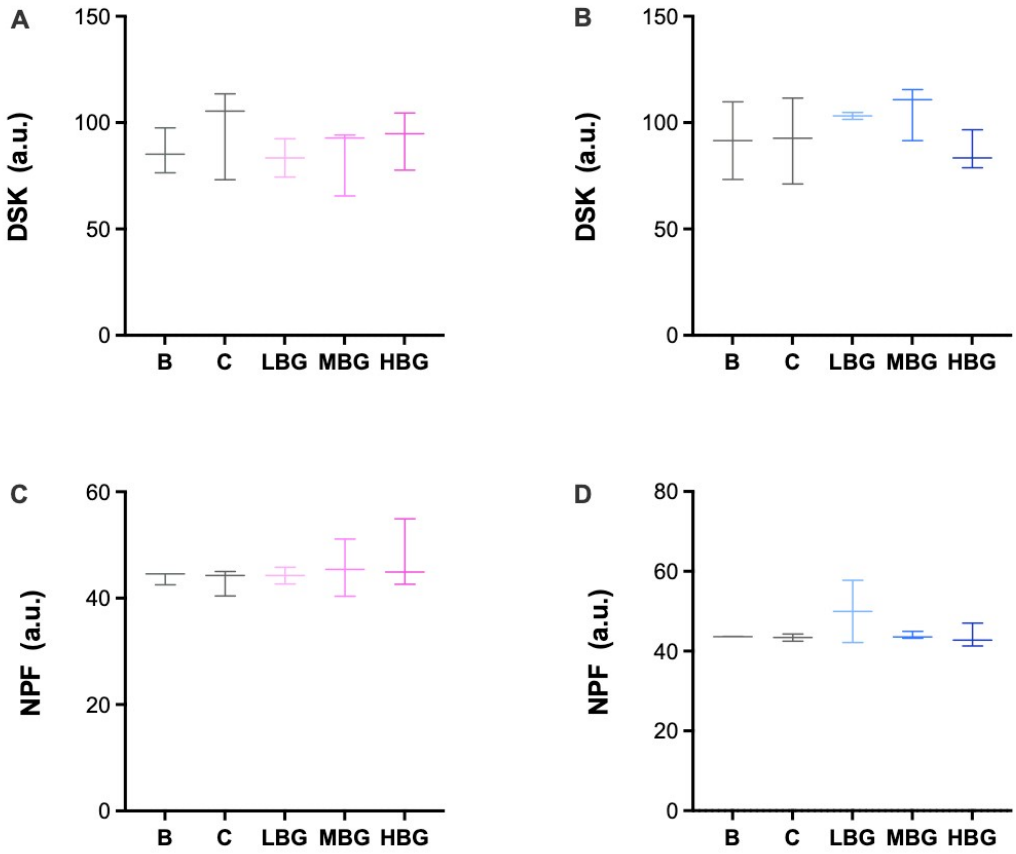


Supplementary Figure S6. Quantification of DSK and NPF immunofluorescence intensity

(A-B) Quantification of DSK immunofluorescence intensity in the midgut of mated female (A) and male (B) flies.

(C-D) Quantification of NPF immunofluorescence intensity in the midgut of mated female (C) and male (D) flies.

Fluorescence intensity is expressed in arbitrary units. Dietary groups include B, C, LBG, MBG and HBG. DSK, Drosulfakinin; NPF, Neuropeptide F; B, blank group; C, corn starch control group; LBG, low-dose β-glucan group; MBG, medium-dose β-glucan group; HBG, high-dose β-glucan group.



Supplementary Figure S7. Quantification of DSK and NPF immunofluorescence intensity in the brain

(A-B) Quantification of DSK immunofluorescence intensity in the brain of mated female (A) and male (B) flies.

(C-D) Quantification of NPF immunofluorescence intensity in the brain of mated female (C) and male (D) flies.

Fluorescence intensity is expressed in arbitrary units. Dietary groups include B, C, LBG, MBG and HBG. DSK, Drosulfakinin; NPF, Neuropeptide F; B, blank group; C, corn starch control group; LBG, low-dose β-glucan group; MBG, medium-dose β-glucan group; HBG, high-dose β-glucan group.