GCT3009-01 Key Inclusion Criteria:

1. Be at least 18 years of age.
2. Must sign an informed consent form prior to any screening procedures.
3. Dose Escalation: Has histologically or cytologically confirmed relapsed and/or refractory B-cell NHL with no available standard therapy or is not a candidate for available standard therapy, and for whom, in the opinion of the investigator, the experimental therapy may be beneficial. All subjects must have received at least two prior lines of systemic therapy.

   Dose Expansion: Has histologically or cytologically confirmed relapsed or refractory B-cell NHL. All subjects must have received at least 2 prior lines of systemic therapy, and,

   a. For FL and DLBCL, at least 1 of the 2 prior lines of treatment must have been a CD20 containing systemic regimen;
   b. For CLL, subjects must have received at least one prior line of BTK inhibitor or BCL 2 inhibitor.
4. Has one of the eligible subtypes of B-cell NHL :

   Dose Escalation: (DLBCL, HGBCL, PMBCL, FL, MCL, MZL, SLL, or CLL). Dose Expansion: (DLBCL, FL, CLL)
5. Has measurable disease for B-cell NHL or has active disease for Chronic Lymphocytic Leukemia (CLL).
6. Eastern Cooperative Oncology Group (ECOG) performance status of 0-1.
7. Has adequate hepatic, renal, and bone marrow functions.
8. Before the first dose of GEN3009, during the trial, and for 12 months after the last dose of GEN3009 and/or the combination, a woman must be either not of childbearing potential or of childbearing potential and practicing a highly effective method of birth control, and must have a negative serum beta-human chorionic gonadotropin (beta-hCG) and urine pregnancy test at screening.
9. A man who is sexually active with a woman of childbearing potential and has not had a vasectomy must agree to use a barrier method of birth control.
10. Subjects must have a life expectancy of at least 3 months.

Key Exclusion Criteria:

1. Prior treatment with a CD37-targeting agent.
2. Prior allogeneic Hematopoietic Stem Cell Transplantation (HSCT).
3. Prior treatment with a CD3xCD20 bispecific antibody (Combination Expansion cohort only).
4. Autologous HSCT within 3 months before the first dose of GEN3009.
5. Lymphomas leukemic phase: high absolute lymphocyte count or the presence of abnormal cells in the peripheral blood indicating circulating lymphoma cells.
6. Treatment with an anti-cancer biologic including anti-CD20 therapy, radio-conjugated or toxin-conjugated antibody or chimeric antigen receptor (CAR) T-cell therapy within 4 weeks or 5 half-lives, whichever is shorter, before the first dose of GEN3009.

Treatment with small molecules such as BTK inhibitors, BCL2 inhibitors, or PI3K inhibitors within 5 half-lives prior to the first dose of GEN3009.

7. Chemotherapy or radiation therapy within 2 weeks of the first dose of GEN3009.
8. Treatment with an investigational drug or an invasive investigational medical device within 4 weeks or 5 half-lives, whichever is shorter, prior to the first dose of GEN3009, and at any time during the study treatment period.
9. Autoimmune disease or other diseases that require permanent or high-dose immunosuppressive therapy.
10. Received a cumulative dose of corticosteroids more than the equivalent of 250 mg of prednisone within the 2-week period before the first dose of GEN3009.
11. Has uncontrolled intercurrent illness.
12. Seizure disorder requiring therapy (such as steroids or anti-epileptics) (Combination Expansion cohort only).
13. Toxicities from previous anti-cancer therapies have not resolved to baseline levels or to Grade 1 or less except for alopecia and peripheral neuropathy.
14. Primary central nervous system (CNS) lymphoma or known CNS involvement at screening.
15. Known past or current malignancy other than inclusion diagnosis.
16. Had allergic reactions to anti-CD20 or anti-CD37 monoclonal antibody treatment or intolerant to GEN3009 or to the combination therapy excipients.
17. Has had major surgery within 4 weeks before screening or will not have fully recovered from surgery, or has major surgery planned during the time the subject is expected to participate in the trial (or within 4 weeks after the last dose of GEN3009 and/or the combination therapy).
18. Known history/positive serology for hepatitis B.
19. Known medical history or ongoing hepatitis C infection that has not been cured.
20. Known history of seropositivity for HIV infection.
21. Is a woman who is pregnant or breast-feeding, or who is planning to become pregnant while enrolled in this trial or within 12 months after the last dose of GEN3009 and/or the combination therapy.
22. Is a man who plans to father a child while enrolled in this trial or within 12 months after the last dose of GEN3009 and/or the combination therapy.
23. Has any condition for which, in the opinion of the investigator, participation would not be in the best interest of the subject (eg, compromise the well-being) or that could prevent, limit, or confound the protocol-specified assessments. Additionally, vulnerable subjects or subjects under guardianship, curatorship, judicial protection or deprived of liberty), are excluded from participation in this trial.
24. Exposed to live/live attenuated vaccine within 4 weeks prior to initiation of GEN3009 treatment.

NOTE: Other protocol defined Inclusion/Exclusion criteria may apply.