



behavior a criminal offense, protecting professionals from similar situations. Brazilian psychiatrists and other health professionals should be vigilant against this emerging and potentially dangerous phenomenon.

João Pedro Soledade Signori,<sup>1</sup>  Gustavo Cambraia do Canto,<sup>2,3</sup> Thiago Henrique Roza,<sup>2,3</sup>  Lisieux Elaine de Borba Telles,<sup>2,3</sup> Marcelo Pio de Almeida Fleck<sup>1,2</sup>

<sup>1</sup>Serviço de Psiquiatria, Departamento de Psiquiatria e Medicina Legal, Universidade Federal do Rio Grande do Sul (UFRGS), Hospital de Clínicas de Porto Alegre (HCPA), Porto Alegre, RS, Brazil. <sup>2</sup>Programa de Pós-Graduação em Psiquiatria e Ciências do Comportamento, Centro de Pesquisa Clínica, UFRGS, HCPA, Porto Alegre, RS, Brazil. <sup>3</sup>Serviço de Psiquiatria de Adições e Forense, Departamento de Psiquiatria e Medicina Legal, UFRGS, HCPA, Porto Alegre, RS, Brazil.

Submitted Jan 10 2022, accepted Mar 01 2022, Epub Jul 15 2022.

## Disclosure

The authors report no conflicts of interest.

**How to cite this article:** Signori JPS, do Canto GC, Roza TH, de Borba Telles LE, de Almeida Fleck MP. Stalking in clinical psychiatry: when the doctor becomes the victim. *Braz J Psychiatry*. 2022;44:464-465. <http://doi.org/10.47626/1516-4446-2022-2464>

## References

- Dressing H, Kuehner C, Gass P. The epidemiology and characteristics of stalking. *Curr Opin Psychiatry*. 2006;19:395-9.
- Westrup D, Fremouw WJ. Stalking behavior: a literature review and suggested functional analytic assessment technology. *Aggress Violent Behav*. 1998;3:255-74.
- Pathé M, Mullen PE. The impact of stalkers on their victims. *Br J Psychiatry*. 1997;170:12-7.
- Dreßing H, Gass P, Schultz K, Kuehner C. The prevalence and effects of stalking. *Dtsch Arztebl Int*. 2020;117:347-53.
- Mester R, Birger M, Margolin J. Stalking. *Isr J Psychiatry Relat Sci*. 2006;43:102-11.
- Brasil, Secretaria Geral. Lei nº 14.132, 31 de março de. 2021. [www.planalto.gov.br/ccivil\\_03/\\_ato2019-2022/2021/lei/l14132.htm](http://www.planalto.gov.br/ccivil_03/_ato2019-2022/2021/lei/l14132.htm).
- Whyte S, Penny C, Christopherson S, Reiss D, Petch E. The stalking of psychiatrists. *Int J Forensic Ment Health*. 2011;10:254-60.
- Galeazzi GM, Elkins K, Curci P. The stalking of mental health professionals by patients. *Psychiatr Serv*. 2005;56:137-8.
- Zona MA, Palarea RE, Lane J. Psychiatric diagnosis and the offender-victim typology of stalking. In: Meloy JR. *The psychology of stalking* Arlington: Academic Press; 1998. p.69-84.
- Mullen PE, Pathé M, Purcell R, Stuart GW. Study of stalkers. *Am J Psychiatry*. 1999;156:1244-9.
- McIvor RJ, Petch E. Stalking of mental health professionals: an underrecognised problem. *Br J Psychiatry*. 2006;188:403-4.
- Pathé MT, Mullen PE, Purcell R. Patients who stalk doctors: their motives and management. *Med J Aust*. 2002;176:335-8.

# Ayahuasca and its interaction with the sigma-1 receptor: a potential treatment for COVID-19

*Braz J Psychiatry*. 2022 Jul-Aug;44(4):465-466  
doi:10.47626/1516-4446-2022-2541



SARS-CoV-2 infects alveolar epithelial cells by endocytosis through the angiotensin-converting enzyme II (ACE2) receptor, which initiates virus replication and its effects on the respiratory system.<sup>1</sup> However, ACE2 receptors are also found on glial cells, the olfactory bulb, the hippocampus, the brainstem, and spinal neurons.<sup>2</sup> Thus, the virus could enter the nervous system through the cribriform plate towards the olfactory bulb, altering the permeability of the blood-brain barrier to easily reach all parts of the nervous system.<sup>2</sup>

Once the virus enters the interior of the cell through the ACE2 receptors, it interacts with the sigma-1 receptor, which is located in the endoplasmic reticulum, conditioning its structure to create the ideal conditions for replication.<sup>3</sup>



It is suggested that sigma-1 receptor agonists could serve as a prophylactic treatment, since these drugs, by occupying this receptor, prevent modification of intracellular machinery to the needs of SARS-CoV-2, stopping the inflammatory process induced by the cytokine storm. For this reason, the use of fluvoxamine, donepezil, arketamine, among others, has been proposed.<sup>4</sup>

Preliminary evidence has been found about the effects of antidepressants in relation to severe impairment and death<sup>5</sup> in Covid-19. Lenze et al.<sup>6</sup> found that a group treated with fluvoxamine had a lower probability of clinical deterioration. There is a significant association between antidepressant use (whether selective serotonin reuptake inhibitors or not) and a reduced risk of intubation or death.<sup>7</sup>

Ayahuasca, a compound used in South American folk healing rituals, is currently being studied for its therapeutic potential to treat mental illnesses.<sup>8</sup> It contains  $\beta$ -carbolines (harmine, harmaline and tetrahydroharmine), which are monoamine oxidase inhibitors, and a substance analogous to serotonin called N,N-dimethyltryptamine (DMT), which is responsible for rapid antidepressant and anxiolytic effects.<sup>9</sup> In relation to Covid-19, preliminary evidence has been published on the use of DMT to treat mental health problems in recovered patients.<sup>10</sup>

Various studies have shown that DMT is an agonist of the sigma-1 receptor, which is related to synaptic plasticity in dendritic growth, and that it has anti-inflammatory action, which could attenuate the pathophysiological neuroinflammation mechanism of neuropsychiatric and neurodegenerative diseases.<sup>11</sup> Although this evidence supported the therapeutic potential of ayahuasca components for mental illnesses prior to the pandemic, in this new scenario these findings could lead to more effective forms of treatment against SARS-CoV-2 beyond neuropsychiatric diseases.

Finally, by interacting with the sigma-1 receptor, the alkaloids found in ayahuasca might inhibit the replication of SARS-CoV-2 once inside the cell, preventing Covid-19 infection and, ultimately, the development of serious complications. It is an opportune time to develop studies on the evolution of COVID-19 among populations that regularly consume ayahuasca due to its potential preventive effects against SARS-CoV-2 infection.

Guillermo Saúl **Escobar-Cornejo**,<sup>1</sup>  Diego Mauricio **Escobar-Cornejo**,<sup>2</sup> Luis Fernando **Ramos-Vargas**<sup>1</sup>   
<sup>1</sup>Escuela Profesional de Psicología, Universidad Católica de Santa María, Arequipa, Perú. <sup>2</sup>Escuela de Posgrado, Universidad San Martín de Porres, Lima, Perú.

Submitted Feb 17 2022, accepted Apr 05 2022, Epub Jul 15 2022.

## Disclosure

The authors report no conflicts of interest.

**How to cite this article:** Escobar-Cornejo GS, Escobar-Cornejo DM, Ramos-Vargas LF. Ayahuasca and its interaction with the sigma-1 receptor: a potential treatment for COVID-19. *Braz J Psychiatry*. 2022;44:465-466. <http://doi.org/10.47626/1516-4446-2022-2541>

## References

- Richardson P, Griffin I, Tucker C, Smith D, Oeschle O, Phelan A, et al. Baricitinib as potential treatment for 2019-nCoV acute respiratory disease. *Lancet*. 2020;395:e30-1.
- Panariello F, Cellini L, Speciani M, De Ronchi D, Atti AR. How does SARS-CoV-2 affect the central nervous system? A working hypothesis. *Front Psychiatry*. 2020;11:582345.
- Vela JM. Repurposing sigma-1 receptor ligands for COVID-19 therapy? *Front Pharmacol*. 2020;11:582310.
- Gordon DE, Jan GM, Bouhaddou M, Xu J, Obernier K, White KM, et al. A SARS-CoV-2 protein interaction map reveals targets for drug repurposing. *Nature*. 2020;583:459-68.
- Bora ES, Arikan C, Yurtsever G, Acar H, Delibas DH, Topal FE. Is it possible that antidepressants protect against COVID-19? Antidepressants and covid. *Ann Clin Anal Med*. 2021;12:991-4.
- Lenze EJ, Mattar C, Zorumski CF, Stevens A, Schweiger J, Nicol GE, et al. Fluvoxamine vs placebo and clinical deterioration in outpatients with symptomatic COVID-19: a randomized clinical trial. *JAMA*. 2020;324:2292-300.
- Hoertel N, Sánchez-Rico M, Vernet R, Beeker N, Jannot AS, Neuraz A, et al. Association between antidepressant use and reduced risk of intubation or death in hospitalized patients with COVID-19: results from an observational study. *Mol Psychiatry*. 2021;26:5199-212.
- Orsolini L, Chiappini S, Papanti D, Latini R, Volpe U, Fornaro M, et al. How does ayahuasca work from a psychiatric perspective? Pros and cons of the entheogenic therapy. *Hum Psychopharmacol*. 2020;35:e2728.
- Dos Santos RG, Hallak JEC. Therapeutic use of serotonergic hallucinogens: a review of the evidence and of the biological and psychological mechanisms. *Neurosci Biobehav Rev*. 2020;108:423-34.
- Kelly JR, Crockett MT, Alexander L, Haran M, Baker A, Burke L, et al. Psychedelic science in post-COVID-19 psychiatry. *Ir J Psychol Med*. 2021;38:93-8.
- da Silva MG, Daros GC, de Bitencourt RM. Anti-inflammatory activity of ayahuasca: therapeutic implications in neurological and psychiatric diseases. *Behav Brain Res*. 2021;400:113003.