IMMUDEX®
PRECISION IMMUNE MONITORING

Accelerating Vaccine Development

The human immune system is incredibly powerful and adaptable, working continuously to keep a variety of invaders from causing infection and disease. From bacteria to viruses and parasites, the immune system recognizes invading threats and triggers a response in the body to contain and fight intruders. Although the immune system is incredibly robust, it is not invincible, which is why vaccines are needed to help support the body's defenses.

Vaccines represent some of the most impactful public health advances seen to date, playing a critical role in reducing the spread of and, in some cases, eliminating the threat of the world's many devastating infectious diseases. During all phases of vaccine development, it is critical to understand the mechanisms behind the response, resistance, and toxicity to new vaccines. Tools with the resolution and scalability to reveal intra- and inter-patient heterogeneity across diseases and world populations can enable researchers to identify key biomarkers and optimize vaccine development from early discovery to clinical trials.

In this application note, explore how Dextramer® technology can help uncover antigen-specific immune cell responses and provide new insights into vaccine therapeutic efficacy and toxicity, transforming how we approach all phases of vaccine development.

Cutting-Edge Reagents for Detection of Antigen-Specific Immune Cells

Get the full picture of the cellular immune response

The antigen-specific immune response is never made of just one type of specificity or affinity but of many different. Dextramer® reagents enable you to cover the whole spectrum of the cellular immune response, even low-affinity ones.

Ensure consistent, reproducible, and comparable results

The high-quality characteristic of the Dextramer® reagents ensure reproducible results across different methods and alignment with collaborators, like in multicenter trials.

Expand the limits of your research

Access the greatest allele coverage in the market and investigate the cellular immune response beyond T cells and in different platforms.

Secure flexibility in your experiments

Dextramer® reagents are optimized for use across different platforms, allowing you to continue directly from in-situ, to flow cytometry, and move onto NGS or single-cell multi-omics.

Detection of Antigen-Specific Immune Cells in Vaccine Development

If you follow traditional research and development pipelines, developing a vaccine for an infectious disease can take between 5 and 10 years. This strategy is not well suited for the needs imposed when a new pathogen emerges and potentially causes an epidemic and asks researchers to rapidly act to help patients suffering worldwide[1]. Examples of lengthy development include Malaria[2], HIV[3], Ebola[4,5] whose vaccine development has continued for decades. Currently, SARS-CoV-2 has prompted a rapid advancement of new vaccine technology into clinical trials, which can potentially lead to a new era in how we develop new vaccines[6].

Regardless of the vaccine type, vaccine development usually follows a rigid process. The research phases include exploratory, pre-clinical, and clinical development in which Dextramer® technology can help uncover antigen-specific immune cell responses and provide new insights into vaccine therapeutic efficacy and toxicity[7, 8, 9, 10].

EXPLORATORY

- Perform massive multiplexing of antigen specificities in epitope discovery[6] or neoantigen screenings by NGS using our dCODE Dextramer® and dCODE Klickmer® technology
- Determine cellular responses to selected epitopes in vitro by flow cytometry using our MHC I or II Dextramer® or Klickmer® reagents

PRE-CLINICAL

- Detect, monitor, and document the presence or responses of antigen-specific immune cell responses in preclinical efficacy studies using MHC I or II Dextramer® and Klickmer® by flow cytometry
- Add information on gene expression, surface protein expression and V(D)J sequences through single-cell multi-omics using our dCODE® Dextramer® technology compatible with 10x Chromium or BD Rhapsody™

CLINICAL

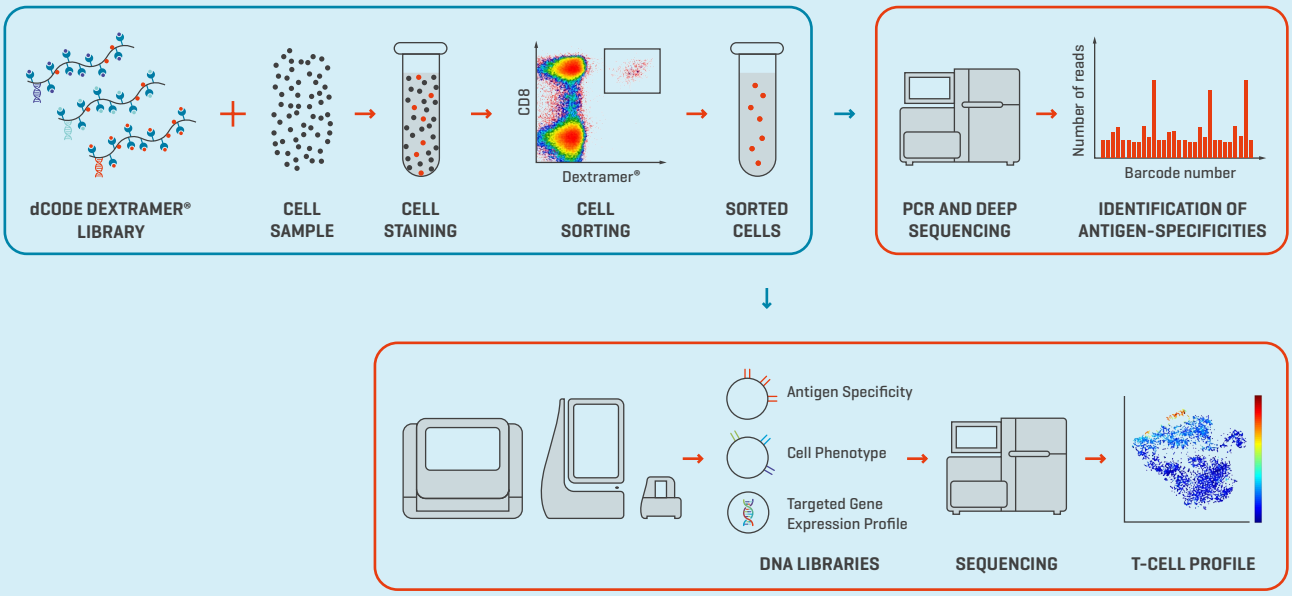
- Detect and monitor antigen-specific T-cell responses in clinical trials using our Clinical-Grade MHC Dextramer® (GMP) reagents that meet numerous requirements in accordance with quality system requirements for medical devices defined by ISO 13485 and 21 CFR 820
- Clinical-Grade Dextramer® reagents undergo a strict quality control to ensure that every batch delivered is a robust, tailored component of a long-term strategy for immune monitoring

Discover Targets that Enhance or Deepen the Vaccine Efficacy

What antigen-specific immune cell populations emerge after stimuli with immunogenic antigens?

Which antigens most potently enhance vaccine efficacy?

What are the T- or B- cell receptors that pair to selected antigens?



To help you address some of the questions that can be raised in epitope discovery in vaccine development, Immudex provides reagents that enable massive multiplexing of antigen-specificity and the possibility to do subsequent single-cell multi-omic analysis using the 10x Chromium or BD Rhapsody™ analysis system of the identified hits. The reagents offered by Immudex, can help you screen multiple epitopes or neoantigens and assess T-cell antigen specificity, providing means to enhance vaccine efficacy[11, 12].

Innovative dCODE Dextramer® Reagents for Detection of Antigen-Specific Immune Cells by NGS or Single-Cell Multi-Omics

dCODE Dextramer® (HiT) ready-to-use reagents for bulk analysis of antigen-specific CD8+ or CD4+ T cells by NGS.

dCODE Dextramer® (RiO) ready-to-use reagents for single-cell multi-omics of antigen-specific CD8+ or CD4+ T cells with information on gene expression, surface marker expression, and V(D)J Sequencing on the BD Rhapsody™ single-cell analysis system.

dCODE Dextramer® (10x) ready-to-use reagents for single-cell multi-omics of antigen-specific CD8+ or CD4+ T cells with information on gene expression, surface marker expression, and V(D)J Sequencing on the 10x Chromium Single Cell Gene Expression system.

U-Load dCODE Dextramer® reagents for detection of antigen-specific CD8+ or CD4+ T cells for loading of peptide receptive MHC molecules of choice produced in your own lab. Available in HiT, RiO, or 10x format.

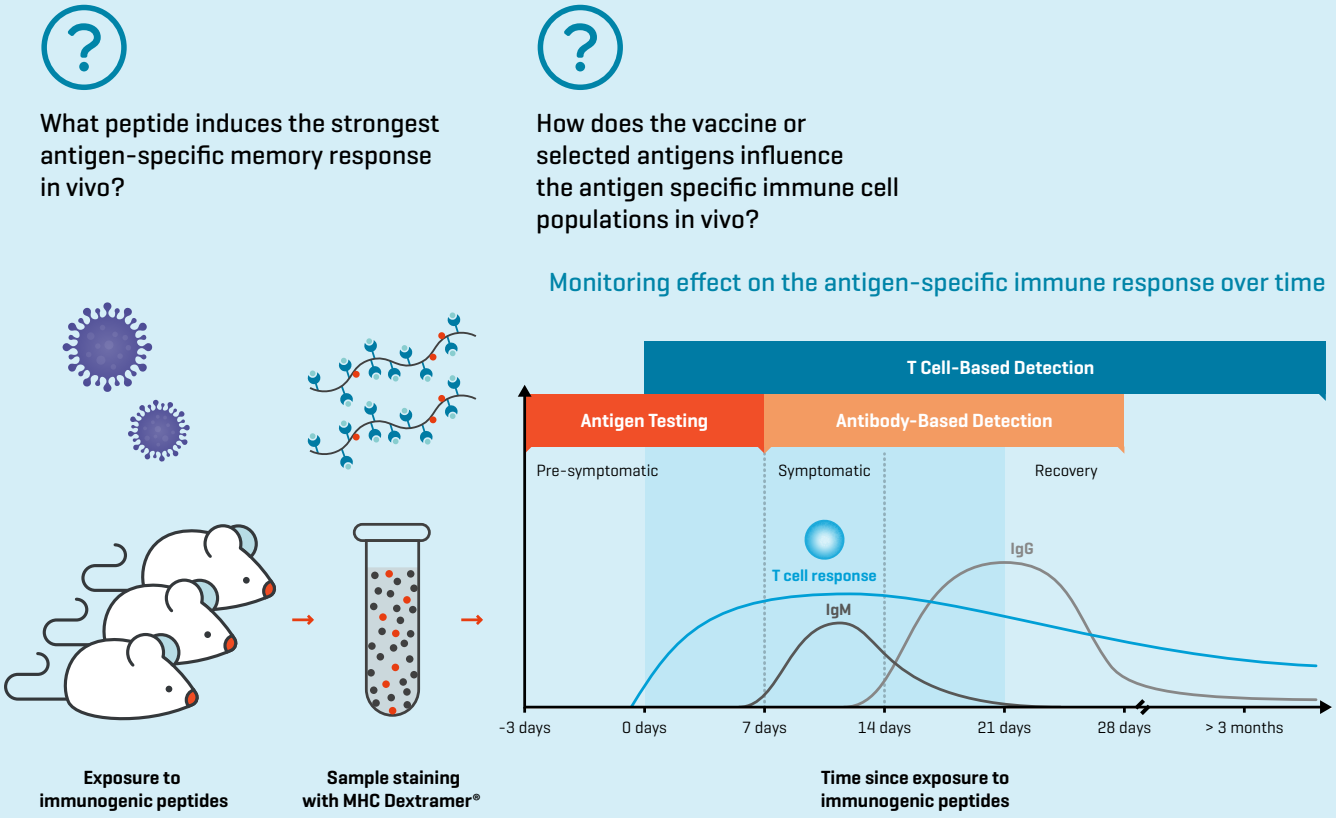
dCODE Klickmer® reagents for custom detection of immune cells through loading of any biotinylated molecule produced in your own lab. Available in HiT, RiO, or 10x format.

CD1d dCODE Dextramer® ready-to-use or customizable reagents for detection of NKT cells. Available in HiT, RiO, or 10x format.

Monitor the Effect of Vaccination Over Time

What peptide induces the strongest antigen-specific memory response in vivo?

How does the vaccine or selected antigens influence the antigen specific immune cell populations in vivo?



Dextramer® technology enables you to get a deeper understanding of how the vaccine impacts the antigen-specific cellular immune response over time in vivo. Immudex offers both ready-to-use reagents for detection of antigen-specific T cells and NKT cells or customizable reagents for detection of other immune cells like B cells. These reagents enable you to track the antigen-specific cells leading to new insights into what antigens are driving the response to the vaccine. By offering a range of murine and primate alleles, Immudex enables preclinical studies of antigen-specific T cells across animal models[13].

Sensitive and Efficient Dextramer® Technology for Detection of Antigen-Specific Immune Cells by Flow Cytometry or In-Situ Staining

MHC I Dextramer® ready-to-use reagents for detection of antigen-specific CD8+ T cells. Available with BV421, FITC, PE, or APC fluorochromes.

MHC II Dextramer® ready-to-use reagents for detection of antigen-specific CD4+ T cells. Available with BV421, FITC, PE, or APC fluorochromes.

Klickmer® reagents for custom detection of immune cells through loading of any biotinylated molecule produced in your own lab. Available with FITC, PE, or APC fluorophores.

U-Load Dextramer® reagents for detection of antigen-specific CD8+ or CD4+ T cells for loading of peptide receptive MHC molecules of choice produced in your own lab. Available with FITC, PE, or APC fluorophores.

CD1d Dextramer® ready-to-use or customizable reagents for detection of NKT cells. Available with BV421, FITC, PE, or APC fluorochromes.

MR1 Dextramer® ready-to-use reagents for detection of MAIT cells. Available with BV421, FITC, PE or APC fluorochromes.

From Exploratory, to Preclinical, to Clinical Studies in Vaccine Development

Immudex Clinical-Grade Dextramer® (GMP) reagents meet numerous requirements in accordance with quality system requirements for medical devices defined by ISO 13485 and 21 CFR 820 to be used as:

- Components for laboratory-developed tests (LTD)
- Reagents for medical devices governed by the Clinical Laboratory Improvement Amendments (CLIA), the US Food & Drug Administration (FDA), and the EU In Vitro Diagnostic Directive (IVDD)
- Tools for clinical investigations in accordance with good clinical (laboratory) practice (GC(L)P) and in compliance with ethical principles of medical research involving human subjects as set forth by the Declaration of Helsinki
- Materials in manufacturing and quality control of investigational and commercial pharmaceutical products in compliance with good manufacturing practices (GMP)

Quality that Meets Authoritative Standards and Requirements

Manufacturing
- In accordance with ISO 13485 and 21 CFR 820

In-process quality control
- MHC-peptide integrity
- Biotinylation degree
- Monomer degradation

Final quality control
- MHC Dextramer® integrity

Product release
- Labeling review
- Batch record review
- Certificate of Analysis provided

Resources

We are dedicated to helping you get the most out of your dCODE Dextramer ® reagents by offering multiple helpful resources and support:

dCODE Dextramer®

Access the dCODE Dextramer® site where you can find everything from how to order to the latest news on dCODE Dextramer® products.

Read more

Resources

Easy access to our complete library of customer publications, posters and webinars and protocols, and many other useful resources.

Read more

Case Studies and Application Notes

Immerse yourself in comprehensive case studies containing information on the applications of dCODE® reagents.

Read more

Technical Support

Let us know if you experience difficulties or have questions. Immudex will help you get the most out of your dCODE Dextramer® products.

customer@immudex.com

Customer Product Development

To advance and support promising research, Immudex provide customized solutions with the best quality. Visit the customer-defined product site to learn more of the service.

Read more

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