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RESEARCH AREA: VIRUS

TITLE: Morphological feature of SARS-CoV-2 infection, histopathological studies by Electron Microscopy

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UNIVPM Research Group: Experimental Pathology

Research activity description: An ongoing pandemic of respiratory disease caused by infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has spread to Italy and many other countries. Real-time reverse transcriptase–polymerase chain reaction (rRT-PCR) of nasopharyngeal swabs typically has been used to confirm the clinical diagnosis. However, whether the virus can be detected in specimens from different tissue, and the analysis of the pathological features in the tissues of patients who have died with COVID-19 could help us to understand the disease pathogenesis and clinical outcomes. Indeed, the SARS-CoV-2 receptor angiotensin converting enzyme 2 (ACE2) is highly expressed on several tissues constituting a possible viral target.

We investigated the biodistribution of SARS-CoV-2 among different human postmortem tissues obtained during autopsy tested positive for SARS-CoV-2.

We search for electron microscopic evidence in different tissues with the aim to clarify the pathogenesis and improve the cure and the outcome.

In samples of lung, heart and kidney collected and processed for Transmission and Scanning Electron Microscopy (TEM and SEM) virions of SARS-CoV-2 were found corroborating the hypothesis that the virus enters the cells of different organs. This was the first report identifying SARS-CoV-2 in different human tissues by TEM and SEM (Pesaresi M, Pirani F, Tagliabracchi A, Valsecchi M, Procopio AD, Busardò FP, **Graciotti L.** SARS-CoV-2 identification in lungs, heart and kidney specimens by transmission and scanning electron microscopy. *Eur Rev Med Pharmacol Sci.*



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2020;24(9):5186-5188. doi:10.26355/eurrev_202005_21217). https://doi.org/10.26355/eurrev_202005_21217

We also describe a possible pathogenetic hypothesis, which considers fat necrosis and inflammation as likely crucial contributors to SARS-CoV-2-induced fat embolism syndrome, particularly in obese patients. Cinti, S., **Graciotti, L.**, Giordano, A. *et al.* COVID-19 and fat embolism: a hypothesis to explain the severe clinical outcome in people with obesity. *Int J Obes* (2020).

Link: <https://www.nature.com/articles/s41366-020-0624-5>

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