

Rapid Response:

Testing for SARS-CoV-2 antibodies in Cetaceans

Dear Editor,

When dealing with SARS-CoV-2 antibodies and, more in general, with anti-SARS-CoV-2 immune response, adequate attention should be also paid to animal species, both domestic/domesticated (such as cats, ferrets and, to a lesser extent, dogs) and wild (such as lions, tigers, non-human primates and minks kept in captivity), which have been reported to be susceptible, at various degrees, to the Coronavirus pathogen responsible for CoViD-19 in mankind (1). Notably, a SARS-CoV-2 spillover from humans to farmed minks, coupled with a viral spillback from minks to humans, has been also described in the Netherlands (2).

Social distancing, hand washing and correct wearing of face masks have been clearly shown to confer strong protection against SARS-CoV-2 spread among people. In this respect, growing concern exists about the "environmental fate" of the aforementioned (disposable) masks, with marine (and terrestrial) contamination/pollution by millions (if not billions, provided that we are dealing with a pandemic!) of face masks being an absolutely realistic possibility. Indeed, a dramatically increasing marine pollution by plastic debris is already taking place across the entire Planet, with the "fish-to-plastic ratio", currently estimated to be 5:1, being expected to reach 1:1 by the year 2050 (3). This alarming context is made even more so by the fact that micro/nanoplastics are known to act as "attractors and concentrators" for a huge number of "persistent environmental contaminants" (like "heavy metals", PCBs, dioxins, "flame retardants", etc.), with Cetaceans (especially Odontocete Cetaceans like dolphins) being able to "accumulate" high levels of the aforementioned chemical pollutants inside their body tissues, given their position of "top predators" within the marine foodweb (4).

Obviously, this contaminant "transfer" through the alimentary chain may be consistently enhanced by micro/nanoplastics, following their acquirement on behalf of Cetaceans through ingestion of (plastic debris harbouring) prey. It has been additionally suggested that micro/nanoplastics could serve as "attractors and concentrators" also for infectious agents like *Toxoplasma gondii*, a protozoan pathogen of concern for free-ranging dolphins and whales (5). It is currently unknown, in fact, how "pelagic" or "offshore" cetacean species may acquire *T. gondii* infection, given the "dilution effect" plausibly exerted by the sea water towards this parasite (as well as, most likely, towards other protozoan and non-protozoan agents).

Coming back to SARS-CoV-2, is it biologically plausible that the "scenario" depicted above for *T. gondii* could also apply to the "new" human beta-coronavirus, which has now caused more than 1 million deaths worldwide? When viewed from a "biological plausibility standpoint", coupled with an appropriate use of the "principle of precaution" and of the "One Health concept", my answer would be "yes, it is". My "affirmative" reply to such a

relevant issue results from the (presumably) "large scale contamination" of marine (and terrestrial) ecosystems (not equally across the Planet, most likely) on behalf of "not adequately disposed face masks", an unknown number/percentage of which could also harbour SARS-CoV-2 (which could be subsequently "attracted and concentrated" by micro/nanoplastics).

Furthermore, based upon the data of an interesting article recently published in PNAS, bottlenose dolphins (*Tursiops truncatus*) and grey whales (*Echrichtius robustus*) would rank among the mammalian species with the highest similarity/homology level of their ACE-2 SARS-CoV-2 viral receptor with the human one.

Of course, we don't know yet if "dolphins and whales" are truly susceptible to SARS-CoV-2 infection, with much more work being needed before we can conclude if this is or is not the case.

Nevertheless, as already recommended for SARS-CoV-2-susceptible "synanthropic" species (like cats and dogs), an "ad hoc" search for SARS-CoV-2 antibodies should be carried out also on "stranded" Cetaceans, in a similar manner to what is "routinely" done for a number of infectious pathogens of documented concern for the marine Cetofauna (such as Morbillivirus, Herpesvirus, *Brucella ceti* and the previously mentioned *T. gondii*).

References

- 1) Di Guardo G. (2020) - Journal of Comparative Pathology.
- 2) Di Guardo G. (2020) - Drug Target Review.
- 3) World Economic Forum Report (2016).
- 4) Di Guardo G., Mazzariol S. (2017) - Science.
- 5) Di Guardo G. (2020) - Protistology.

Competing interests: No competing interests

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