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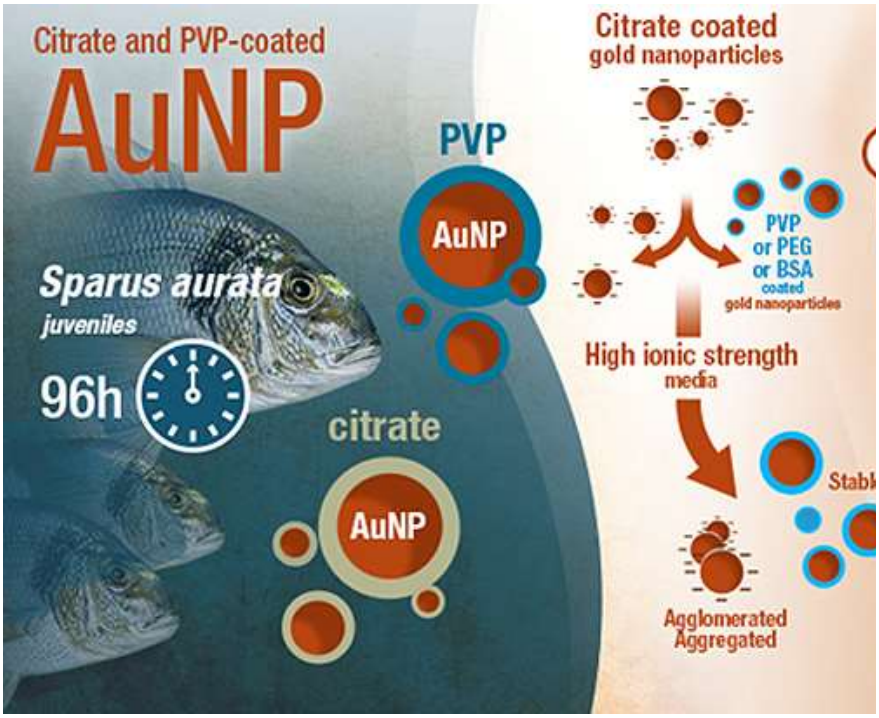
Gold nanoparticles can alter fish immune s



Gold nanoparticles (AuNP) are among the most used nanoparticles in high tec
little information about their effect on the environment and, particularly, on aqu
and the University of Aveiro, Portugal, have studied how these nanoparticles a
very important commercial fish species in Europe. The results indicate that wh
these fishes, they can cause changes in the levels of hormones that regula
also induced changes in the expression of genes associated with immune res
about the potential impact of these nanoparticles on marine fishes.

Nanoparticles are everywhere. With a range size between 1 and 100 nm, they act as minusc
information-loaded handshakes. Due to its ubiquitous nature and versatility, data on the potentia
nanoparticles is urgently required to ensure human and environmental safety and promote safe use

Among the most used nanoparticles, gold nanoparticles (AuNP) have been employed in high techn
water remediation and aquaculture practices. One of the prerequisites for its use is their non-toxic
effects of estuarine/marine organisms. An ongoing collaboration between Universitat Autònom
behaviour of AuNP under marine conditions and its effects to economically relevant fish species, su
widespread in Atlantic and Mediterranean coastal waters, is one of the most commercially importa
Europe.

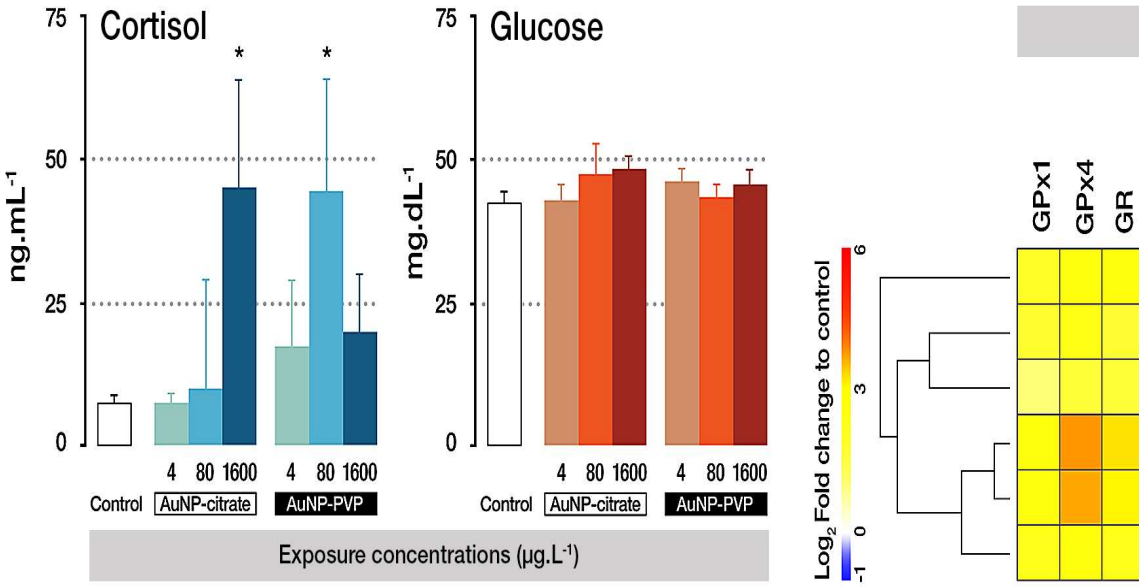


Fig. 1. Left: *Cortisol and glucose levels in Sparus aurata plasma after 96 h exposure to gold nanoparticles.* ***Right:*** *gene expressio represented with shades of orange/red. AuNP elicit changes in several immune- (il1ß, interleukin 1 ß; cox2, cyclooxygenase 2; igmh associated X protein), oxidative- (gpx1, gpx4, glutathione peroxidase 1 and 4; gr, glutathione reductase; cat, catalase; sod2, supero 6) and cellular stress-related transcripts (hsp70, heat shock protein 70; grp75, glucose-regulated protein, 75 kDa; mt, metallothionein*

Overall, data revealed that although citrate coated gold nanoparticles tend to aggregate polyvinylpyrrolidone, polyethylene glycol, bovine serum albumin) may provide them with stability t range. Dissolved AuNP seem able to activate the fish hypothalamus-pituitary-interrenal (HPI) axis, increasing plasma cortisol levels (Fig. 1, left) and potentially disrupting the endocrine responses in 96 hours of exposition to AuNP, even with biocompatible coatings and at low concentrations, can a immune responses and apoptosis/cell death processes (Fig. 1, right) in sea bream. This represents systemic/whole organism levels.

Further studies are being performed under different conditions to evaluate AuNP impact in the env for the safe use of nanoparticles.

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References

Teles M, Soares AM, Tort L, Guimarães L, Oliveira M. **Linking cortisol response with gene expre** *Environ*. 2017 Apr 15;584-585:1004-1011. doi: 10.1016/j.scitotenv.2017.01.153

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