

## Endocrine Disruptors

The endocrine system is a collection of glands that regulate hormone secretion throughout the body, which controls metabolism, growth, and reproductive functions among other things. Endocrine disruptors bind to specific receptors and act as either agonists or antagonists for hormones, which can be detrimental.

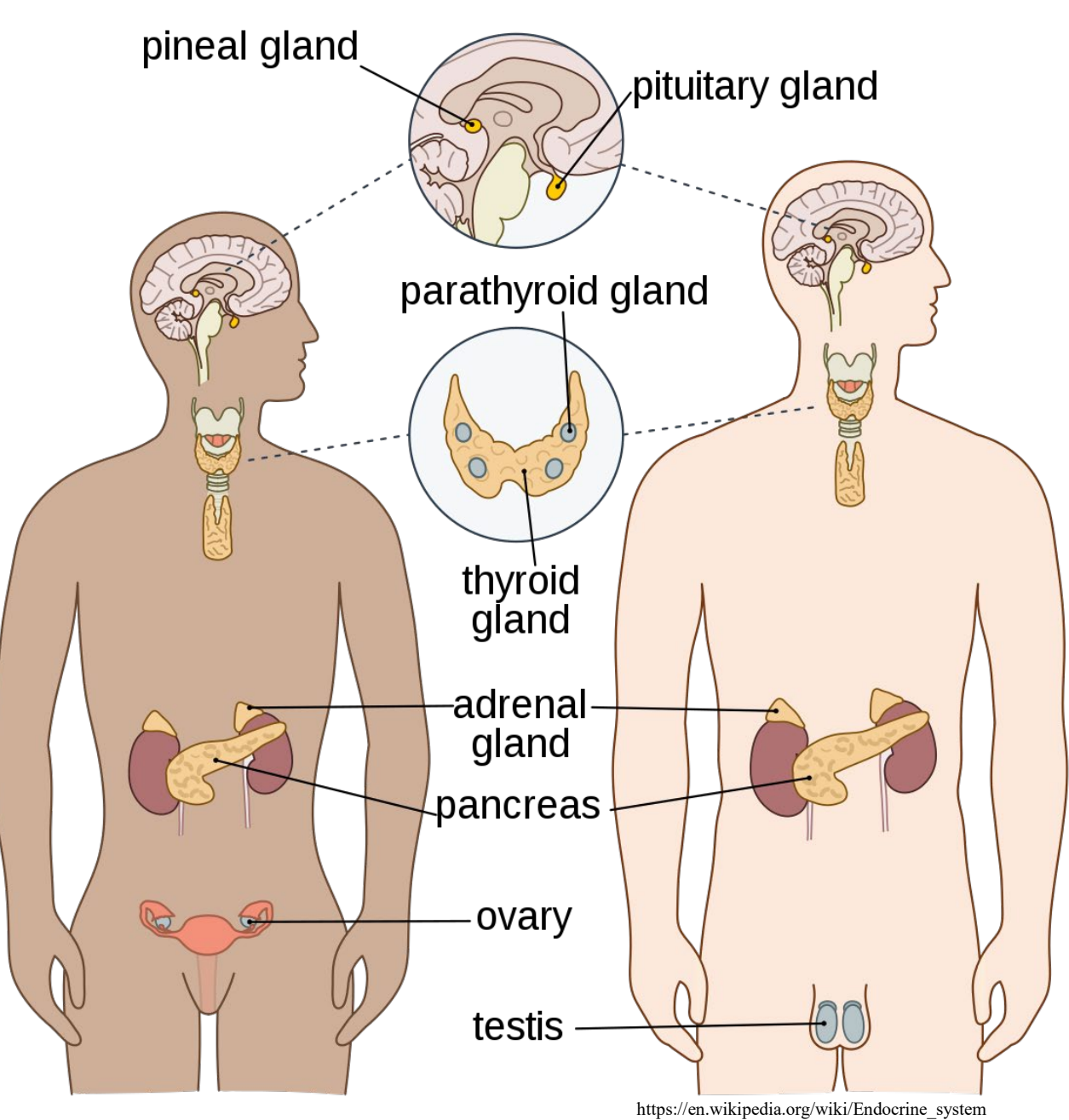


Figure 1: Endocrine system, which regulates hormones throughout the body via pictured organs/glands.

## Potential Endocrine Disruptor

As mentioned above, a potential endocrine disruptor (PED) is a chemical that mimics a hormone or other chemical and binds to specific receptors, triggering an unintended response. With COVID still being an issue, we are constantly exposing ourselves to hand sanitizer, which was the PED in this experiment.

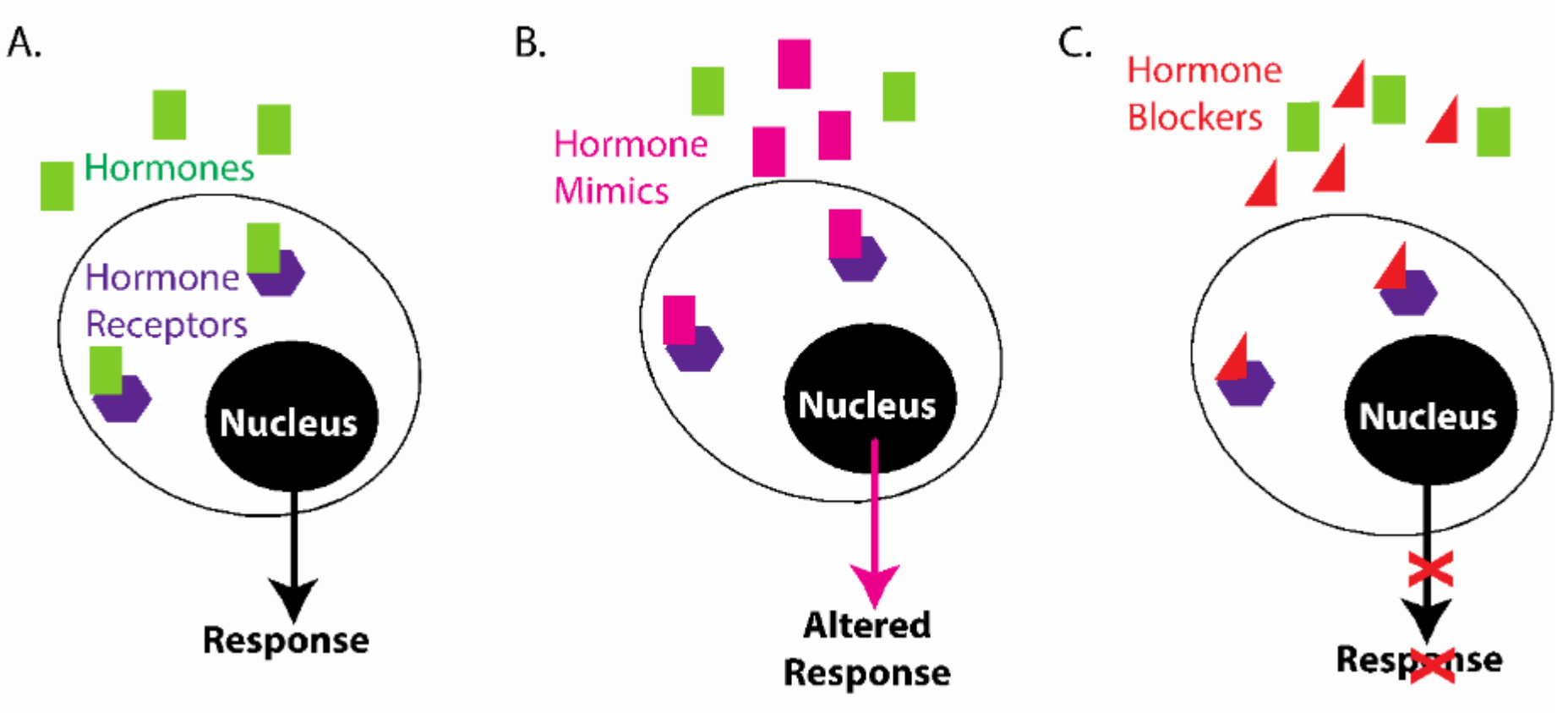


Figure 2: Endocrine disruptors as hormone mimics (B) as well as hormone blockers (C).

## Method

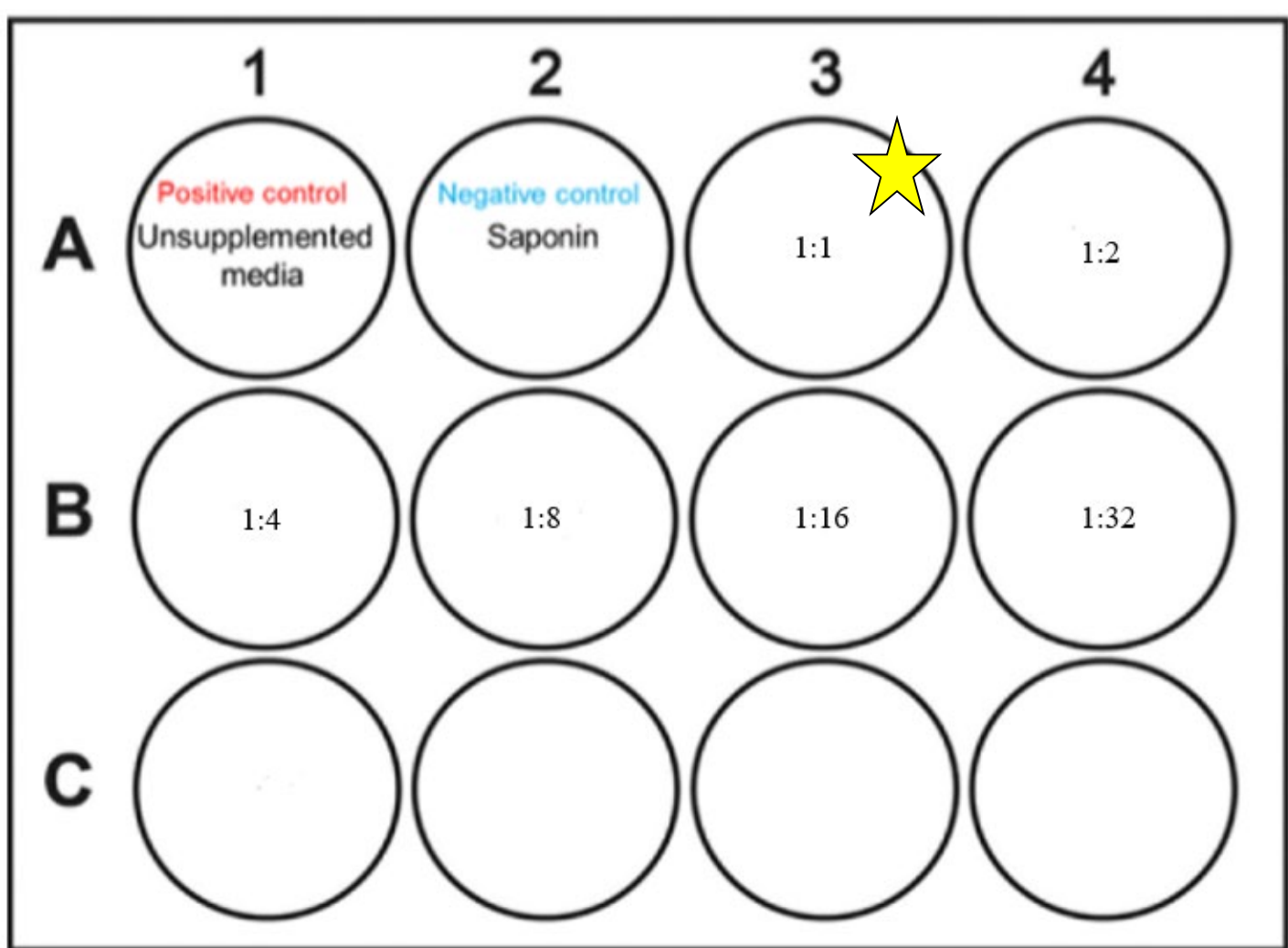


Figure 3: Cell Viability Assay showing concentrations of hand sanitizer solution used. Noted with a star is highest concentration with viable cells. The 1:1 concentration is comprised of 150µL of sanitizer to 10mL of media.

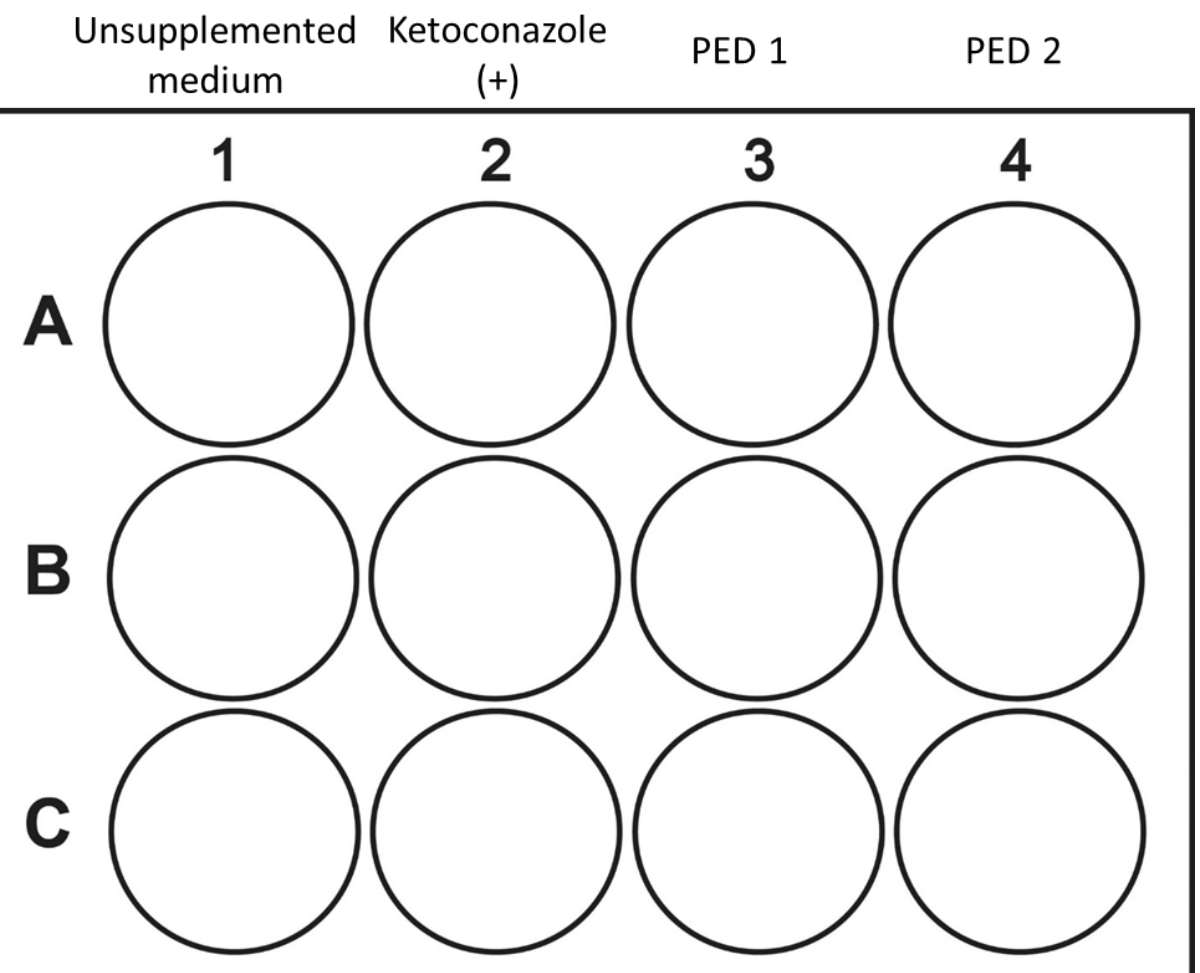


Figure 4: PED exposure assay done in triplicate. Following 48 hours, two wells were picked for competitive ELISA.

Figure 5: Process of competitive ELISA.

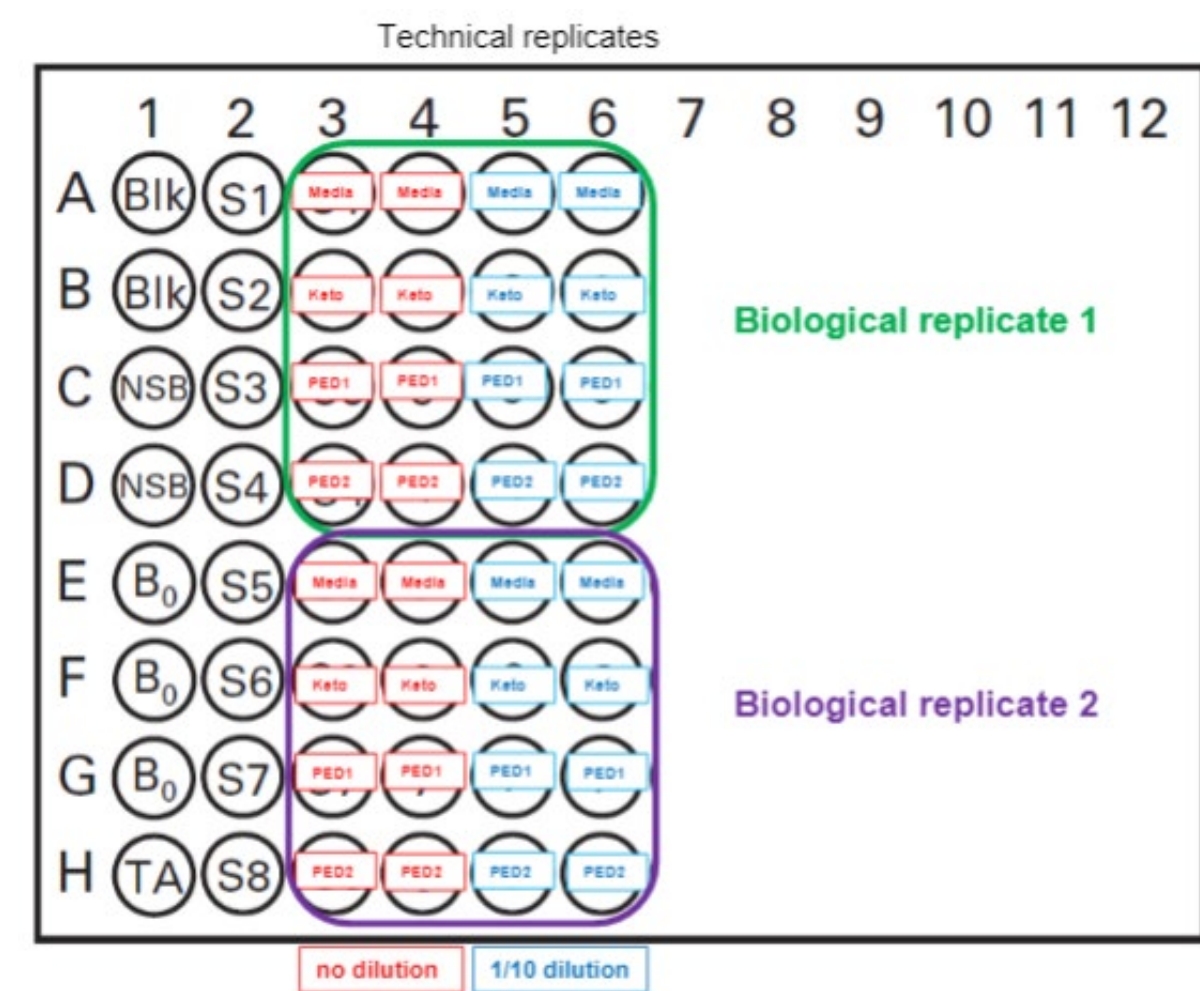
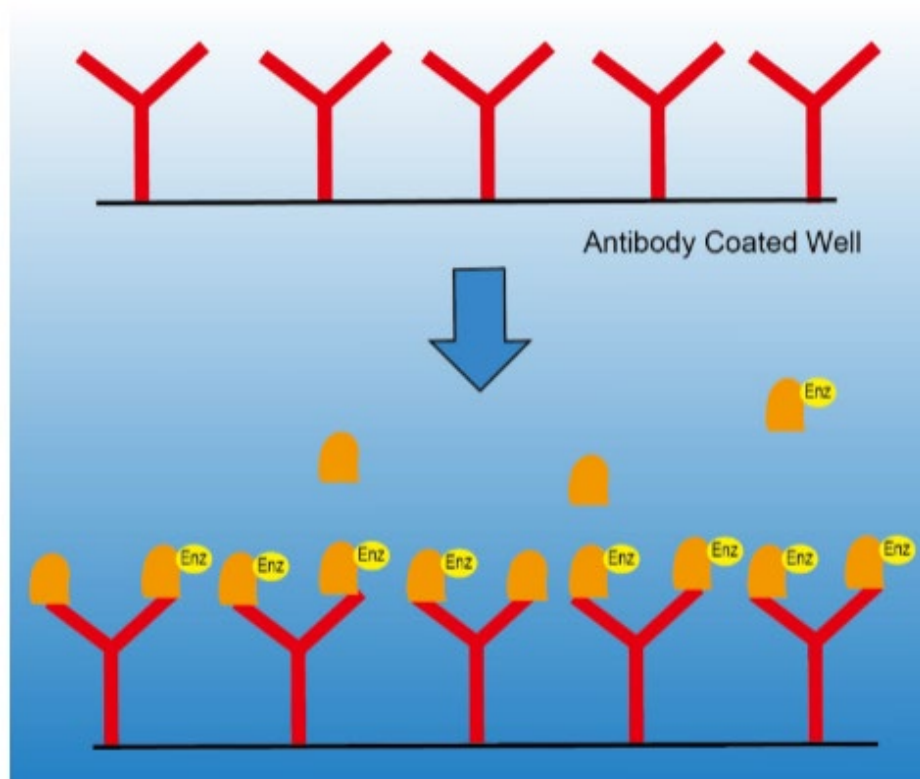


Figure 6: The layout of the ELISA plate.

## Results

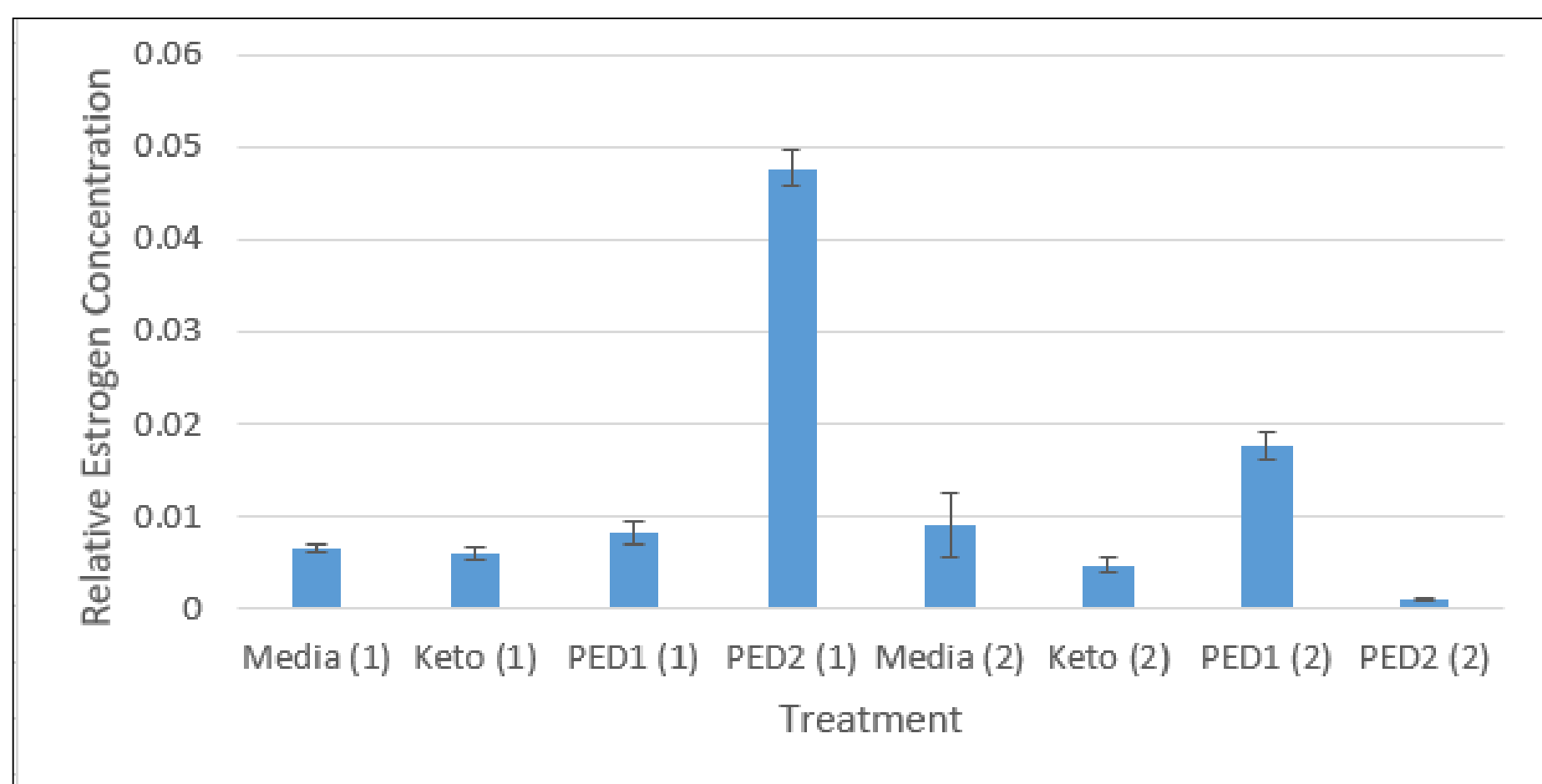


Figure 7: Effect of hand sanitizer on estradiol. The two samples showed opposite trends rendering the results inconclusive. PED1 and PED2 represent the 1:1 and 1:2 concentrations of hand sanitizer solution.

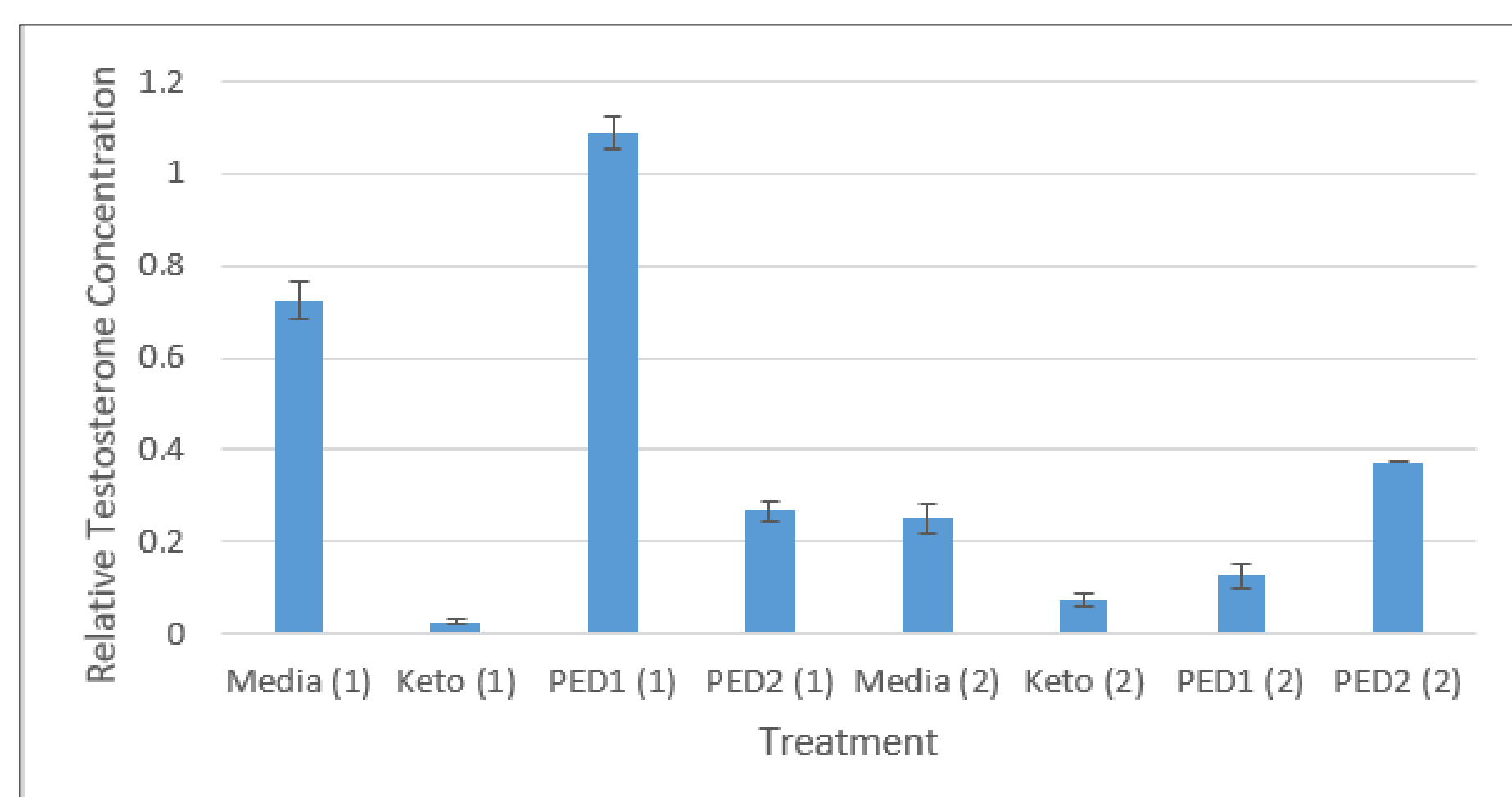


Figure 8: Effects of hand sanitizer on testosterone levels. The two samples showed opposite trends rendering the results inconclusive. PED1 and PED2 represent the 1:1 and 1:2 concentrations of hand sanitizer solution.

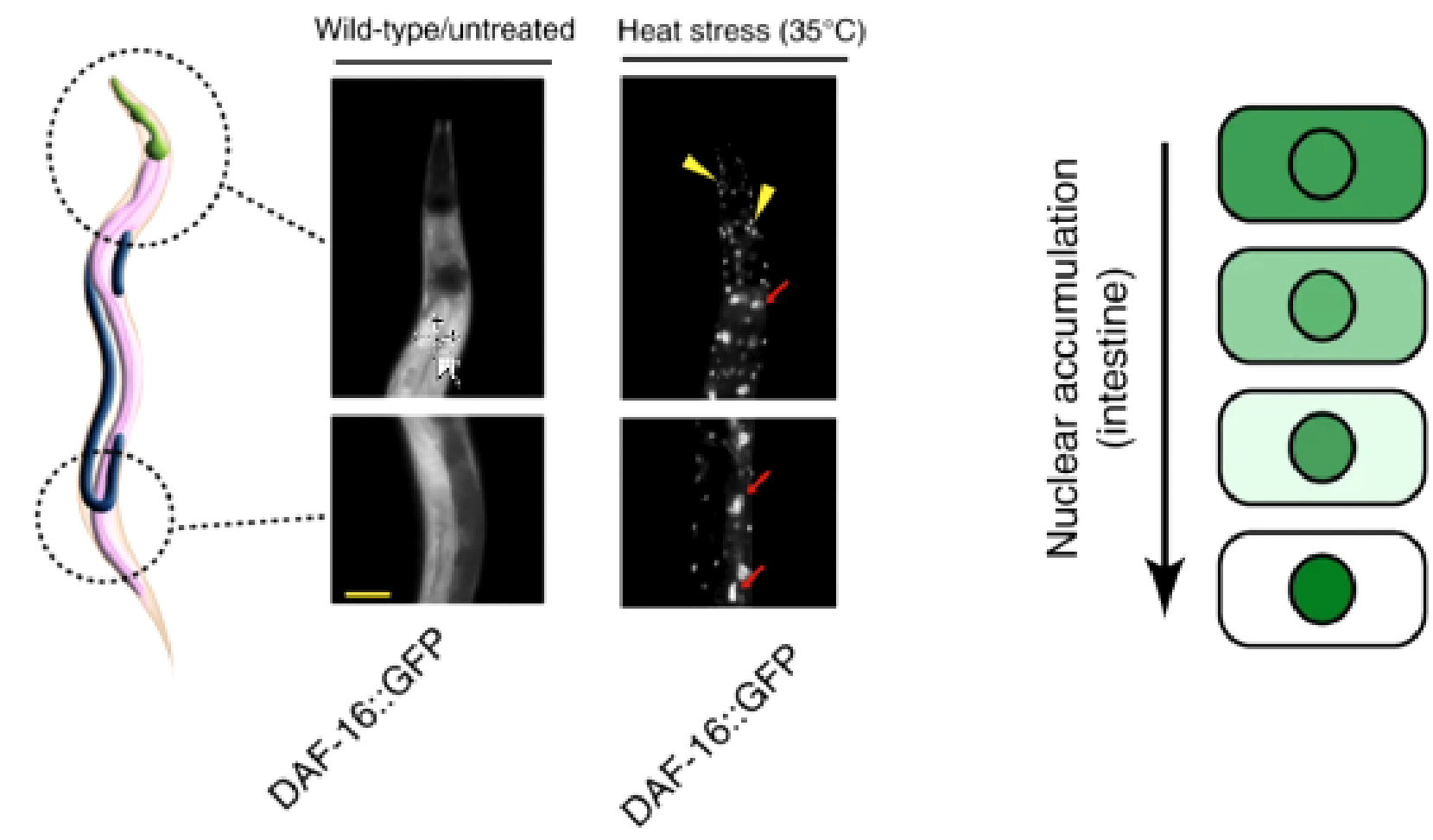


Figure 9: DAF-16::GFP expression in unstressed (control) and animals exposed to stress (heat shock).

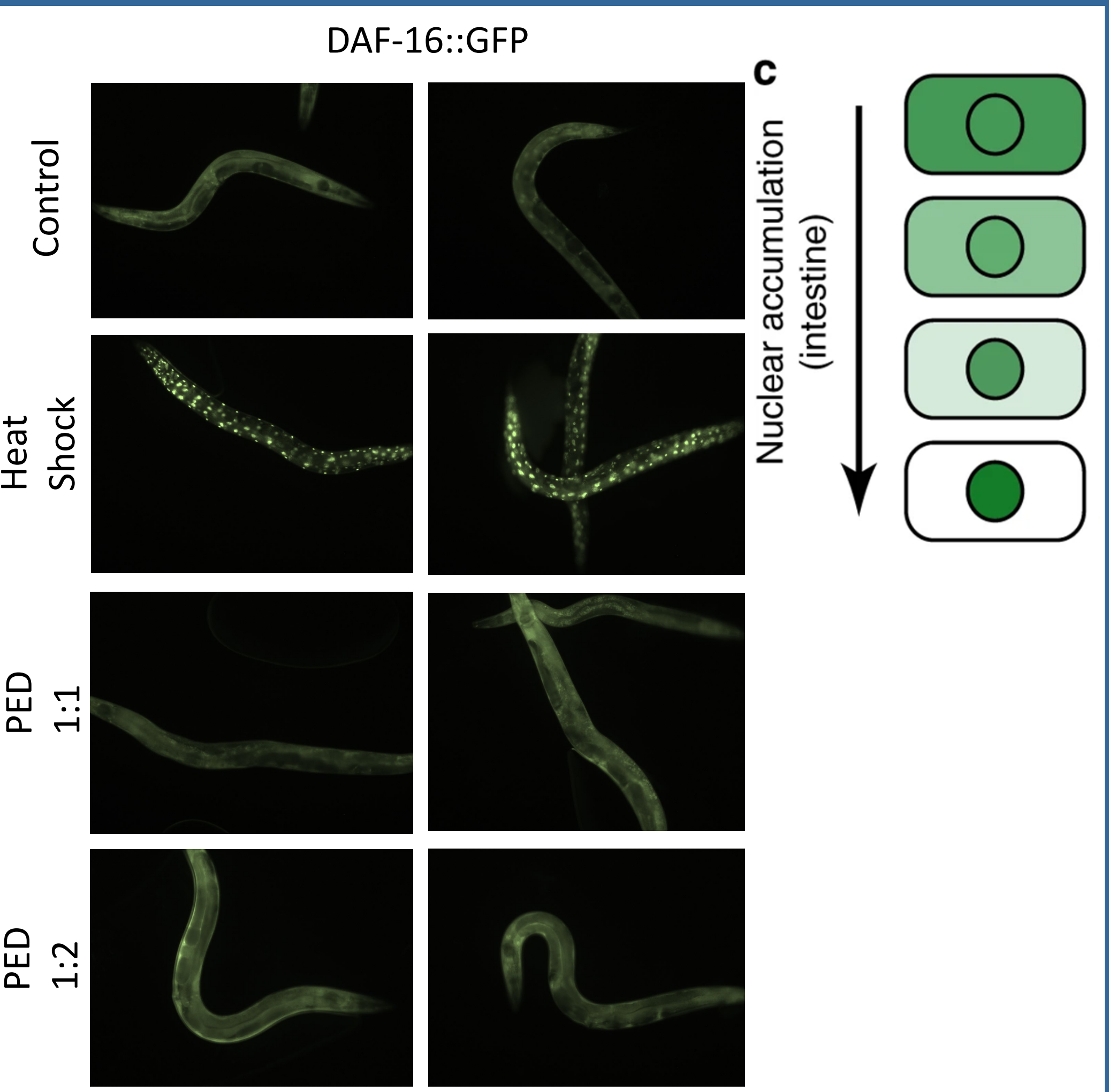


Figure 10: Visualization of DAF-16 using GF. The lack of nuclear import implies that the organisms are not under stress.

## Conclusion

Following exposure to the chosen concentrations of the hand sanitizer, the worms showed no notable distress. The two biological samples showed opposite trends in estradiol and testosterone levels rendering the results inconclusive. Although the hand sanitizer was not toxic to *C. elegans*, further evaluation is needed to assess its endocrine-disrupting potential.

## Acknowledgements

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