Lyme Disease Vaccine Candidate: Development Timeline

About VLA15 candidate clinical trial program

VLA15 is the Lyme disease vaccine candidate which has **advanced the furthest** along the clinical development timeline.[1]

VLA15 has demonstrated a **favorable safety profile** across all trials to date.[2,3,4]

DEC 2016

Valneva receives FDA and European approvals to start clinical testing of **VLA15**[5]

JUL 2017

VLA15 is granted FDA Fast Track Designation[6]

MAR 2018

Positive Phase 1 results from VLA15-101[7,8]

- 179 participants in Europe and the U.S. aged 18-<40
- Participants received one of three doses of VLA15 (12µg, 48µg or 90µg) during a day 0-28-56 vaccination schedule

Results

- VLA15 demonstrated a favorable safety profile across all treatment groups[6]
- VLA15 was also shown to be immunogenic in all doses and formulations tested, with OspA-specific antibody responses against all OspA serotypes
- Alum-adjuvanted formulations elicited higher immune-responses

DEC 2018

Phase 2 **VLA15-201** trial started[9,10]

JUL 2019

Phase 2 **VLA15-202** trial started[11,12]

APR 2020

Pfizer and Valneva announce collaboration to co-develop and commercialize **VLA15**[13]

JUL 2020

Phase 2 VLA15-201 meets endpoints[14,15]

- 572 participants from Europe and the U.S. aged 18-65
- Participants received three doses of VLA15 (135µg or 180µg), or placebo
- Month 0-1-2 vaccination schedule

Results

- Immunogenicity profiles confirmed in older adults (50-65 years)
- Immunogenicity increased and higher doses (180µg) elicited higher antibody responses across all serotypes, compared to Phase 1
- VLA15 had a favorable safety profile across all doses and age groups tested

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OCT 2020

Phase 2 VLA15-202 meets endpoints[16,17]

- 246 participants from the U.S. aged 18-65
- Participants received three doses of VLA15 (135µg or 180µg), or placebo
- Month 0-2-6 vaccination schedule, with booster dose at month 18

Results

- The extended vaccination schedule improved immunogenicity and demonstrated functionality of antibodies across all serotypes
- 180µg confirmed as the optimal dosage
- Administration of a booster dose at month 18 improved antibody titers substantially
- VLA15 demonstrated a favorable safety profile across all treatment groups

MAR 2021

Phase 2 **VLA15-221** trial initiation[18]

JUL 2022

Phase 3 VALOR trial started[19]

- First Phase 3 trial which will assess efficacy, safety, lot consistency and immunogenicity of VLA15
- 9,437 participants aged 5 years and older across Europe, Canada and the U.S.
- Participants receive four doses of VLA15 or placebo (1:1 ratio)
- Month 0-2-(5-9) vaccination schedule, with a booster dose 9-12 months following completion[20]

DEC 2022

Interim analysis of Phase 2 VLA15-221[21]

- 585 participants including first pediatric participants from the U.S. aged 5-65
- All participants received 180µg dose of VLA15 or placebo
- Two and three-dose dosing schedules evaluated, Month 0-2-6 and Month 0-6, with a booster dose at month 18

Results

- Antibodies were higher in pediatric and adult participants who received a 3-dose primary vaccination series
- Based on these results, it was confirmed that a 3-dose primary series vaccination schedule would be used in Phase 3 trial protocols
- VLA15 was found to be immunogenic and have a favorable safety profile in pediatric populations
- Strong immune response shown in both children and adolescents one month after booster dose (month 19)[22]

DEC 2022

Phase 3 pediatrics safety trial (C4601012) started[22]

- 3,550 pediatric participants to provide further evidence on the safety of VLA15 in the pediatric population

Pending successful completion of the Phase 3 trials...

Pfizer could submit a **Biologics License Application (BLA)** to the U.S. FDA and **Marketing Authorization Application (MAA)** to the European Medicines Agency (EMA) in **2026**[22]

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References

1. Valneva. Lyme disease – VLA15. Available from: https://valneva.com/research-development/lyme-disease/. Accessed: March 2024.
2. Bézay N, Hochreiter R, et al. Safety and immunogenicity of a novel multivalent OspA-based vaccine candidate against Lyme borreliosis: a randomised, phase 1 study in healthy adults. Lancet Infect Dis. 2023 Oct;23(10):1186-1196. doi: 10.1016/S1473-3099(23)00210-4.
3. Valneva. Valneva and Pfizer Report Further Positive Phase 2 Results, Including Booster Response, for Lyme Disease Vaccine Candidate. September 2021. Available at: https://valneva.com/press-release/valneva-and-pfizer-report-further-positive-phase-2-results-including-booster-response-for-lyme-disease-vaccine-candidate/?lang=de. Accessed: March 2024.
4. Valneva and Pfizer Report Further Positive Phase 2 Data for Lyme Disease Vaccine Candidate. February 2024. Available at: https://www.pfizer.com/news/press-release/press-release-detail/valneva-and-pfizer-report-further-positive-phase-2-data. Accessed: March 2024.
5. Valneva. Valneva Receives FDA and European Approvals to Start Clinical Testing of Lyme Disease Vaccine Candidate. December 2016. Available at: https://valneva.com/wp-content/uploads/2019/06/2016_12_09_Valneva_Lyme_Clinical_Trial_Approvals_EN.pdf. Accessed: March 2024.
6. Valneva. Valneva Receives FDA Fast Track Designation for its Lyme Disease Vaccine Candidate VLA15. July 2017. Available at: https://valneva.com/press-release/valneva-receives-fda-fast-track-designation-for-its-lyme-disease-vaccine-candidate-vla15/. Accessed: March 2024.
7. Valneva. Valneva Reports Positive Phase I Interim Results for Its Lyme Vaccine Candidate VLA15. Available at: https://valneva.com/wp-content/uploads/2019/06/2018_03_19_VLA15_Phase_I_Results_PR_ENG.pdf. Accessed: March 2024.
8. Valneva. Valneva Reports Positive Initial Booster Data and Final Phase 1 Data for its Lyme Disease Vaccine Candidate. Available at: https://valneva.com/press-release/valneva-reports-positive-initial-booster-data-and-final-phase-1-data-for-its-lyme-disease-vaccine-candidate/. Accessed: March 2024.
9. Valneva. Valneva Initiates Phase 2 Clinical Development For Its Lyme Disease Vaccine Candidate. Available at: https://valneva.com/wp-content/uploads/2019/06/2018_12_17_VLA_Lyme_Phase2_Initiation_PR_EN.pdf. Accessed: March 2024.
10. Clinical Trials.Gov. Immunogencity and Safety Study of a Vaccine Against Lyme Borreliosis, in Healthy Adults Aged 18 to 65 Years. Randomized, Controlled, Observer-blind Phase 2 Study. Available at: https://clinicaltrials.gov/ct2/show/NCT03769194. Accessed: March 2024.
11. Valneva. Valneva Initiates Second Phase 2 Study for its Lyme Disease Vaccine Candidate VLA15. Available at: https://valneva.com/wp-content/uploads/2019/07/2019_07_01_VLA_Lyme_Phase2_202_Initiation_PR_EN_Final.pdf. Accessed: March 2024.
12. Clinical Trials. Gov. Study Assessing the Safety, Immunogenicity and Dose Response of VLA15, A New Vaccine Candidate Against Lyme Borreliosis. Available at: https://clinicaltrials.gov/ct2/show/NCT03010228. Accessed: March 2024.
13. Pfizer. Valneva and Pfizer announce collaboration to co-develop and commercialize lyme disease vaccine, VLA15. April 2020. Available at: https://investors.pfizer.com/investor-news/press-release-details/2020/Valneva-and-Pfizer-Announce-Collaboration-to-Co-Develop-and-Commercialize-Lyme-Disease-Vaccine-VLA15/default.aspx. Accessed: March 2024.
14. Valneva. Valneva Announces Positive Initial Results for Phase 2 Study of Lyme Disease Vaccine Candidate. Available at: https://valneva.com/press-release/valneva-announces-positive-initial-results-for-phase-2-study-of-lyme-disease-vaccine-candidate/. Accessed: March 2024.
15. Clinical Trials.Gov. Phase 2 Study Of VLA15, A Vaccine Candidate Against Lyme Borreliosis, In A Healthy Peadiatric And Adult Study Population. Available at: Available at: https://clinicaltrials.gov/ct2/show/NCT04801420. Accessed: March 2024.
16. Valneva. Valneva and Pfizer Report Further Positive Phase 2 Results, Including Booster Response, for Lyme Disease Vaccine Candidate. September 2021. Available from: https://valneva.com/press-release/valneva-and-pfizer-report-further-positive-phase-2-results-including-booster-response-for-lyme-disease-vaccine-candidate/. Accessed: March 2024.
17. Clinical Trials.Gov. Alternative Schedule Study For VLA15, a Vaccine Candidate Against Lyme Borreliosis. Available at: https://clinicaltrials.gov/ct2/show/NCT03970733. Accessed: March 2024.
18. Valneva. Valneva and Pfizer Announce Initiation of Phase 2 Study for Lyme Disease Vaccine Candidate. 2021. Available at: https://valneva.com/press-release/valneva-and-pfizer-announce-initiation-of-phase-2-study-for-lyme-disease-vaccine-candidate/. Accessed: March 2024.
19. ClinicalTrials.gov. An Efficacy, Safety, Tolerability, Immunogenicity, and Lot-Consistency Clinical Trial of a 6-Valent OspA-Based Lyme Disease Vaccine (VLA15) (VALOR). July 2022. Available from: https://www.clinicaltrials.gov/ct2/show/NCT05477524. Accessed: March 2024.
20. Pfizer data on file.
21. Pfizer. Valneva and Pfizer Report Six-Month Antibody Persistence Data in Children and Adults for Lyme Disease Vaccine Candidate. December 2022. Available from: https://valneva.com/press-release/valneva-and-pfizer-report-six-month-antibody-persistence-data-in-children-and-adults-for-lyme-disease-vaccine-candidate/. Accessed: March 2024.
22. Valneva. Valneva and Pfizer Report Positive Pediatric and Adolescent Phase 2 Booster Results for Lyme Disease Vaccine Candidate. 2023. Availble at: https://valneva.com/press-release/valneva-and-pfizer-report-positive-pediatric-and-adolescent-