



Editorial

# Neurological Manifestation of COVID-19: Current Knowledge on Pathophysiology, Clinical Manifestation and Management

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Within the first few weeks of the outbreak of the COVID-19 pandemic, reports about the neurological manifestations and complications of the disease had already emerged. Smell and taste disorders and prolonged encephalopathy syndromes were among the first manifestations to be described. Since then, multiple neurological manifestations of COVID-19 have been identified, including extra-CNS manifestations [1]. Soon, it became clear that it was only possible to quickly increase our knowledge of neurological COVID-19 manifestations via large-scale international cooperation. In this context, the EAN launched one of the first international registries (ENERGY) to improve our knowledge of neurological complications but also of long-term manifestations, and a prevalence of neurological complications between 20% and 60%, depending on the study population, was found [2–4]. Given the enormous number of confirmed cases (556,897,312 according to the WHO as of 15 July 2022), even if only 20% of those infected with COVID-19 exhibit neurological symptoms, the worldwide impact is indescribable. Nevertheless, only a few studies have addressed the pathophysiological pathways of neurological COVID-19 manifestations; accordingly, many questions remain unanswered.

With the ongoing pandemic, the severity of COVID-19 seems to have diminished to some extent, probably due to growing immunity (either due to infection or vaccination) than through less dangerous new variants of the COVID-19 virus. With the diminished overall disease severity, the distribution and extent of neurological manifestations has also changed: on the one hand, severe manifestations such as prolonged encephalopathy syndromes seem to be less frequent than they were in the beginning of the pandemic, and on the other hand, the importance of the long-term neurological COVID-19 manifestations have come to the forefront. Many patients complain of fatigue and neuropsychological deficits in particular, even several months after infection, which have an enormous effect not only on the patient but also on society [5].

In this Special Issue of *CTN*, our current knowledge on epidemiology, pathophysiology, and the implications of acute and long-term neurological manifestations of COVID-19 and the vaccines against it are discussed.

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## References

1. Bassetti, C.; Jung, S.; Helbok, R. Das neurologische Spektrum der COVID-19-Erkrankung. *Swiss Med. Forum* **2021**, *21*, 385–390. [[CrossRef](#)]
2. Beghi, E.; Helbok, R.; Crean, M.; Chou, S.H.; McNett, M.; Moro, E.; Bassetti, C.; EAN Neuro-COVID Task Force. The European Academy of Neurology COVID-19 registry (ENERGY): An international instrument for surveillance of neurological complications in patients with COVID-19. *Eur. J. Neurol.* **2021**, *28*, 3303–3323. [[CrossRef](#)] [[PubMed](#)]
3. Beghi, E.; Helbok, R.; Ozturk, S.; Karadas, O.; Lisnic, V.; Grosu, O.; Kovács, T.; Dobronyi, L.; Bereczki, D.; Cotelli, M.S.; et al. Short- and long-term outcome and predictors in an international cohort of patients with neuro-COVID-19. *Eur. J. Neurol.* **2022**, *29*, 1663–1684. [[CrossRef](#)] [[PubMed](#)]
4. Chou, S.H.; Beghi, E.; Helbok, R.; Moro, E.; Sampson, J.; Altamirano, V.; Mainali, S.; Bassetti, C.; Suarez, J.I.; McNett, M.; et al. Global Incidence of Neurological Manifestations Among Patients Hospitalized With COVID-19-A Report for the GCS-NeuroCOVID Consortium and the ENERGY Consortium. *JAMA Netw. Open* **2021**, *4*, e2112131. [[CrossRef](#)] [[PubMed](#)]
5. Diem, L.; Fregolente-Gomes, L.; Warncke, J.D.; Hammer, H.; Friedli, C.; Kamber, N.; Jung, S.; Bigi, S.; Funke-Chambour, M.; Chan, A.; et al. Fatigue in Post-COVID-19 Syndrome: Clinical Phenomenology, Comorbidities and Association with Initial Course of COVID-19. *J. Cent. Nerv. Syst. Dis.* **2022**, *14*, 11795735221102727. [[CrossRef](#)] [[PubMed](#)]