

Zinc oxide nanoparticles induce oxidative stress, genotoxicity and apoptosis in the hemocytes of *Bombyx mori* larvae

Rania Belal¹ and Abir Gad^{2*}

¹ Department of Genetics, Faculty of Agriculture, University of Alexandria, Alexandria 21545, Egypt. E-mail: rania.belal@alexu.edu.eg

²Department of Applied Entomology and Zoology, Faculty of Agriculture, University of Alexandria, Alexandria 21545, E-mail: abeer.gad@alexu.edu.eg

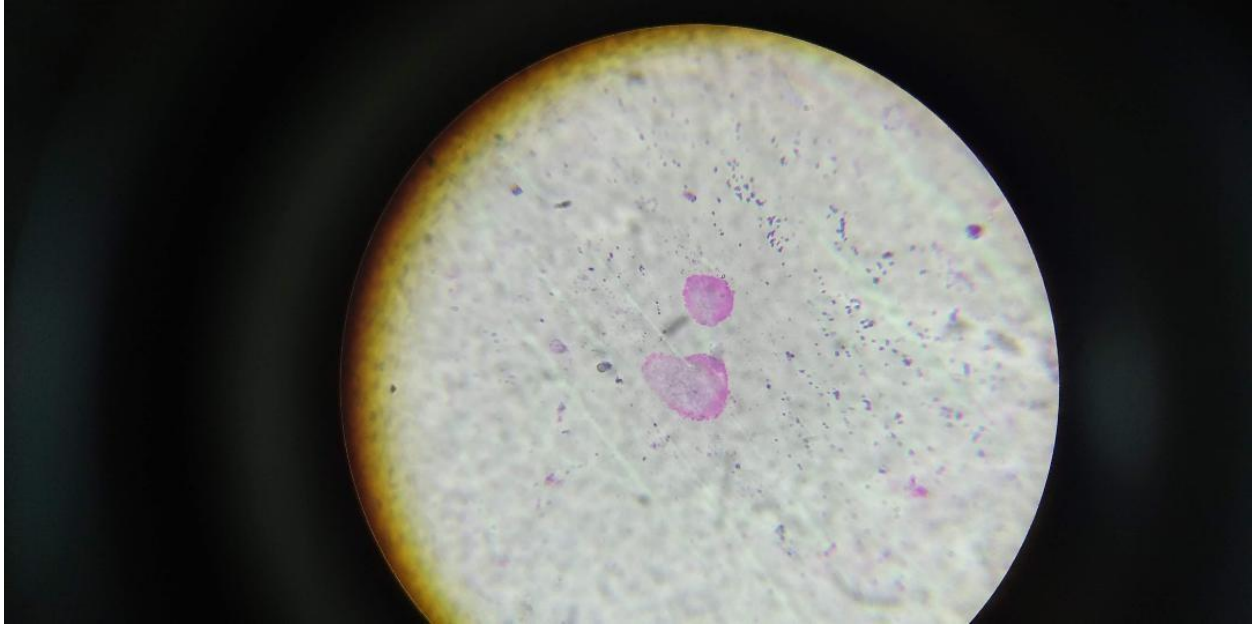
*Corresponding author: Abir Gad. Department of Applied Entomology and Zoology, Faculty of Agriculture, University of Alexandria, Alexandria 21545, E-mail: abeer.gad@alexu.edu.eg

S1: <https://doi.org/10.1111/phen.12333>

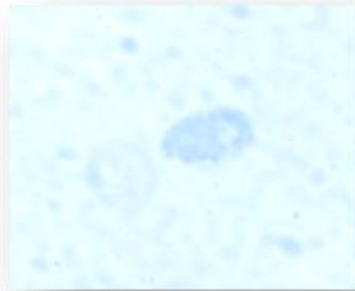
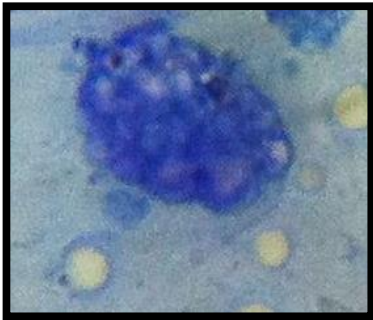
Toxicity effect of Silver Nanoparticles to the Haemocytes and Antioxidant activity of Silkworm *Bombyx mori*. *Physiol Entomol* (2020) 45:154–160.



S2: Effect of ZNO- NPS at concentration 100 µg/ml on Oenocyte, the treatment caused cytoplasm lysis



S3: Effect of ZNO- NPS at concentration 50 and 100 $\mu\text{g/ml}$ on granulocyte, the treatment caused apoptotic cells



S4: Effect of ZNO- NPS at concentration 50 and 100 $\mu\text{g/ml}$ on Oenocyte, the treatment caused numerous vacuoles covering the cytoplasm.

Gene Name ^a	Fold change ^b	Expression ^c	Student-test <i>P</i> value ^d
Arginine Kinase (<i>AK</i>)	0.735433	↓	0.6083
Glutathion S- transferase (<i>GST</i>)	2.049114	↑	0.008556
Cytosolic non-specific dipeptidase 2(<i>CNDP2</i>)	3.63	↑	0.005099
Calexcitine- 2 like genes (<i>CE</i>)	2.375	↑	0.004792

S5: Statistical analysis of real-time expression of studied genes.

^a Gene name . ^b Fold change control/ treatment . ^c Gene expression : describes the down regulation while ↑ describes the up regulation. ^d differences between means were tested for significance at 0.05 using T-test.