**Supplementary Figure 1.** Life expectancy Kaplan–Meier curves with 95% confidence for flies fed seven diets varying in the percentage of protein (P) (Log Rank test, χ^2=3166.5, df=6, p≤0.001).
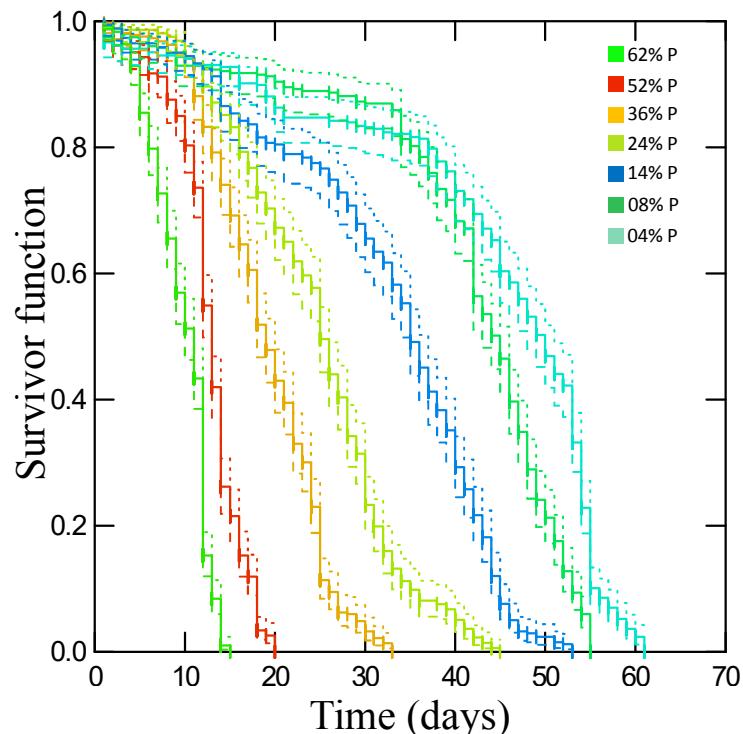
**Supplementary Figure 2.** Expression levels of immune receptors (mean±SE) according to the percentage of protein in the diet at: A. 25% mortality, B. 50% mortality, C. 75% mortality.
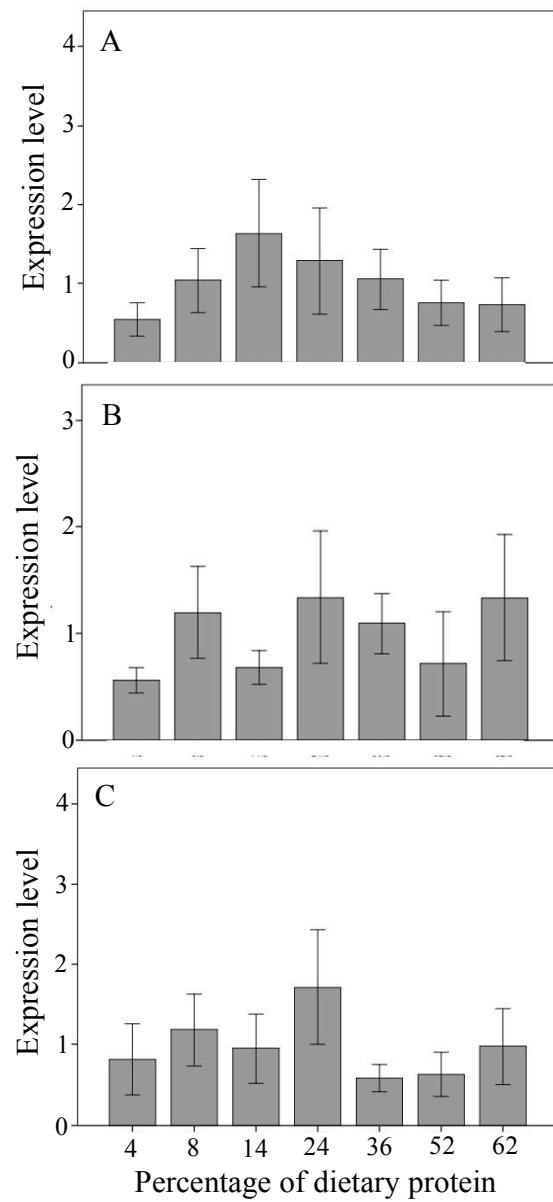
Supplementary Figure 3. Estimated nonparametric smooths of immune gene expression levels from the generalized additive model according to the percentage of dietary protein at 25%, 50% and 75% mortality.

Supplementary Figure 3 (1/4) Molecules involved in the recognition of pathogens

25% mortality | 50% mortality | 75% mortality

S(PGRPSC2): EDF=0.9401, p=0.00113 | EDF=0.5178, p=0.172 | EDF=0, p=NA

S(PGRPLE): EDF=0, p=NA | EDF=0.6758, p=0.0965 | EDF=0, p=NA

S(PGRPLC): EDF=0, p=NA | EDF=1.645, p=0.00439 | EDF=0, p=NA

S(GNBP1): EDF=1.963, p=0.0124 | EDF=0, p=NA | EDF=0, p=NA

S(PGRPSA): EDF=0.874, p=0.0121 | EDF=0, p=NA | EDF=2.138, p<0.001

S(PGRPSB1): EDF=0.9693, P<0.001 | EDF=1.829, p=0.00186 | EDF=2.216, p<0.001

Percentage of dietary protein
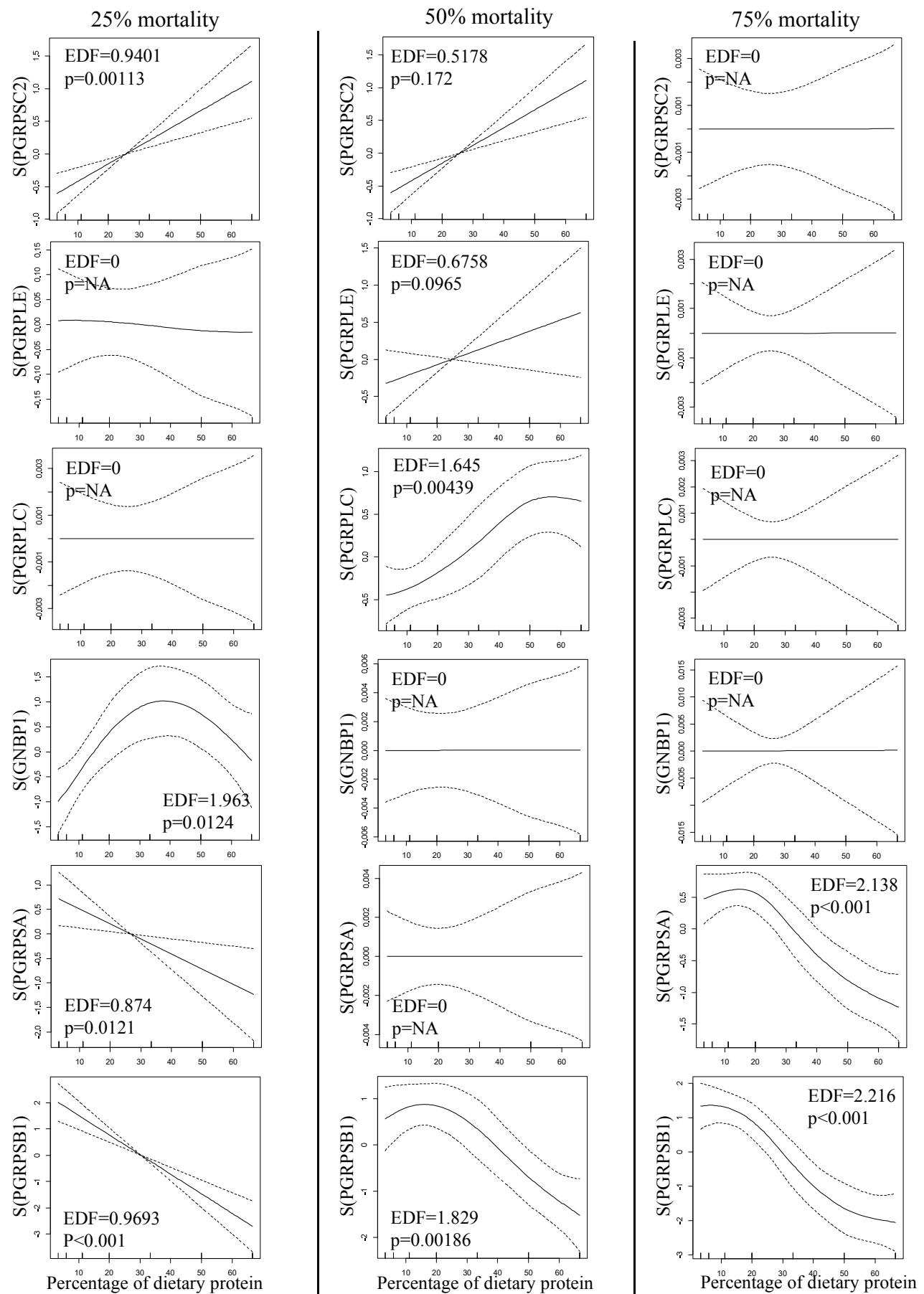
Supplementary Figure 3 (2/4) Molecules involved in the transduction of the immune signal

25% mortality	50% mortality	75% mortality
EDF=0.108 P=0.306	EDF=0.917 P=0.144	EDF=0 P=0.932
EDF=0 p=NA	EDF=0.821 p=0.217	EDF=0 p=NA
EDF=0 p=NA	EDF=0.658 p=0.105	EDF=0 p=NA
EDF=0 p=NA	EDF=0.640 p=0.204	EDF=0 p=NA
EDF=2.111 p=0.00962	EDF=1.738 p=0.0631	EDF=0 p=NA
EDF=0.5526 p=0.153	EDF=1.311 p=0.0897	EDF=0 p=0.999

Percentage of dietary protein
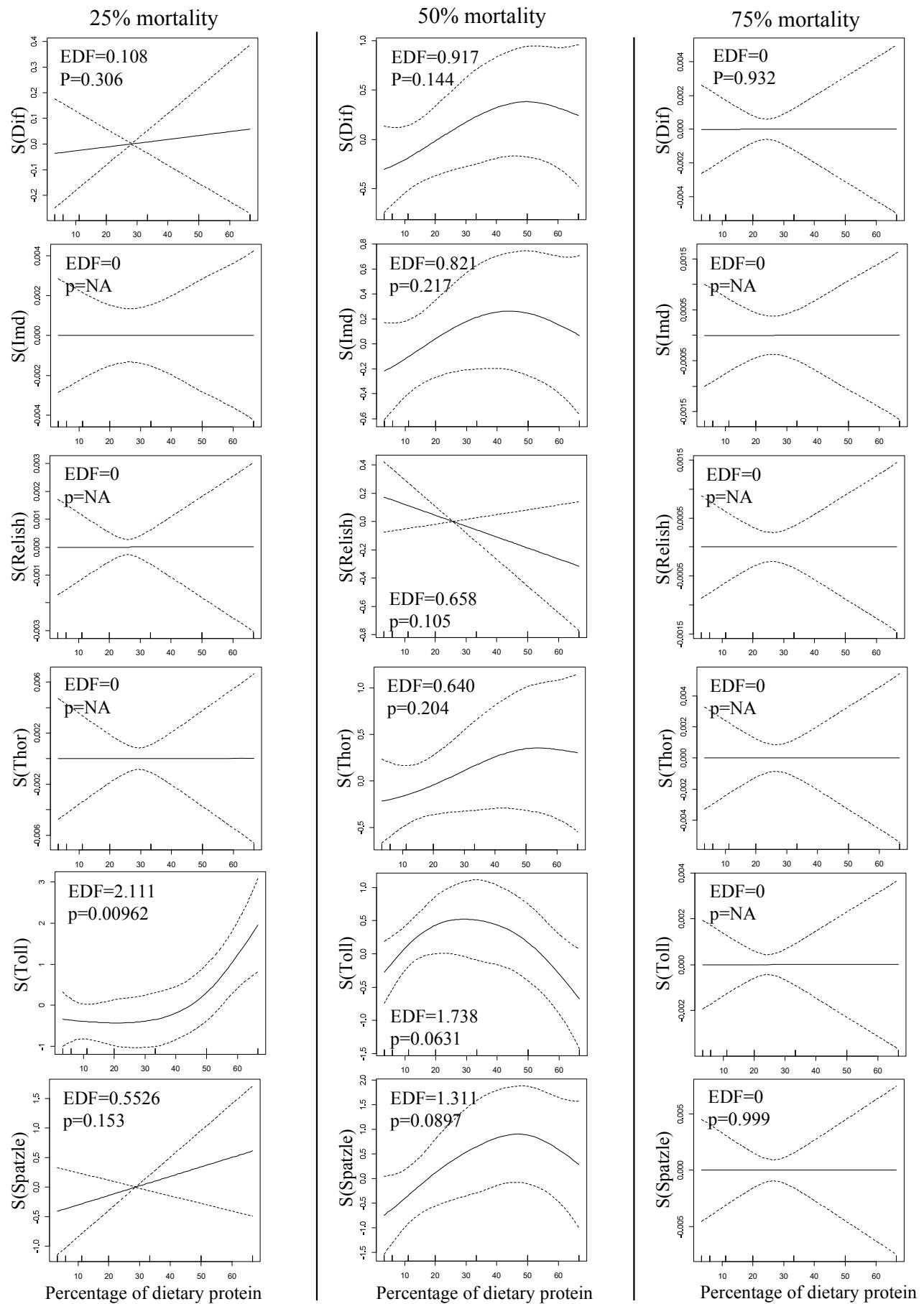
Supplementary Figure 3 (3/4) Antimicrobials

| 25% mortality | 50% mortality | 75% mortality |

S(AttA), S(AttB), S(AttC), S(AttD), S(Drs) plotted against Percentage of dietary protein

EDF=1.059, p=0.189 (AttA, 25%)
EDF=0, p=NA (AttB, 25%)
EDF=1.794, p=0.0531 (AttC, 25%)
EDF=1.358, p=0.0279 (AttD, 25%)
EDF=0, p=NA (Drs, 25%)

EDF=0.1344, p=0.301 (AttA, 50%)
EDF=0, p=NA (AttB, 50%)
EDF=1.469, p=0.0408 (AttC, 50%)
EDF=1.262, p=0.000107 (AttD, 50%)
EDF=0.6479, p=0.115 (Drs, 50%)

EDF=8748, p=0.0119 (AttA, 75%)
EDF=0, p=NA (AttB, 75%)
EDF=0.9269, p=0.0022 (AttC, 75%)
EDF=1.547, p<0.001 (AttD, 75%)
EDF=0.4154, p=0.216 (Drs, 75%)

Percentage of dietary protein

Supplementary Figure 3 (4/4) Antimicrobials