Vaxart's S-Only COVID-19 Vaccine Candidate Produces Strong-Cross Reactive Mucosal and Systemic Immune Responses in Non-Human Primates

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Newly published data demonstrates substantial cross-reactivity against multiple variants of COVID-19

S-only candidate is believed to be the first to demonstrate robust neutralizing antibody responses in mucosal sites, which is where primary infection occurs

Vaxart's S-only candidate induced a 1000-fold increase in nasal IgA responses to the variants, which could have substantial impact on reducing community transmission

SOUTH SAN FRANCISCO, Calif., Feb. 24, 2022 (GLOBE NEWSWIRE) -- A new study published on BioRxiv.org demonstrates that Vaxart's S-only COVID-19 clinical vaccine candidate, now being studied by Vaxart in Phase II trials, generated antibodies to the original COVID-19 virus strain and to the beta, delta, alpha and gamma variants of SARS-CoV-2 in the serum and nasal mucosa of non-human primates (NHPs).

The NHP results also showed that Vaxart's S-only vaccine candidate not only produced similar serum antibody (IgG) responses to other vaccines evaluated in NHP studies,[1] but also produced significantly elevated mucosal IgA antibody responses after a single dose of the Vaxart vaccine.

The vaccine was cross-reactive - inducing antibodies to all four of the major variants of concern studied -- with IgA increases of over 1,000-fold observed. Nasal IgA antibodies have been shown to be more effective at blocking transmission than serum IgG.[2] The mucosa is where viral entry and primary infections occur in NHPs and humans.

"The data we collected is important for two very significant reasons," said Dr. Sean Tucker, Vaxart's Chief Scientific Officer, and the senior author of the study. "First, the data suggests Vaxart's S-only COVID-19 clinical candidate may be able to induce cross-protective antibodies at the site of infection, the mucosa. These antibodies are only minimally induced in currently authorized vaccines and may be key to protecting against new variants.

"The existing approved COVID-19 vaccines produce substantial serum antibody responses and are potent against the original COVID-19 virus strain, but they offer less protection against other variants," Dr. Tucker said. "The omicron variant, in particular, preferentially replicates in the upper respiratory tract, likely making it less susceptible to serum antibodies.

"Second, we believe our S-only candidate is the first to elicit neutralizing antibody responses in the nasal mucosa of a monkey. We have shown in earlier human studies with our first oral vaccine candidate that potent mucosal responses, including responses in the nose, could be induced," Dr. Tucker added.

"As a result, our expectation is that this candidate will produce similar results in humans, as well. This mucosal response may also serve to reduce the likelihood of person-to-person transmission. Vaxart's preclinical studies have shown that mucosal responses can provide better protection against viral shedding and transmission than responses to injectable vaccines," Dr. Tucker said.

Vaxart began its Phase II COVID-19 oral vaccine trials in the U.S. in October 2021. Data is expected in the first half of 2022.

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[1] https://www.nature.com/articles/s41586-020-2607-z

https://www.nature.com/articles/s41467-021-21639-w

https://www.science.org/doi/10.1126/science.abj0299

https://www.sciencedirect.com/science/article/pii/S0092867421000787#fig4

[2] Seibert CW, Rahmat S, Krause JC, Eggink D, Albrecht RA, Goff PH, et al. Recombinant IgA is sufficient to prevent influenza virus transmission in guinea pigs. Journal of virology 2013 Jul;87(14):7793-804.

About the Study
The study evaluated three different vaccine candidates:

1. VXA-CoV2-1.1-S or ED90, based on the S protein from the SARS-CoV-2 parental strain;
2. ED94, matched to the beta variant; and
3. ED88, a combination of parental S and N proteins.

Each candidate was administered intranasally to four animals 28 days apart; four other animals received an S protein vaccine via intramuscular injection followed by intranasal administration of ED88. Nasal swab and serum samples were collected at baseline, day 1 and on days 15, 30, 44 and 58 post vaccination from the four test groups, as well as from four unvaccinated control animals.

Key Findings
Key findings from the study include:

- Mucosal administration generated levels of IgG that were similar to data reported for other SARS-CoV-2 vaccines.
- Vaxart's S-only vaccine, clinical candidate VXA-CoV2-1.1-S, induced the most potent antibody response of the three

candidates tested, generating substantial nasal IgA and serum IgG to multiple variants.

- While ED94 generated the highest IgG responses to the matched beta variant, it was less cross-reactive against other variants compared with VXA-CoV2-1.1-S.
- VXA-CoV2-1.1-S induced cross-reactive serum and nasal antibodies to multiple variants and elicited the highest neutralizing antibody responses to the Wuhan and delta variant, compared with ED94 and ED88.
- ED88 produced less robust IgG and IgA responses than the other adenoviral candidates.

About Vaxart

Vaxart is a clinical-stage biotechnology company developing a range of oral recombinant vaccines based on its proprietary delivery platform. Vaxart vaccines are designed to be administered using tablets that can be stored and shipped without refrigeration and eliminate the risk of needle-stick injury. Vaxart believes that its proprietary tablet vaccine delivery platform is suitable to deliver recombinant vaccines, positioning the company to develop oral versions of currently marketed vaccines and to design recombinant vaccines for new indications. Vaxart's development programs currently include tablet vaccines designed to protect against coronavirus, norovirus, seasonal influenza, and respiratory syncytial virus (RSV), as well as a therapeutic vaccine for human papillomavirus (HPV), Vaxart's first immune-oncology indication. Vaxart has filed broad domestic and international patent applications covering its proprietary technology and creations for oral vaccination using adenovirus and TLR3 agonists.

Note Regarding Forward-Looking Statements

This press release contains forward-looking statements that involve substantial risks and uncertainties. All statements, other than statements of historical facts, included in this press release regarding Vaxart's strategy, prospects, plans and objectives, results from pre-clinical and clinical trials, commercialization agreements and licenses, and beliefs and expectations of management are forward-looking statements. These forward-looking statements may be accompanied by such words as "should," "believe," "could," "potential," "will," "expected," "plan," and other words and terms of similar meaning. Examples of such statements include, but are not limited to, statements relating to Vaxart's ability to develop and commercialize its product candidates, including its vaccine booster products; Vaxart's expectations regarding clinical results and trial data; and Vaxart's expectations with respect to the effectiveness of its product candidates. Vaxart may not actually achieve the plans, carry out the intentions, or meet the expectations or projections disclosed in the forward-looking statements, and you should not place undue reliance on these forward-looking statements. Actual results or events could differ materially from the plans, intentions, expectations, and projections disclosed in the forward-looking statements. Various important factors could cause actual results or events to differ materially from the forward-looking statements that Vaxart makes, including uncertainties inherent in research and development, including the ability to meet anticipated clinical endpoints, commencement, and/or completion dates for clinical trials, regulatory submission dates, regulatory approval dates, and/or launch dates, as well as the possibility of unfavorable new clinical data and further analyses of existing clinical data; the risk that clinical trial data are subject to differing interpretations and assessments by regulatory authorities; whether regulatory authorities will be satisfied with the design of and results from the clinical studies; decisions by regulatory authorities impacting labeling, manufacturing processes, and safety that could affect the availability or commercial potential of any product candidate, including the possibility that Vaxart's product candidates may not be approved by the FDA or non-U.S. regulatory authorities; that, even if approved by the FDA or non-U.S. regulatory authorities, Vaxart's product candidates may not achieve broad market acceptance; that a Vaxart collaborator may not attain development and commercial milestones; that Vaxart or its partners may experience manufacturing issues and delays due to events within, or outside of, Vaxart's or its partners' control; difficulties in production, particularly in scaling up initial production, including difficulties with production costs and yields, quality control, including stability of the product candidate and quality assurance testing, shortages of qualified personnel or key raw materials, and compliance with strictly enforced federal, state, and foreign regulations; that Vaxart may not be able to obtain, maintain, and enforce necessary patent and other intellectual property protection; that Vaxart's capital resources may be inadequate; Vaxart's ability to resolve pending legal matters; Vaxart's ability to obtain sufficient capital to fund its operations on terms acceptable to Vaxart, if at all; the impact of government healthcare proposals and policies; competitive factors; and other risks described in the "Risk Factors" sections of Vaxart's Quarterly and Annual Reports filed with the SEC. Vaxart does not assume any obligation to update any forward-looking statements, except as required by law.

Contacts

Vaxart Media Relations:
Mark Herr
Vaxart, Inc.
mherr@vaxart.com
(203) 517-8957

Investor Relations:
Andrew Blazier
FINN Partners
IR@vaxart.com
(646) 871-8486

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