Rapid and robust preclinical and clinical development of CAR T-cell therapies

End-to-end specialized scientific and regulatory capabilities with a data-driven approach

A mid-sized biotech sponsor developing novel autologous and allogeneic CAR T therapies engaged Labcorp to support several solid tumor and hematologic malignancy therapeutic programs. The goal was to help the sponsor identify lead assets, successfully navigate through investigational new drug (IND) submission and conduct Phase I/II dosing studies, all against an aggressive timeline. The sponsor also sought to replace a spreadsheet-based system for tracking patient recruitment and site performance with a more advanced technology solution featuring real-time capabilities. The project involved coordination across multiple Labcorp business solutions for a streamlined effort including preclinical pharmacology, toxicology, clinical development* and laboratory services.

*Services provided by Fortrea, which was the Clinical Development and Commercialization Services business of Labcorp until its spinoff on June 30, 2023.

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Preclinical program

Applying knowledge accumulated from conducting hundreds of preclinical CAR T studies, the Labcorp preclinical pharmacology team delivered early efficacy assessments and lead optimization studies using the most appropriate animal models to efficiently identify the lead assets. The assets then transitioned to the Labcorp toxicology team, which recommended and provided justification for fewer studies than the sponsor's original study design. This proposal was met favorably by the regulatory agency during the sponsor's pre-IND meeting. The toxicology team then conducted the IND-enabling studies that resulted in the sponsor achieving active IND status 6-12 months ahead of its original expected timeline. The preclinical team also provided guidance on assays to measure persistence and expansion of the cell therapy products, which later became part of the clinical protocol. Altogether, the integrated and refined preclinical program delivered by Labcorp helped the sponsor set the stage for faster clinical trial implementation, extend its cash runway and meet its investor milestones earlier.

Clinical program*

Labcorp provided data-driven solutions supporting site selection and patient recruitment across the program, utilizing proprietary data sources to identify sites with high past recruitment performance and strong quality scores, as well as specific experience both in the indication and with cell therapy programs. This helped to enable strong enrollment and delivery of high-quality data. Labcorp worked closely with the sponsor and the sites to support the investigator teams in understanding the instructions for sample collection and special transport. This included initial training at the site initiation visit and refresher training delivered "just-in-time" to establish the sites were prepared for the complexities of the protocol at the time of patient enrollment.

The Labcorp team then conducted the Phase I and I/II dose escalation studies of the sponsor's autologous cell therapy and selected Labcorp Central Laboratory Services to manage the complex logistics required, including tracking of sample collection, transport and specimen management. As part of the central labs testing program, Labcorp also conducted biomarker analyses to delineate pharmacokinetics/pharmacodynamics, safety, disease and mechanistic attributes using flow cytometry, genomics, immunohistochemistry and immunoassay platforms—testing developed in coordination with strategic input provided by the Labcorp Biomarker Solution Center. These services were essential for identifying and monitoring patients and completing the clinical trials on time.

Labcorp's communication was one of the key strengths in this trial. The dose escalation studies required careful management of patient slots that was compounded in importance by complex pre-study eligibility criteria. Labcorp held weekly calls with principal investigators to foster close communication on the status of the trial and availability for new patients to enroll, as well as emerging safety information and dose escalation decisions.

Sponsor needs

- Specialized cell therapy-related scientific expertise for asset identification and on-time completion of IND-enabling studies
- Regulatory expertise in cell therapies that anticipate and meet the requirements for a successful IND submission*
- Technical capabilities and solutions to support site selection and patient enrollment through site performance metrics and recruitment tracking by indication, available in real time
- Support for investigator site-level updates to documents and process following a mid-program change of the cell product manufacturing facility*
- Experience in conducting biomarker analyses of treatment dosing pharmacokinetics, levels of the target cell population and other indicators of treatment efficacy and safety
- Risk identification and mitigation due to COVID-19 to allow clinical work to proceed during the pandemic through a compassionate, flexible team, as well as decentralized clinical trial solutions for clinical monitoring*
- Seamless integration of preclinical pharmacology, toxicology, clinical and laboratory services

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Labcorp's support as a flexible and site-centric partner was evident throughout the clinical trials. As the trials expanded, the sponsor changed their manufacturing facility to increase production capacity. Our teams worked closely with the sponsor through submission of revised information to the FDA for approval of the new facility and resulting timeline and study document changes so that the transition was as seamless as possible to the sites. When the COVID-19 pandemic impacted site operations, Labcorp quickly identified risks at a study and site level through a proprietary dashboard that centralized critical systems and local/site-level intelligence. Decentralized clinical trial strategies were developed, documented and implemented to confirm that critical study monitoring tasks could be performed remotely even while on-site access was limited. The sites faced staff turnover and adjusted deployment of their internal resources; in turn, Labcorp enabled protocol and data integrity through robust documentation of delegation of authority, as well as training of the new site team members on the protocol and the nuances of sample handling required. Many monitoring activities were performed remotely so that the sponsor still had access to clean, reliable data to make study decisions.

Deep Cell and Gene Therapy Capabilities and Experience

A recent Labcorp market research study showed that cell and gene therapeutic experience and indication expertise were the top criteria for selecting a partner. Expertise was defined by scientific know-how and ability to successfully navigate regulatory milestones.

Results summary

For the sponsor, partnering with Labcorp for its preclinical and clinical programs helped it to:

- Decrease the white space between studies and achieve a seamless transition from their preclinical lead asset to the clinical development phase
- Achieve a successful IND submission 6-12 months ahead of schedule and extend its cash runway through a preclinical program refined through specialized scientific and regulatory experience in cell therapies
- Accelerate the Phase I/II dose escalation studies through data-driven patient recruitment and site selection based on experience with cell therapies and in the indication*
- Have confidence in the clinical study execution, logistics and status through specialized advance training, frequent communication with investigator sites and real-time results reporting*
- Elucidate the kinetics of the CAR T product and early signals of safety and mechanistic immune response modulation through biomarker analyses
- Minimize clinical study disruption and risks during a global pandemic through decentralized monitoring*
- Transition smoothly to expanded trials requiring a major manufacturing change through timely submission of revised information to the FDA for approval*
- Increase efficiency in future studies by up to 25% through application of lessons learned to new clinical study templates*
- Avoid the need to manage and coordinate separate partners in the generation and compilation of essential data and insights across its programs

The sponsor continues to utilize Labcorp as their laboratory partner of choice for dozens of studies across the continuum of services to support the development of its new drug assets for oncology indications.

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