

## Reply: COVID-19 in liquid nitrogen: a potential danger still disregarded

Sir,

We would like to thank Drs [Parmegiani and Vajta \(2020\)](#) for their appreciation and for their comments about our opinion paper ([Alteri et al., 2020](#)).

We agree with our colleagues that the contamination of liquid nitrogen and nitrogen vapour (LN<sub>2</sub>/NV) with SARS-CoV-2 in one of the steps from manufacturing to distribution might represent a potential source for virus spreading and this risk seems to be still largely disregarded. In order to deal with this issue, the technology for sterilizing liquid nitrogen has been developed and might be worthwhile at minimizing pathogen exposure risks during cryopreservation and warming ([Parmegiani et al., 2012](#)). In addition, dilution steps when handling embryos and oocytes before vitrification and after warming should represent a strategy to reduce any possible contaminants ([European Society of Human Reproduction and Embryology, 2020](#)). Nonetheless, the importance of SARS-CoV-2 airborne infection spreading and the use of preventive measures to mitigate this route of airborne transmission have been strongly emphasized ([Morawska and Milton, 2020](#)). Indeed, the use of personal protective equipment during the COVID-19 pandemic is highly recommended in every working context, also during LN<sub>2</sub>/NV manufacturing, transport, storage, distribution and application (<https://osha.europa.eu/en/themes/covid-19-resources-workplace>). The implementation of safe work practices to limit exposure to SARS-CoV-2 at work requires first assessing the risks, and then implementing control measures to minimize worker exposure.

Against this background, it is reassuring that the risk of SARS-CoV-2 contamination of LN<sub>2</sub>/NV due to airborne spreading may be considered negligible, as long as good laboratories practices and European regulations are always observed.

### Conflict of interest

E.S. reports personal fees from Theramex, Merck Serono and Health Reimbursement Arrangement, nonfinancial support from Merck

Serono, grants from Ferring and Theramex, outside the submitted work. P.V. reports grants from Theramex and ESHRE and speakers' honoraria from Merck outside the submitted work. The remaining authors have no competing interests.

### References

- Alteri A, Pisaturo V, Somigliana E, Viganò P. Cryopreservation in reproductive medicine during the COVID-19 pandemic: rethinking policies and European safety regulations. *Hum Reprod* 2020;doi:10.1093/humrep/deaa210.
- European Society of Human Reproduction and Embryology. *News and Statements. Coronavirus Covid-19: ESHRE Statement on Pregnancy and Conception*. [https://www.eshre.eu/Press-Room/ESHRE-News#COVID19\\_April2](https://www.eshre.eu/Press-Room/ESHRE-News#COVID19_April2) (21 September 2020, date last accessed).
- Morawska L, Milton DK. It is time to address airborne transmission of COVID-19. *Clin Infect Dis* 2020;ciaa939. doi:10.1093/cid/ciaa939
- Parmegiani L, Accorsi A, Bernardi S, Arnone A, Cognigni GE, Filicori M. A reliable procedure for decontamination before thawing of human specimens cryostored in liquid nitrogen: three washes with sterile liquid nitrogen (SLN2). *Fertil Steril* 2012;**98**: 870–875.
- Parmegiani L, Vajta G. COVID-19 in liquid nitrogen: a potential danger still disregarded. *Hum Reprod* 2020;doi:10.1093/humrep/deaa288.

Alessandra [Alteri](#)<sup>1</sup>, Valerio [Pisaturo](#)<sup>1</sup>, Edgardo [Somigliana](#)<sup>1</sup> and Paola [Viganò](#)<sup>1,\*</sup>

<sup>1</sup>Reproductive Sciences Laboratory, Obstetrics and Gynaecology Unit, IRCCS San Raffaele Scientific Institute, Milan 20132, Italy

\*Correspondence address. Reproductive Sciences Laboratory, Obstetrics and Gynaecology Unit, IRCCS San Raffaele Scientific Institute, Milan 20132, Italy. Tel: +39-0226436228; Fax: +39-0226435266; E-mail: [vigano.paola@hsr.it](mailto:vigano.paola@hsr.it)

doi:10.1093/humrep/deaa287