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LETTER

Mucosal immune responses to *Vibrio cholerae* O-specific polysaccharide in adults following oral vaccination not optimally assessed

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On August 1, 2019 in the journal PLOS Neglected Tropical Diseases, Akter et al. published an in-depth study of the immune responses to *Vibrio cholerae* O-specific polysaccharide in adults following oral vaccination with a killed whole-cell cholera vaccine in an endemic population (Bangladesh).[1] They state that vaccine responses in serum and mucosal samples to oral cholera vaccination are maximal following the first dose of vaccination, without evident boosting with the second dose. They conclude that these observations suggest that a single dose of oral cholera vaccine may be sufficient to mediate protection in adults in a cholera endemic zone.

In the article, the mucosal immune responses (antibody-secreting cell (ASC) responses as measured by ELISPOT) were determined on days 0, 7 and 21, i.e. 7 days after the first dose on day 0, and 7 days after the second dose on day 14. When looking at these time points, the antigen-specific IgA ASC responses peaked on day 7 and decreased on day 21.

After oral vaccination, activated intestinal lymphocytes transiently migrate to the circulation before homing back to the inductive mucosa. It has been shown extensively using both oral cholera (Dukoral®) and ETEC (ETVAX) vaccines that the kinetics of mucosal ASC responses differ between primary and booster vaccination, using both the ELISPOT assay and the related antibody in lymphocyte supernatant (ALS) assay.[2–5] Peak ASC responses after a second vaccine dose are seen already on day 5, and due to the short time frame in which the migrating cells may be sampled in the peripheral circulation, these responses have decreased by day 7. Peak responses on day 5 after booster vaccination have also been seen after a third vaccine dose of ETVAX administered 13–23 months after primary ETVAX vaccinations,[4] and in subjects receiving a single dose of oral cholera vaccine after primary vaccinations up to 14 years earlier.[2] Whilst these studies have primarily been performed previously in ETEC and cholera naïve Swedish subjects, the more rapid recall response after booster vaccination has also been shown with oral cholera vaccination in both children and adults in the cholera endemic Bangladesh.[5] Importantly, the differing kinetics of ASC responses after booster vaccination are apparent for both T-cell dependent protein antigens such as the cholera toxin B-subunit or ETEC colonization factors, as well as the T-cell independent O antigen (O78 LPS) (3,4 and unpublished data).

It is thus highly likely that peak ASC responses have been missed in the study published by Akter et al. If mucosal ASC responses are not measured at the optimal time point after booster vaccination, no conclusions can, in fact, be made about the lack of evident boosting of the immune response, or the possible sufficiency of a single dose of oral cholera vaccine in providing protection, based on these results. These limitations should have been addressed in the paper.

Disclosure of potential conflicts of interest

No potential conflicts of interest were disclosed.

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References

1. Akter A, Dash P, Aktar A, Jahan SR, Afrin S, Basher SR, Hakim A, Lisa AK, Chowdhury F, Khan AI, et al. Induction of systemic, mucosal and memory antibody responses targeting Vibrio cholerae O1 O-specific polysaccharide (OSP) in adults following oral vaccination with an oral killed whole cell cholera vaccine in Bangladesh. Diemert DJ, editor. PLOS Neglected Tropical Diseases. 2019 Aug 1;13(8):e0007634. doi:10.1371/journal.pntd.0007634.
2. Leach S, Lundgren A, Svennerholm A-M. Different kinetics of circulating antibody-secreting cell responses after primary and booster oral immunizations: a tool for assessing immunological memory. Vaccine. 2013 Jun;31(30):3035–38. doi:10.1016/j.vaccine.2013.04.066.
3. Lundgren A, Bourgeois L, Carlin N, Clements J, Gustafsson B, Hartford M, Holmgren J, Petzold M, Walker R, Svennerholm A-M,

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et al. Safety and immunogenicity of an improved oral inactivated multivalent enterotoxigenic Escherichia coli (ETEC) vaccine administered alone and together with dmLT adjuvant in a double-blind, randomized, placebo-controlled phase I study. Vaccine. 2014 Dec;32 (52):7077–84. doi:10.1016/j.vaccine.2014.10.069.

4. Lundgren A, Jertborn M, Svennerholm A-M. Induction of long term mucosal immunological memory in humans by an oral inactivated multivalent enterotoxigenic Escherichia coli vaccine. Vaccine. 2016 Apr;34(34):3132–40. doi:10.1016/j.vaccine.2016.04.055.
5. Akhtar M, Qadri F, Bhuiyan TR, Akter S, Rafique TA, Khan A, Islam LN, Saha A, Svennerholm A-M, Lundgren A et al. Kinetics of antibody-secreting cell and fecal IgA responses after oral cholera vaccination in different age groups in a cholera endemic country. Vaccine. 2017 Jan 5;35(2):321–28. doi:10.1016/j.vaccine.2016.11.055.