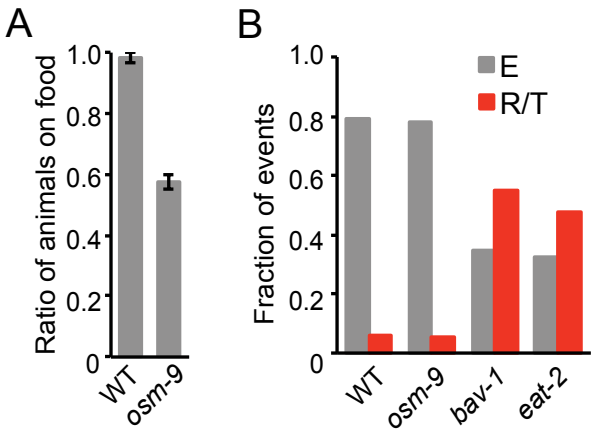

Fig. S1. (A) *osm-9* mutants distribute more off food than wild-type animals. (B) *osm-9* behave similar to wild-type when approaching food from the off food area. Events scored manually at 24 h: E, enter, i.e. the animals move directly onto food; R/T, reversals and turns.

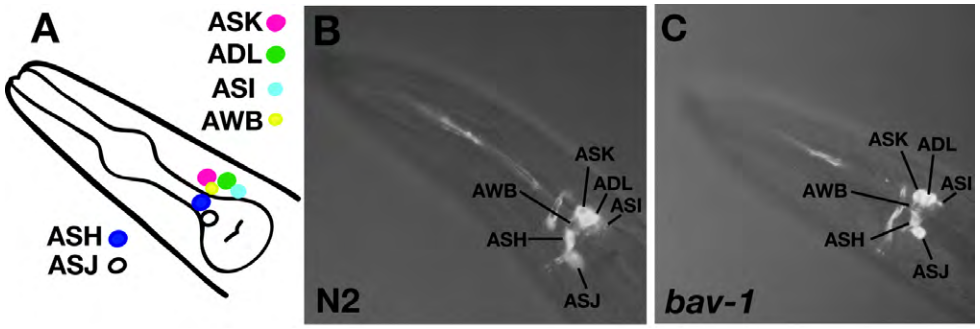

Fig. S2. Characterisation of *bav-1*. (A–C) Dyefilling. Schematic drawing indicating cell bodies of amphid neurons that dye fill (A). Dye filling of wild-type (B) and *bav-1* (C) animals shows no differences.

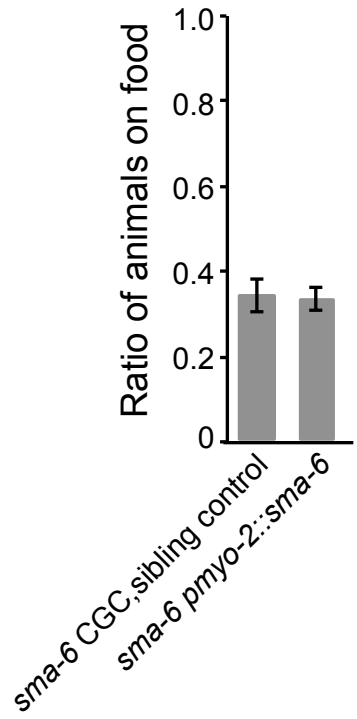

Fig. S3. Food-avoidance behavior of *sma-6* is not restored when *sma-6* is expressed with the pharyngeal promoter *myo-2*. Error bars represent s.e.m.

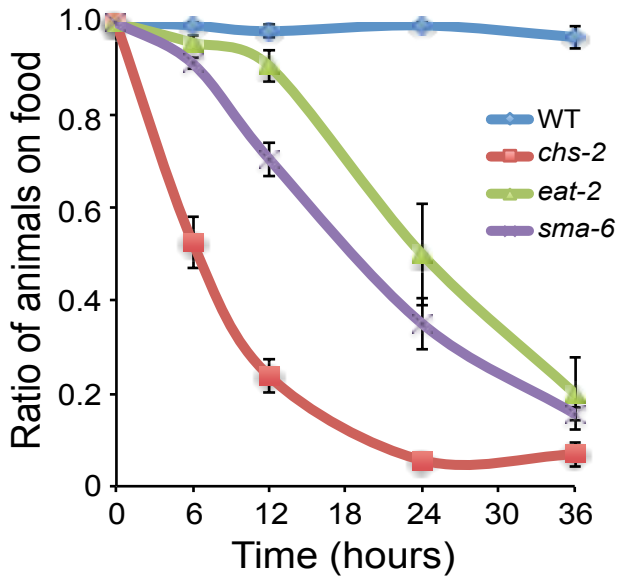

Fig. S4. Food-avoidance behaviour to HB101. *chs-2*, *eat-2* and *sma-6* mutant animals avoid the *E. coli* strain HB101 similarly to OP-50. Error bars represent s.e.m.

Movie 1. *bav-1* animals accumulate off food and show avoidance behavior towards food. Speed 10×. The food lawn is located in the bottom center.

Table S1. *Caenorhabditis elegans* strains used

Wild-type N2 CGC
DA465 *eat-2 (ad465)*
GE337 (CGC)
BOL1 *chs-2 (mbd1)* (=GE337 outcrossed 3x=*bav-1*)
DA472 *pha-2 (ad472)*
DA601 *eat-6 (ad601)*
BOL19 *eat-2(ad465);tax-4(p678)*
BOL82 *eat-2(ad465);osm-9(ky10)*
BOL80 *eat-2(ad465);odr-3(n2150)*
BOL160 *odr-1(ky225);eat-2(ad465)*
BOL89 *chs-2(mbd1) mbdEx[pchs-2::chs-2 genomic]*
BOL114 *chs-2(mbd1);tax-4(p678)*
BOL162 *chs-2(mbd1);tax-2(p694)*
BOL173 *eat-2(ad465);tax-4(p678) mbdEx [pstr-3::tax-4, punc-122::gfp]*
BOL170 *eat-2(ad465); tax-4(p678) mbdEx [psrg-8::tax-4, punc-122::gfp]*
BOL98 *eat-2(ad465); tax-4(p678) mbdEx [pstr-1::tax-4, punc-122::gfp]*
BOL164 *eat-2(ad465); tax-4(p678) mbdEx [psra-13::tax-4, punc-122::gfp]*
BOL174 *eat-2(ad465); tax-4(p678) mbdEx [pgpa-10::tax-4, punc-122::mCherry]*
BOL172 *eat-2(ad465); tax-4(p678) mbdEx [psrg-8::tax-4,pstr-3::tax-4 punc-122::mCherry]*
BOL171 *eat-2(ad465); tax-4(p678) mbdEx [pstr-1::tax-4,pstr-3::tax-4, punc-122::gfp]*
BOL165 *eat-2(ad465); tax-4(p678) mbdEx [psrg-8::tax-4,pgpa-10::tax-4, punc-122::mCherry]*
BOL100 *eat-2(ad465); tax-4(p678) mbdEx [psrg-8::tax-4,pstr-3::tax-4, pgpa-10::tax-4, punc-122::gfp]*
BOL177 *eat-2(ad465); tax-4(p678) mbdEx [ptrx-1::tax-4, punc-122::gfp]*
BOL176 *eat-2(ad465); tax-4(p678) mbdEx [pstr-3::tax-4,ptrx-1::tax-4 punc-122::gfp]*
BOL167 *eat-2(ad465); tax-4(p678) mbdEx [ptrx-1::tax-4,psrbc-64::tax-4, punc-122::gfp]*
BOL168 *eat-2(ad465); tax-4(p678) mbdEx [ptrx-1::tax-4,psrbc-64::tax-4, pstr-3::tax-4, punc-122::gfp]*
VC 48 kpc-1 (gk8)
CB502 *sma-2 (e502)*
LT121 *dbl-1(wk70)*
VC547 *daf-4 (ok828)*
DR1369 *sma-4 (e729)*
LT186 *sma-6 (wk7)*
VC1183 *sma-9(ok1628)*
BOL29 *aak-2(ok524);eat-2(ad465)*
BOL175 *chs-2 (mbd); rsks-1(sv31)*
BOL74 *hen-1(tm501);eat-2(ad465)*
JC2154 *hen-1(tm501)*
BV633 *rsks-1(sv31)* a kind gift from Dr. S. Tuck
DA476 *daf-22(m130)*
ZC235 *dbl-1(nk3); yxEx172.7[pdbl-1::dbl-1; punc-122::gfp]*
ZC1524 *dbl-1(nk3); yxIs17[pflp-18::nCre; punc-122::rfp]; yxEx694[pnmr-1s::LoxPStopLoxP::dbl-1; pnmr-1s::LoxPStopLoxP::gfp; punc-122::gfp]*
ZC1334 *sma-6(wk7);yxEx615[psma-6::sma-6;punc-122::gfp]*
ZC1341 *sma-6(wk7);yxEx622[pstr-3::sma-6;punc-122::gfp]*
ZC1531 *sma-6(wk7);yxEx743[pcol-12::sma-6;punc-122::gfp]*
ZC1573 sma-6(wk7);yxEx765[pges-1::sma-6;punc-122::gfp]