

Title:

Self-spreading vaccines: Viral back burning, One Health and the ecosystem

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Main Text:

In their recent paper (1), Lentzos et al. (2022) have presented self-spreading viruses and the associated challenges for their governance at the global scale.

Regarding their biological properties, it is difficult not to establish a parallel between the inner nature of lab-made self-spreading viruses and invasive species. Indeed, they check several boxes in common: a lack of evolutionary history with the species native to the target region, a rapid spread once established, large and rather unpredictable impacts on ecosystems and a difficulty to eradicate once established. Apart from the discussion around the classification of viruses, there is then a clear apparent paradox between the interest in using a tool with invasive properties that is associated with uncertainties regarding its fate in viral communities and the harmlessness towards ecosystems in general.

Considering their potential applications, wildlife immunization ranks high with the idea of limiting the risk of spillover events and its associated risk for pathogen emergence and spread in the human population. This high-tech approach aims at developing a given tool for a specific pathogen freeing itself from a deep understanding of the ecosystem functioning and appears then as a reductionist approach compared to the holistic One Health approach (2). This latter one considers indeed the complexity of the interactions between people and animal health and the environment they share. How could the release of self-spreading viruses be compatible and combined given the current road map for neglected tropical diseases? (3)

Finally, for this approach as well as for other biotech-orientated ones such as gene drive or Horizontal Environmental Genetic Alteration Agents (HEGAAs) (4) it is also worth questioning the role of institutions (US NIH, DARPA) or philanthropic foundations (B. & M. Gates Foundation) in funding solutions that are mostly biotech ones to answer sustainable development goals (agriculture, livestock, health...). Moreover, while they can clearly be controversial, they aim at targeting areas in the Global South, but are essentially developed in the Global North as highlighted by Lentzos et al. (2022). This raises the question of a research that can easily be tarnished with neo-colonialism.

Overall, this calls for international forums to regulate and oversee the development of such a tool. It should also not dispense from the urgent questioning of the real interest of such approach in tackling the problems it is designed for while really considering if nature- and ecosystem-based solutions can be implemented as for invasive species (5).

#### References and Notes

1. Lentzos et al. *Science*, 375, 6576 (2022).
2. <https://www.who.int/news/item/01-12-2021-tripartite-and-unep-support-ohhlep-s-definition-of-one-health>
3. WHO. "One Health companion document to the neglected tropical diseases road map 2021–2030" (2021) <https://www.who.int/publications/m/item/one-health-companion-document-to-the-neglected-tropical-diseases-road-map-2021-2030>
4. Reeves et al. *Science*, 362, 6410 (2018)
5. Ngondya & Munishi. *TREE*. 37, 4 (2022)