

## LETTER TO THE EDITOR

# Porcine-derived medical therapies for SARS-CoV-2: Traversing Muslim bioethical concerns and assuring equity

Dear Editor,

In the June issue of the *European Journal of Immunology*, Vanhove et al. shared promising results using novel swine glyco-humanized polyclonal antibody, XAV-19, to combat severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infectivity.<sup>1</sup> In their studies, immunized animals developed a rapid polyclonal hyperimmune response that inhibited infection of human cells by SARS-CoV-2 in cytopathic assays. A related in-vitro study found XAV-19 to be effective against British and South African variants of SARS-CoV-2 as well.<sup>2</sup> These encouraging results have set in motion a randomized, double-blinded, placebo-controlled Phase 2 trial among patients with SARS-CoV-2-induced pneumonia.<sup>3</sup>

The posited benefits of using glyco-humanized polyclonal antibodies over convalescent plasma are several, including a more directed and consistent neutralization of SARS-CoV-2 virus and lessened inflammatory-related ill effects.<sup>1</sup> Hence, these data open up a new frontier for human therapeutics that target pathogens without evoking adverse immunogenic responses. At the same time, the porcine origin and incubation of these antibodies may raise concerns among some religious communities. In anticipation of a near future where XAV-19 is an option for SARS-CoV-2 infection, and where swine glyco-humanized polyclonal antibodies are used to combat other diseases, this correspondence is meant to raise awareness of such potential concerns and suggest a path to address them.

The global Muslim community, numbering nearly 2 billion persons, may raise concerns about the use of swine glycol-humanized antibodies. Based on scriptural sources, the Islamic legal tradition holds pigs to be inherently filthy, *najas al-ayn*, and as such it is not only forbidden to consume but also generally prohibited to use for human benefit.<sup>4</sup> This legal notion informs ethical norms and cultural attitudes about porcine-derived products in healthcare. Over the past several decades, Muslim patients and clinicians around the globe have queried religious authorities about the permissibility of using pig valves, porcine-derived heparin, vaccines and medications with porcine-based gelatin, xenotransplantation from pigs, and the like. The response from Islamic jurists to such questions is almost univocal; while the general use of such therapeutics is prohibited, exceptions can be made based on a credible life threat should the treatment not be taken and the absence of alternative efficacious regimens.<sup>5</sup> Rec-

ognizing that Muslim countries are not at the forefront of biomedical innovation and that contingent usage should not be the norm, some Islamic juridical councils also call on Muslim stakeholders to pursue research into non-porcine based therapeutics. Against this backdrop, various Muslim publics remain uncertain about, and at times avoid, therapies that can be related to pork. Should XAV-19 prove to be an effective therapy against SARS-CoV-2, its usage in Muslim communities will likely run up against these norms and attitudes. Consequently, a targeted strategy of religiously tailored education and communication that addresses points of religious concern while promoting informed choices will need to be enacted in order to ensure healthcare equity.

Given that religious permissibility depends on the absence of alternative efficacious regimens and a potential life threat, XAV-19 will have to be proven to be significantly more efficacious than convalescent plasma in treating specific SARS-CoV-2 related ailments that are life-threatening. Such data will need to be furnished to Islamic jurists so that they can authorize contingent usage for Muslim polities. At the same time, at the community level, religiously tailored communiqués that include decision aids noting religious permissibility under life-threat may prove useful. Beyond this, educational seminars or podcasts that bring together clinicians and religious scholars to dispel myths about the science, discuss the diverse religious edicts on the usage of porcine in medical therapy, and encourage informed decision-making may be appropriate.

A model for such religiously tailored and ethically balanced resources and programming was recently implemented in the United States and addressed the topic of organ donation. Organ donation is controversial in Muslim public circles given histories of distrust of the biomedical establishment, disquiet over the entity of "brain death," and religious values around the dignity and sanctity of the human body. Islamic jurists hold different positions on the matter as well.<sup>6</sup> As a result, Muslim attitudes are more negative than that of their counterparts, and Muslims are noted to be reticent to receive as well as donate organs.<sup>7</sup> To address this context, my research team partnered with the *Fiqh* Council of North America and the International Institute for Islamic Thought to investigate the religious, clinical, social scientific, and bioethical dimensions of the issue. Ultimately, we joined together to furnish a religious edict that specified conditions of permissibility.<sup>8</sup> We also partnered with multiple organ procurement

organizations to design a religiously tailored pamphlet<sup>9</sup> and conducted a randomized crossover trial of mosque-based educational workshops that proved effective in increasing knowledge about the religious and biomedical dimensions of organ donation, participant preparedness to make informed choices about the matter, and their organ donation intent.<sup>10</sup> As XAV-19 moves forward to Phase 2 trials, and other swine glyco-humanized antibodies become viable therapeutic options, pharmaceutical and clinical stakeholders should begin to lay the foundations for public acceptability by engaging with Muslim stakeholders and developing religiously tailored and ethically balanced educational resources.

#### ACKNOWLEDGMENT

The author thanks Dr. Emanuele Cozzi for his work on this novel therapy and assistance with this correspondence.

#### CONFLICT OF INTEREST

The author has no conflicts of interest to report and is solely responsible for the content of this manuscript.

#### ETHICS STATEMENT

This submission does not involve human subjects research and thus ethics oversight. There is no data to report or share.

Aasim I. Padela<sup>1,2,3</sup> 

<sup>1</sup> Initiative on Islam and Medicine, Brookfield, Wisconsin, USA

<sup>2</sup> Center for Bioethics and the Medical Humanities, Institute for Health and Equity, Medical College of Wisconsin, Milwaukee, Wisconsin, USA

<sup>3</sup> Department of Emergency Medicine, Medical College of Wisconsin, Milwaukee, Wisconsin, USA

#### Correspondence

Aasim I. Padela, MD, MSc, 8701 West Watertown Plank Road, HUB for Collaborative Medicine, Medical College of Wisconsin Milwaukee, Wisconsin 53226.

Email: [apadela@mcw.edu](mailto:apadela@mcw.edu)

#### KEYWORDS

COVID-19, Islam, polyclonal antibodies, religion

#### ORCID

Aasim I. Padela  <https://orcid.org/0000-0003-4834-2889>

#### REFERENCES

1. Vanhove B, Duvaux O, Rouse J, et al. High neutralizing potency of swine glyco-humanized polyclonal antibodies against SARS-CoV-2. *Eur J Immunol.* 2021;51(6):1412-1422.
2. Vanhove B, Marot SS & Gaborit B et al. XAV-19, a novel swine glyco-humanized polyclonal antibody against SARS-CoV-2 spike, efficiently neutralizes B. 1.1. 7 British and B. 1.351 South-African variants. *bioRxiv.* 2021.
3. Gaborit B, Vanhove B, Vibet M-A, et al. Evaluation of the safety and efficacy of XAV-19 in patients with COVID-19-induced moderate pneumonia: study protocol for a randomized, double-blinded, placebo-controlled phase 2 (2a and 2b) trial. *Trials.* 2021;22(1):199.
4. Younas S. Pork gelatin: permissible or not? 2010. Accessed February 1, 2011. [www.seekerguidance.org/ans-blog/2010/04/15/pork-gelatin-permissible-or-not/](http://www.seekerguidance.org/ans-blog/2010/04/15/pork-gelatin-permissible-or-not/)
5. Padela AI, Furber SW, Kholwadia MA, Moosa E. Dire necessity and transformation: entry-points for modern science in Islamic bioethical assessment of porcine products in vaccines. *Bioethics.* 2014;28(2):59-66.
6. Padela AI, Duivenbode R. The ethics of organ donation, donation after circulatory determination of death, and xenotransplantation from an Islamic perspective. *Xenotransplantation.* 2018;25(3):1-12.
7. Sharif A, Jawad H, Nightingale P, et al. A quantitative survey of Western Muslim attitudes to solid organ donation. *Transplantation.* 2011;92(10):1108-1114.
8. Padela AI, Auda J. The moral status of organ donation and transplantation within Islamic law: the Fiqh Council of North America's position. *Transplant Direct.* 2020;6(3):e536.
9. Organ donation: A guide to medical and religious considerations for American Muslims. Initiative on Islam and Medicine. Brookfield, Wisconsin. Available at: <https://static1.squarespace.com/static/5ea1086c9aafa907cc166785/t/5f19befb9849397e5f762fea/1595522816168/Organ+Donation+Guide.pdf>.
10. Padela AI, Duivenbode R, Saunders MR, Quinn M, Koh E. The impact of religiously tailored and ethically balanced education on intention for living organ donation among Muslim Americans. *Clin Transplant.* 2020;34(12):e14111.