immudex®
PRECISION IMMUNE MONITORING

Decipher Adaptive Immunity

Discover, Detect and Characterize Antigen-Specific Immune Cells

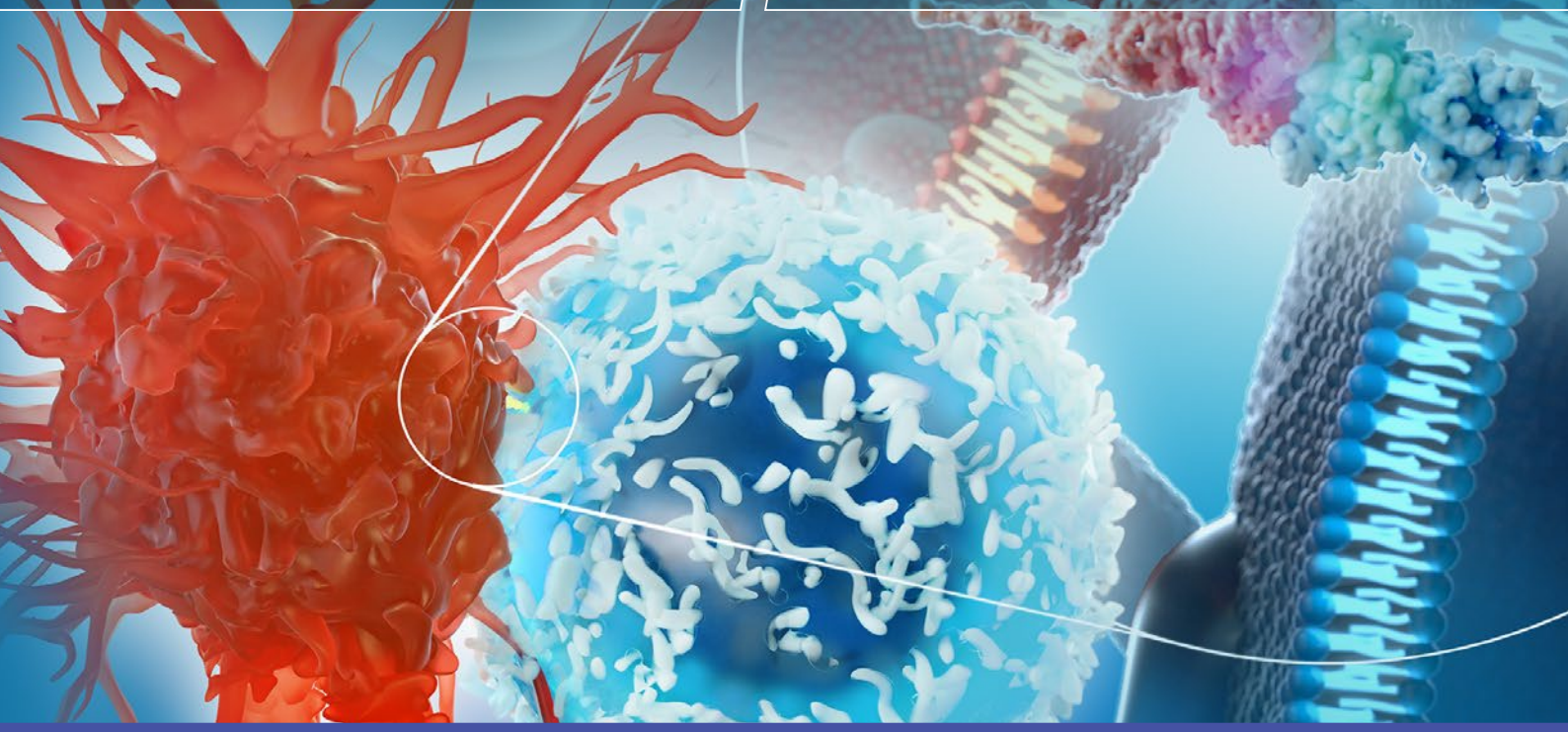
T Cells | B Cells | Non-Conventional T Cells | Antigen-Presenting Cells | CAR-T Cells

Dextramer® Reagents for:

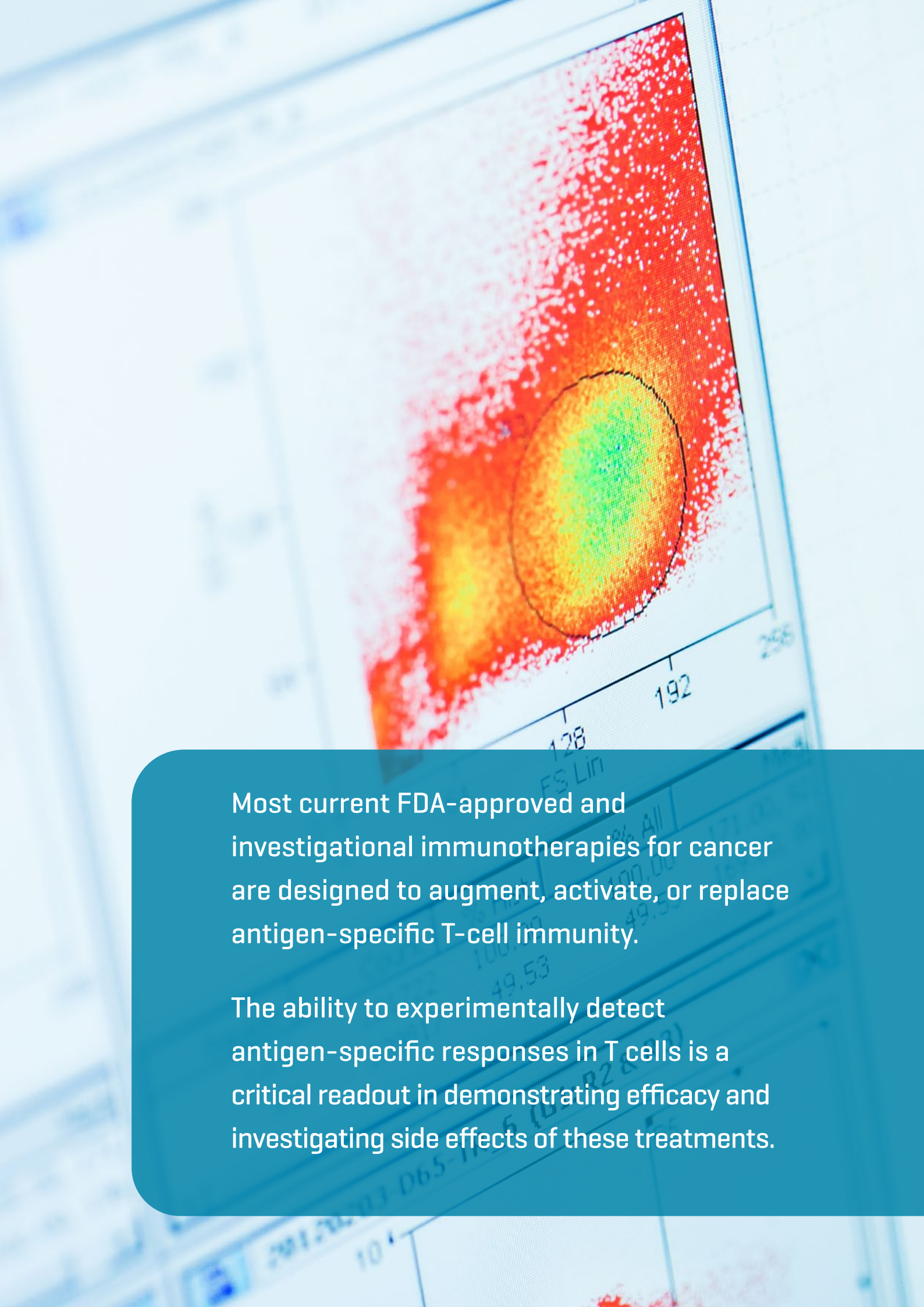
- Flow Cytometry
- NGS and Single-Cell Multi-Omics
- TCR Discovery and Validation
- Release Testing of Cellular Therapies

Applications for Dextramer® Reagents:

- Immuno-Oncology, TCR-T, CAR-T
- Infectious Diseases
- Autoimmunity
- Vaccine Development



Product Catalog



Most current FDA-approved and investigational immunotherapies for cancer are designed to augment, activate, or replace antigen-specific T-cell immunity.

The ability to experimentally detect antigen-specific responses in T cells is a critical readout in demonstrating efficacy and investigating side effects of these treatments.

Contents

1. Immudex Products At a Glance

1.1 CD8⁺ and CD4⁺ T Cells

Ready-To-Use

MHC I and MHC II Dextramer®
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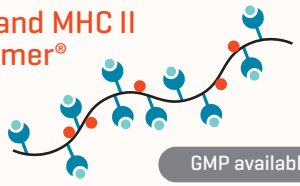
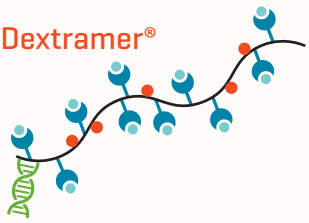


GMP available

- Flow cytometry
- Detect and isolate antigen-specific T cells
- TCR validation
- *In situ* staining

dCODE Dextramer®
[page 17]

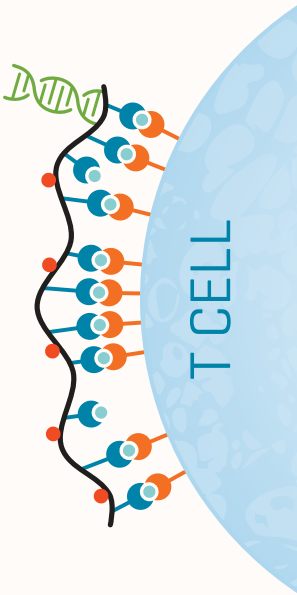


- Gold standard barcoded MHC multimers
- Antigen-specific T cell NGS/single-cell multi-omics
- Epitope discovery and neo-antigen screening
- TCR discovery and validation
- Specificity profiling

Ready-to-Use MHC Monomers
[page 22]

GMP available

- MHC I and II monomers
- T-cell stimulation
- TCR characterization and cross-reactivity screening
- Assess TCR:pMHC binding strength
- Development of TCR-like antibodies
- MHC multimer assembly

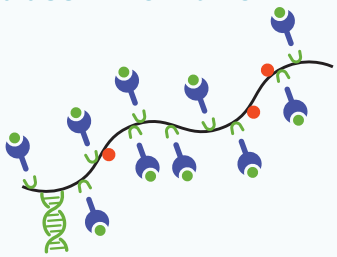


Loadable Solutions

U-Load Dextramer®
[page 21]

- Detect antigen-specific CD8⁺ and CD4⁺ T cells
- Loadable Dextramer® technology
- Flow cytometry

U-Load dCODE Dextramer®
[page 21]



- Antigen-specific T-cell monitoring with the power of multiplexing
- Loadable dCODE Dextramer® technology
- Epitope discovery and neo-antigen screening
- TCR discovery
- NGS/single-cell multi-omics (10x, RiO, HiT)

Peptide-Receptive MHC Monomers
[page 22]

- easYmers® MHC I and U-Load® MHC II monomers
- MHC multimer assembly
- Assess pMHC binding affinity

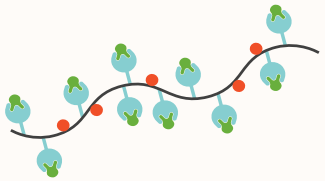
Don't find what you're looking for?

See our Custom Solutions and Services. Page 26

1.2 Non-Conventional T Cells

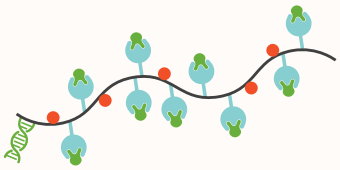
Ready-To-Use

CD1d Dextramer®
[page 12]



- Detect CD1d-restricted Natural Killer T cells
- Flow cytometry
- *In situ* staining

CD1d dCODE Dextramer®
[page 12]



- NKT cell monitoring with the power of multiplexing
- NGS/single-cell multi-omics (10x, RiO, HiT)

CD1d Monomers
[page 12]

- iNKT cell stimulation and enrichment

MR1 Dextramer®
[page 13]

- Detect MAIT cells
- Flow cytometry
- *In situ* staining

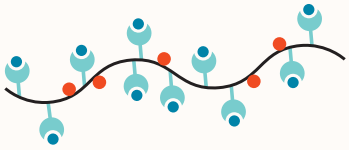
MR1 dCODE Dextramer®
[page 13]

- MAIT cell monitoring with the power of multiplexing
- NGS/single-cell multi-omics (10x, RiO, HiT)

MR1 Monomers
[page 13]

- MAIT cell stimulation and enrichment

HLA-E and HLA-G Dextramer®
[page 14]



- Detect antigen-specific NK and T cells
- Flow cytometry
- *In situ* staining

HLA-E and HLA-G dCODE Dextramer®
[page 14]

- NK cell monitoring with the power of multiplexing
- NGS/single-cell multi-omics (10x, RiO, HiT)

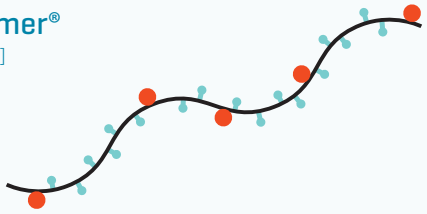
HLA-E and HLA-G Monomers
[page 14]

- NK cell stimulation and enrichment

1.3 B Cells

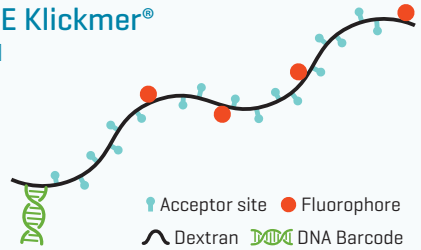
Loadable Solutions

Klickmer®
[page 16]



- Detect antigen-specific B-cells and more
- Build high-avidity multimers
- Attach your biotinylated molecule of choice
- Efficient protein-ligand interaction
- Flow cytometry

dCODE Klickmer®
[page 17]



- Antigen-specific B-cell monitoring with the power of multiplexing
- Loadable dCODE Klickmer® technology
- BCR sequencing
- Antibody discovery
- NGS/single-cell multi-omics (10x, RiO, HiT)

1.4 Antigen-Presenting Cells

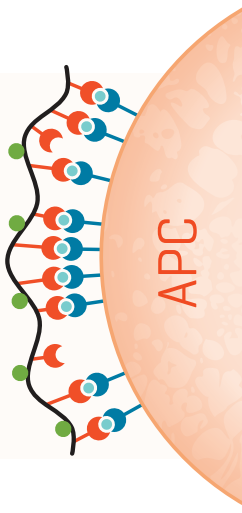
Ready-To-Use

TCR Dextramer®
[page 27]

- Detect antigen-presenting cells
- Validate and characterize TCRs
- Quality control of cancer vaccines
- Flow cytometry
- *In situ* staining

Soluble TCR Monomers
[page 27]

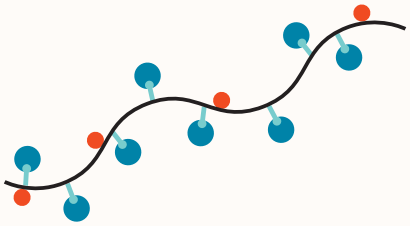
- Assess TCR:pMHC binding strength
- TCR cross-reactivity screening



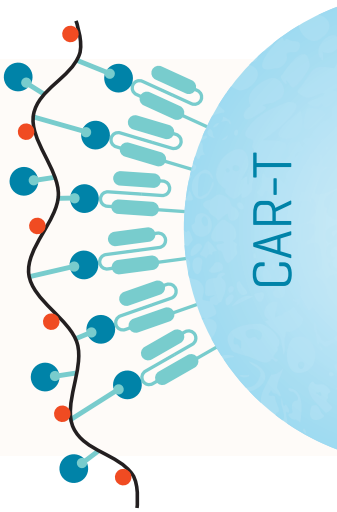
1.5 CAR-T Cells

Ready-To-Use

Dextramer® for CAR-T Detection
[page 39]



- Direct CAR detection
- Determine % of CAR positive cells
- Flow cytometry
- Single-cell multi-omics
- Custom CAR-T Detection for your target of choice



1.6 Why Study Antigen Specificity

Antigen Specificity is at the Heart of Immunotherapeutics

Most immunotherapies are designed to augment, activate, or replace antigen-specific T-cell immunity. An in-depth understanding of the antigen-specific cellular immune response is critical, not only to understand disease progression, but also for the development of effective immunotherapeutics.

At Immudex we are certain that **precision immune monitoring** – studying the antigen-specific cellular immune response in detail - can expand the boundaries of what's possible in medicine and open new therapeutic and diagnostic opportunities.

By enabling a better understanding of the complexity of the immune response – scientists develop more effective immune-based therapeutics and diagnostics

Unravelling the Complexity of the Immune Response

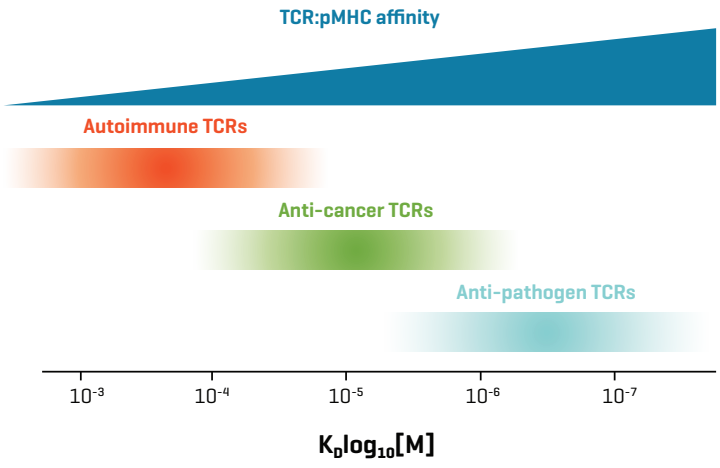
The immune system and its cellular response are highly complex, but with the right research tools, we can unravel that complexity.

One challenge is that TCR:pMHC complex affinities can vary. Self-reactive cells such as autoimmune T-cells tend to have low-affinity TCRs whereas anti-pathogen TCRs tend to bind to cognate pMHC with relatively high affinity.

High avidity Dextramer® technology ensures efficient binding to antigen-specific T cells, enabling T cells with a wide range of TCR affinities to be detected reliably and robustly, so you don't risk missing out on important information.

We offer a broad product portfolio that allows scientists to investigate diverse types of immune cells, including T cells, non-conventional T cells and B cells, with reagents tailored to specific applications.

Our products are compatible with multiple platforms from flow cytometry to next generation sequencing and single-cell multi-omics. With our GMP manufacturing capabilities, it is easy to transition from basic research to clinical applications.



Adapted from Dolton G. et al, Front Immunol 2018

1.7 Applications of Immudex's Technology

Cell Therapy

Immudex's technology supports the development and manufacturing of cellular immunotherapeutics, including TCR-T, CAR-T and dendritic cell vaccines.

Dextramer® (GMP) reagents are used in lot-release testing to ensure that the infusion product meets certain criteria for use in clinical trials. Dextramer® technology can also help to assess TCR specificity and minimize cross-reactivity.

> The FDA recommended that we use a GMP-grade multimer for the purposes of lot-release testing our TCR-T based therapy.
>
> — Scientist, Pharmaceutical Company

Target Discovery

TCR Discovery and Specificity Profiling

- dCODE Dextramer®

Infusion Product Characterization and Validation

Biochemical Characterization and Biological Applications

- Soluble TCR Monomers
- TCR Dextramer®
- MHC Monomers
- MHC Dextramer®
- dCODE Dextramer®

Manufacturing and Release Testing for Clinical Trials

Assessment of T Cell Number, Identity and Purity

- MHC Dextramer® (GMP)

Clinical Trials

Precision Immune Monitoring of Patient Response

- TCR Dextramer®
- MHC Dextramer®
- dCODE Dextramer®

Epitope and TCR Discovery

dCODE Dextramer® reagents enable researchers to connect specific antigens with α, β, and/or paired αβ TCR sequences. With up to 1,000 unique DNA barcodes available, dCODE Dextramer® is the gold-standard for high-throughput V(D)J sequencing of antigen-specific T cells, advancing the discovery of epitope and TCRs with therapeutic potential.

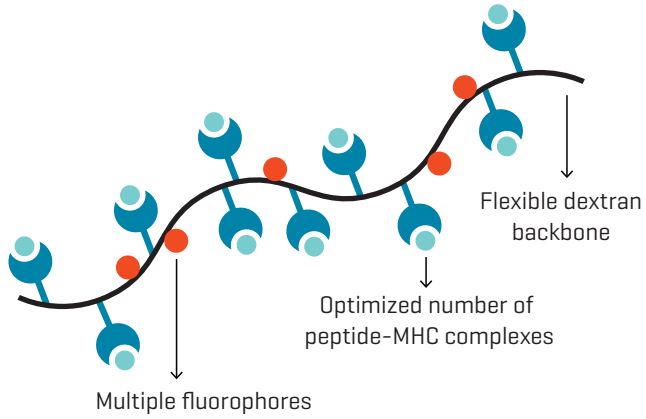
Vaccine Development

Precision Immune Monitoring of antigen-specific T and B cells using MHC Dextramer® reagents helps scientists to investigate vaccine efficacy – whether the vaccine candidate has induced a long-lasting memory response.

Antibody Discovery

dCODE Klickmer® enables the comprehensive multiplexed detection of antigen-specific B cells, revealing BCR sequences at single-cell resolution, and facilitating the identification of novel antibodies that bind to the target of interest. Furthermore, Immudex's technology can support the identification of antibodies targeting pMHC.

2. Dextramer® Technology



Dextramer® reagents are designed to enable detection and characterization of immune cells by flow cytometry. They are based on a flexible backbone made of dextran polymer that can be charged with multiple copies of protein complexes and fluorophores. Even when probing weak protein-protein interactions these reagents are capable of binding with high avidity to cells by engaging with multiple surface proteins simultaneously.

This configuration is at the core of all Immudex products enabling analysis of a growing list of immune cells in the quest of unravelling complex immune responses.

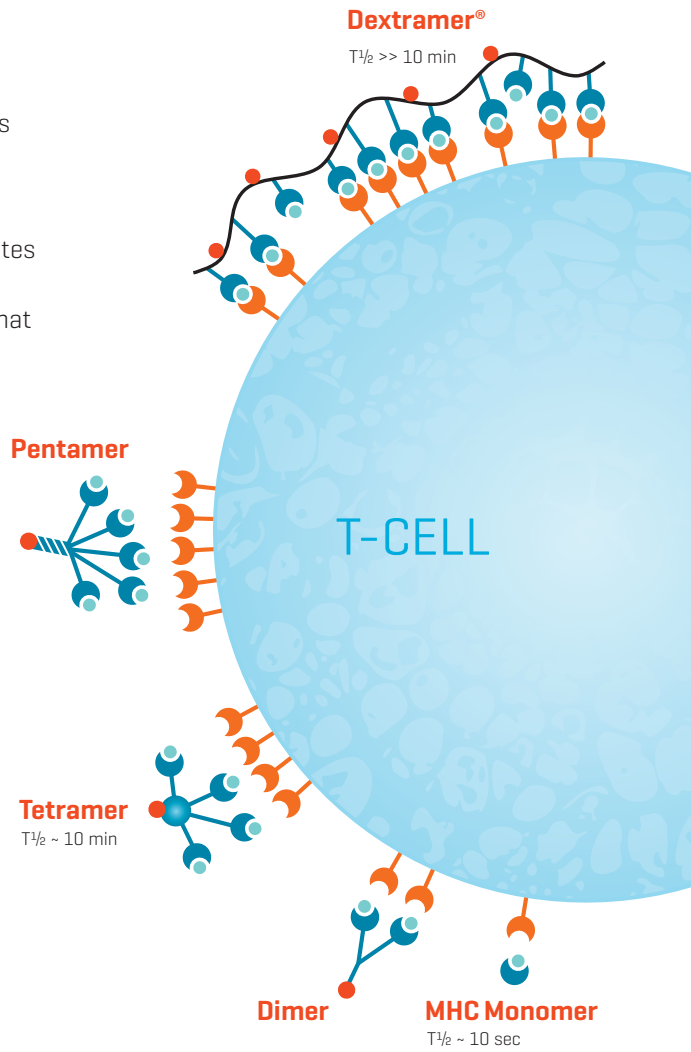
High-avidity multimers are ideal for monitoring T-cell responses

It is a feature of the immune synapse that TCR:pMHC interactions are weak and transient with half-lives measured in seconds. This makes detection of antigen-specific T cells challenging.

The dextran backbone of MHC Dextramer® reagents accommodates numerous peptide MHC complexes. Thus, each polymer presents several options to bind cell receptors in a flexible configuration that promotes multi-binding to increase avidity.

As a result, Dextramer® binding time is significantly longer than other multimers.

MHC Dextramer® enables sensitive flow cytometric detection of rare $CD4^+$ and $CD8^+$ T cells even with low-affinity receptors, helping researchers uncover T-cell populations that other multimer technologies miss.



Go beyond T cells

TCR Dextramer® reagents rely on the same Dextramer® technology to enable the detection of antigen-presenting cells (page 28).

Klickmer® reagents are also based on the Dextramer® technology, adapted to carry multiple universal acceptor sites. Combine Klickmer® reagents with any biotinylated molecule to create high-avidity multimers that efficiently bind B cells, CAR-T cells, and much more.

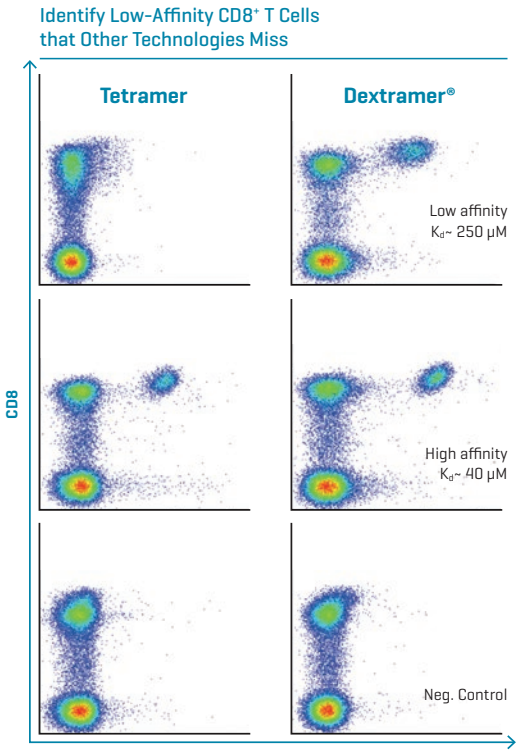
3. Product Overview – Basic Research

3.1 MHC Dextramer®

MHC I and MHC II Dextramer®

MHC I and MHC II Dextramer® are made up of a flexible dextran polymer decorated with multiple fluorophores and an optimized number of MHC-peptide complexes. They are designed for monitoring of antigen-specific T cells by flow cytometry with superior sensitivity.

MHC I Dextramer® reagents are also available as GMP products (page 24).



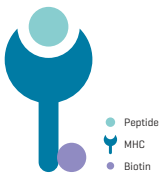
Adapted from Dolton *et al.*, Clin Exp Immunol. 2014.

Applications of MHC Dextramer®

- Detection, isolation and enumeration of antigen-specific T cells by flow cytometry
- Epitope discovery
- Characterization of vaccine responses
- Longitudinal studies of immunity

Reasons why you should work with MHC Dextramer®

- High order multimers with exceptional avidity enabling sensitive detection and isolation of rare antigen-specific T cell populations, even challenging T cells with low affinity TCRs that go undetected with classical MHC multimers
- Ability to investigate the importance of MHC variability in disease with access to a growing and extensive list of MHC alleles (>90 MHC I alleles) and off-the-shelf epitopes
- Rigorous quality control ensuring reliable and reproducible results



MHC Monomer	MHC Dextramer®	MHC dCODE Dextramer®
Optimizable	Flow Cytometry *In situ*	Next generation sequencing Single-Cell Multi-Omics
20, 100, 200, 1000 µg	50, 150, 500, 1000 tests	25, 50, 150 tests
MHC I and II	MHC I and II	MHC I and II
Biotin	BV421, FITC, PE, APC, or none	DNA barcode (10x, RiO, HiT) (page 19)

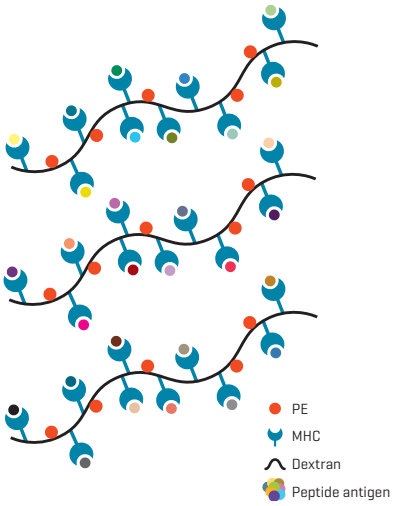
PEPTIDE · MHC · FLUOROPHORE · DEXRAN · DNA BARCODE · BIOTIN

MHC Dextramer® Negative Controls

Background staining can be allele-specific, in some cases related to the strength of the peptide-independent interaction between the MHC on the Dextramer® and CD8 on the T cell surface. In addition, background staining can also be donor-dependent.

We therefore advise the use of allele-matched antigen presenting MHC Dextramer® and negative control Dextramer®. We also recommend evaluating the background in every donor sample included in an experiment.

We have developed a new class of negative control reagents based on a novel innovative design. We use peptide pools of enormous diversity to create MHC Dextramer® that differ fundamentally from our normal reagents.



Instead of presenting a single pMHC monomer, **MHC Dextramer® Peptide Pool Negative Controls** are decorated with MHC monomers that all present different peptides. In addition, no two MHC Dextramer® Peptide Pool Negative Control molecules are likely to be composed of the same combination of pMHCs.

As a result, MHC Dextramer® Peptide Pool Negative Controls are **unable to bind to T cells by antigen-specific TCR engagement**. Thus, they are the perfect control for the delineation of background-stained cell populations.

We also offer MHC I Dextramer® Negative Controls with empirically derived peptide sequences that have been found to give very low levels of background staining.

For MHC II we use Class II-associated invariant chain peptide (CLIP) as a negative control.

MHC Dextramer® Positive Controls

Depending on the experimental setup, the ideal positive controls is:

- An MHC Dextramer® with an epitope derived from a widespread human virus (CMV, EBV or Flu)
- A pool of three Dextramer® with viral epitopes from CMV, EBV and Flu

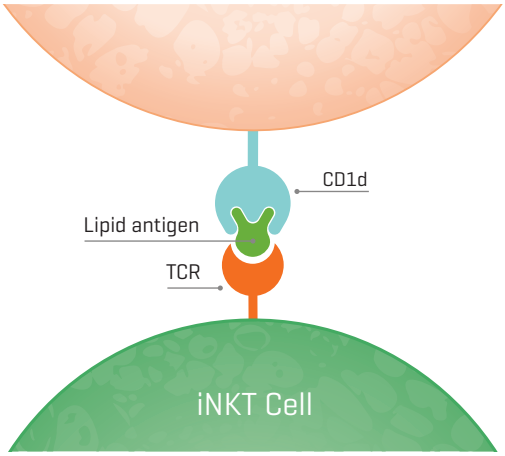
Ordering MHC Dextramer®

- Visit immudex.com to search for MHC I and MHC II Dextramer® reagents according to your desired peptide, allele, antigen, or disease category. If you do not find what you are looking for, contact us and we will search our larger internal database of products for you.
- Consult the selected list of **alleles** (page 33) and the full list of available alleles on our website (https://www.immudex.com/resources/mhc-alleles-list/).
- We also provide custom alleles and specificities.
- Fluorochromes available (BV421, FITC, PE, APC, or none).
- Test size (50,150, 500, 1000 tests). One test is 10 µl reagent and sufficient to stain 1–3 x 10^6 lymphoid cells or 1–3 x 10^5 clonal antigen-specific T cells.
- We also offer a range of Disease Panels with selected Dextramer® reagents related to Cancer and Infectious Diseases.

3.2 CD1d Products

Natural Killer Cells (NKT) comprise a family of specialized T cells with special TCRs that recognize lipid antigens presented by CD1d. They play an important role in modulating the immune response to microbial infections and tumors and are also involved in autoimmunity. Currently they are under investigation for use in cancer cell therapy since they are not alloreactive and able to invade solid tumor tissue where they orchestrate anti-tumor activity of multiple types of immune cells.

CD1d Dextramer® are made up of a flexible dextran polymer decorated with multiple fluorophores and an optimized number of CD1d molecules coupled with glycolipid alpha-Galactosyl Ceramide (α-GalCer). The result is a highly sensitive reagent to monitor CD1d restricted NKT cells by flow cytometry.



Applications of CD1d Products

- Detection, isolation and enumeration of CD1d restricted cells by flow cytometry
- Characterization of CD1d restricted cells in response to disease, down to the single-cell level by NGS or single-cell multi-omics
- Monitoring of cell therapy derived NKT cells

CD1d Dextramer®	Glycolipid	Cat. No.
Human CD1d	α-GalCer	XD8002
Mouse CD1d	α-GalCer	YD8002
Human CD1d	Unloaded	XD8001
Mouse CD1d	Unloaded	YD8001

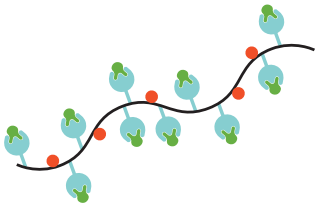
CD1d Monomer

Optimizable

20, 100, 200 µg, 1 mg

α-GalCer or unloaded*

Biotin



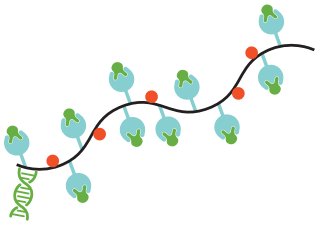
CD1d Dextramer®

Flow Cytometry
In situ

50, 150, 500, 1000 tests

α-GalCer or unloaded*

BV421, FITC, PE, APC or none



CD1d dCODE Dextramer®

Next generation sequencing
Single-Cell Multi-Omics

25, 50, 150 tests

α-GalCer or unloaded*

PE, DNA barcode (10x, RiO, HiT) (page 19)

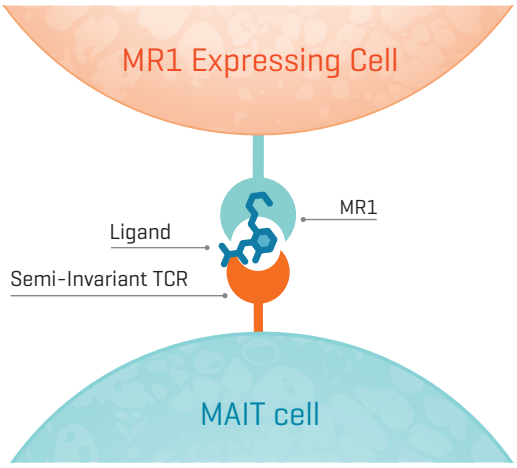
LIPID ANTIGEN · CD1D · FLUOROPHORE · DEXRAN · DNA BARCODE · BIOTIN

* CD1d products are also available unloaded, without a lipid, for use as a negative control.

3.3 MR1 Products

Mucosal-associated invariant T (MAIT) cells have a complex role in immunity but are proving attractive targets for immunotherapy. To understand their potential further, better research tools are needed.

With an optimized number of MR1-peptide complexes and a high number of fluorophores, MR1 Dextramer® reagents provide superior sensitivity and resolution.



Applications of MR1 Products

- Detection, isolation and enumeration ligand-specific MAIT cells by flow cytometry
- Characterization of ligand-specific MAIT cells phenotype, activity, and function
- Validate target recognition of your MAIT cell therapy or TCR-like antibody candidates for more specific cell therapies

MR1 Dextramer®	Ligand	Cat. No.
hMR1	5-OP-RU	ZA08004
hMR1	6-FP (Neg. Control)	ZA08003

Relevant Information

- Choice of ligands:
  - 5-OP-RU: a potent activator of MAIT cells
  - 6-FP: non-stimulatory for most MAIT cells (negative control)
- Mouse MR1 reagents and custom ligand-MR1 specificities can be requested through Custom Solutions and Services.

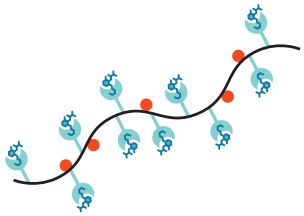
MR1 Monomer

Optimizable

20, 100, 200 µg

5-OP-RU
6-FP

Biotin



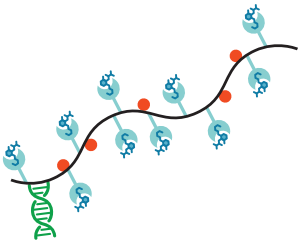
MR1 Dextramer®

Flow Cytometry
In situ

50, 150 tests

5-OP-RU
6-FP

BV421, FITC, PE, APC, or none



MR1 dCODE Dextramer®

Next generation sequencing
Single-Cell Multi-Omics

25, 50, 150 tests

5-OP-RU
6-FP

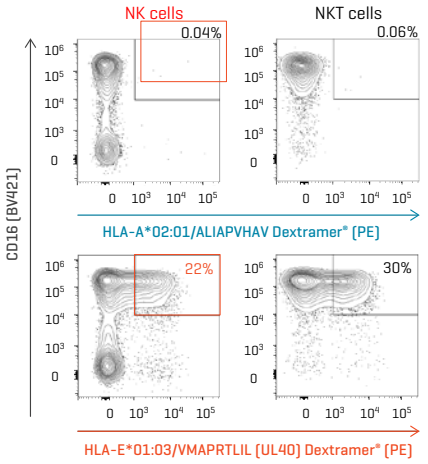
DNA barcode
(10x, RiO, HiT) (page 19)

LIGAND · MR1 · FLUOROPHORE · DEXRAN · DNA BARCODE · BIOTIN

3.4 HLA-E and HLA-G Products

HLA-E and HLA-G Dextramer® can be utilized for detecting antigen-specific NK and T cells to understand their unique peptide recognition and interactions with immune receptors. These molecules offer insights into unconventional T cell responses, immune tolerance, and pathological conditions such as cancer or infectious disease.

Through multimerization of HLA-E or HLA-G, Dextramer® technology increases the avidity for sensitive and reliable detection of NK and T cells.



Applications of HLA-E and HLA-G Products

- Detection, isolation and enumeration antigen-specific NK and T cells by flow cytometry
- Characterization of antigen-specific NK and T cells phenotype, activity, and function
- Development of pan-population therapies (alleles with low polymorphism)

Relevant Information

- Qa-1b is the mouse equivalent of HLA-E and is available through Custom Solutions and Services.
- HLA-E Dextramer® is available also as 15 tests.

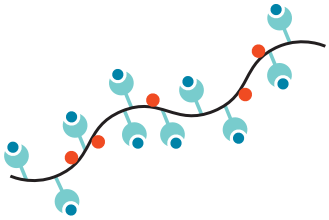
HLA-E and HLA-G Monomer

Optimizable

20, 100 µg

HLA-E*0103 / Qa-1b
HLA-G*0101

Biotin



HLA-E and HLA-G Dextramer®

Flow Cytometry
In situ

50, 150 tests*

HLA-E*0103 / Qa-1b
HLA-G*0101

FITC, PE, APC or none

HLA-E and HLA-G dCODE Dextramer®

Next generation sequencing
Single-Cell Multi-Omics

25, 50, 150 tests

HLA-E*0103 / Qa-1b
HLA-G*0101

DNA barcode
(10x, RiO, HiT) (page 19)

PEPTIDE · FLUOROPHORE · DNA BARCODE
MHC · DEXRAN · BIOTIN

Cat. No.	Allele	Peptide	Antigen	Disease Area
UR07003C	HLA-E*0103	RLPAKAPLL	inhA	Tuberculosis
UR07004C	HLA-E*0103	VMAPRTLVL	UL40	CMV
UR07005C	HLA-E*0103	VMAPRTLIL	UL40	CMV
US06470	HLA-G*0101	RIIPRHLQL	H2A	Autoimmune
US06667	HLA-G*0101	KYIHSANVL	ERK2	Autoimmune

3.5 Dextramer® *In Situ* Staining

Immune monitoring is typically performed by analyzing immune cells in blood samples. However, most T cells reside and function in tissue at sites where the actual disease manifests and establish tissue resident memory T cells for protective immunity.

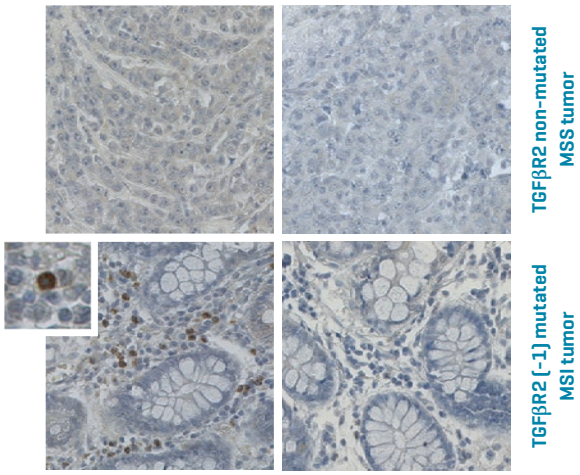
Tracking T cells in the tissue where they exert their function can advance our understanding of T-cell immunity. MHC Dextramer® used as *in situ* staining reagents on fresh frozen or FFPE samples can detect spatial distribution, localization, and abundance of antigen-specific T cells in normal tissue or at a site of disease.

Applications of MHC Dextramer® for *In Situ* Staining

- Detection of T-cells that are rare in blood
- Study of tissue-specific T cell responses in different models: mouse, primate, and humans
- Tracking distribution of cell therapy derived T cells

*In situ staining of tumor-specific CD8⁺ T cells in FFPE sections of microsatellite-stable (MSS) or -instable (MSI) tumors from HLA-A*0201 colorectal cancer patients, using FITC-labeled MHC I Dextramer® toward the TGFβR2 (-1) neoepitope (FSP02)*

Adapted from Mlecnik et al., 2016.



Relevant Information

- MHC Dextramer® are available as individual reagents (see page 10).
- Fluorochrome (BV421, FITC, PE, APC, or none)
- Test sizes (50, 150, 500, 1000 tests)

In addition, Immudex offers the **Dextramer® In Situ Staining Kit** to optimize T-cell staining in solid tissue sections by IHC and comprises three Dextramer® reagents where:

- Each Dextramer® carries the same specificity (e.g., HLA-A*0201/ELAGIGILTV)
- Each Dextramer® has a different number of MHC-peptide complexes, providing reagents with low, medium, or high avidity, respectively
- Each Dextramer® is FITC labeled for direct visualization by fluorescent microscopy

The Dextramer® *In Situ* Staining Kit is available for Class I alleles and CD1d.

References

- Lasrado N, *et al.* Mechanisms of sex hormones in autoimmunity: focus on EAE. Biology of Sex Differences, 2020; 11:50.
- Mlecnik B, *et al.* Integrative analyses of colorectal cancer show immunoscore is a stronger predictor of patient survival than microsatellite instability. Immunity 2016; 44(3):698-711.
- Kim YH, *et al. In situ* detection of HY-specific T cells in acute graft-versus-host disease-affected male skin after sex-mismatched stem cell transplantation. Biol Blood Marrow Transplant. 2012; 18(3):381-387.

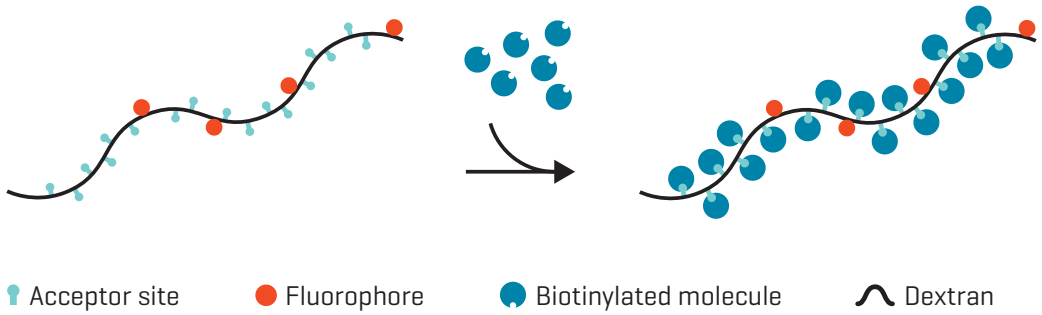
3.6 Klickmer®

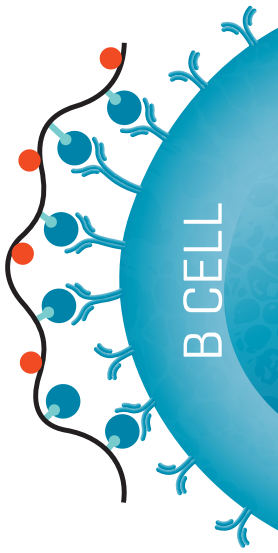
Unravel Immunity Beyond T Cells

A version of Dextramer® technology where the backbone contains numerous agnostic acceptor sites that bind and display any mono-biotinylated molecule. This multipurpose tool opens new possibilities to explore immunity, from sensitive detection of B cells and ligand/antibody discovery, to isolation of different types of immune cells, cancer cells and other special cell populations e.g. CAR-T cells. Attach your mono-biotinylated molecule of choice to Klickmer®.

Product Benefits

- Customized, sensitive, and efficient detection of your target of choice
- Create antigen multimers with high avidity characteristic of the Dextramer® technology
- High-resolution detection in numerous applications
- Short production turnaround time, save time searching and sourcing reagents



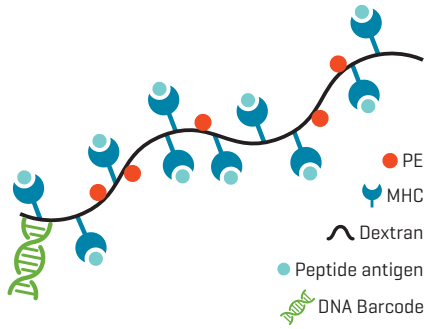


Relevant Information

- **Fluorochrome:** BV421, FITC, PE, APC, or none
- **Volume:** 60 µL, 200 µL, 1mL and 2 mL
- **Catalog number:** DX01K-BV421/FITC/PE/APC/none
- Let us do the loading for you! See Dextramerization® Services (page 29).

3.7 DNA-Barcoded dCODE® Technology

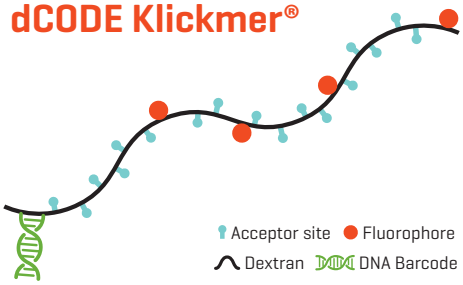
dCODE Dextramer®



The addition of a DNA barcode transforms MHC Dextramer® into a powerful tool for indexing T cells according to their TCR specificity. It enables efficient screening of multiple T-cell specificities in a single sample by amplifying and sequencing DNA barcodes that are unique for each dCODE Dextramer®. Get detailed insights about gene expression, surface proteins, and V(D)J sequences with single-cell antigen specificity.

- Hundreds of unique DNA barcodes available
- Broadest allele coverage (MHC I, MHC II, MR1, CD1d, HLA-E, HLA-G)
- Tried, tested, published technology

dCODE Klickmer®

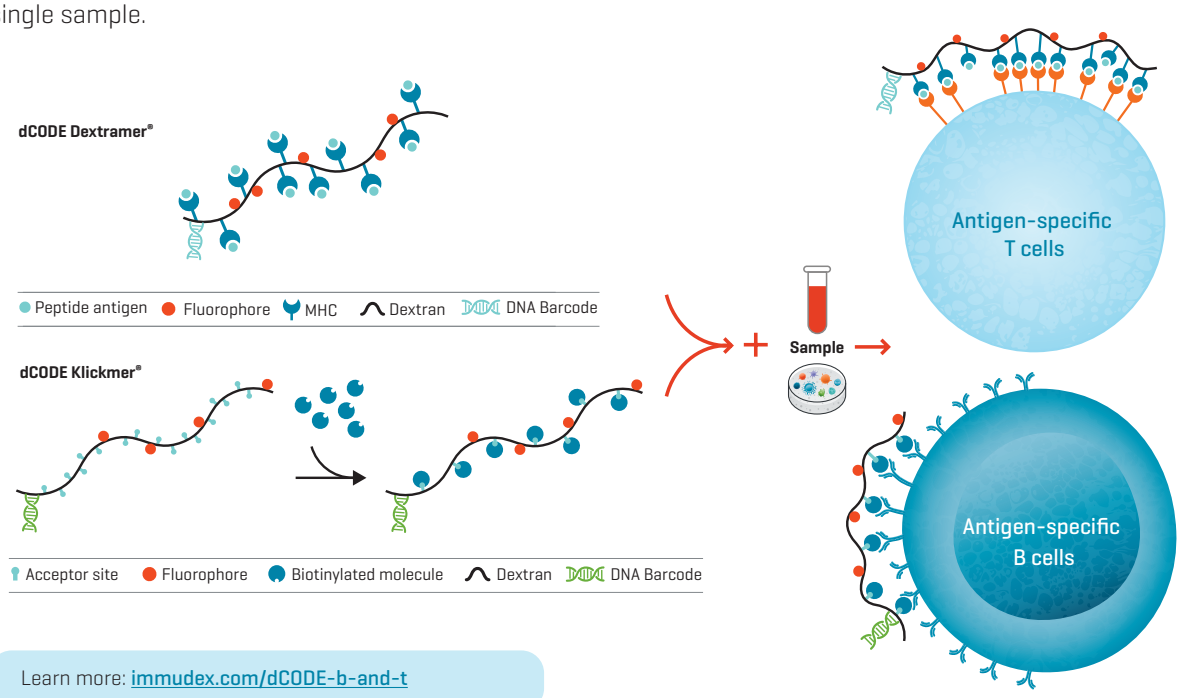


Adding a DNA barcode to Klickmer® enables multiple antigen-specific B cell populations to be characterized simultaneously in a single sample, speeding up antibody discovery.

dCODE Klickmer® reagents are available as single reagents or panels, in three formats (10x, RiO, HiT) (page 19).

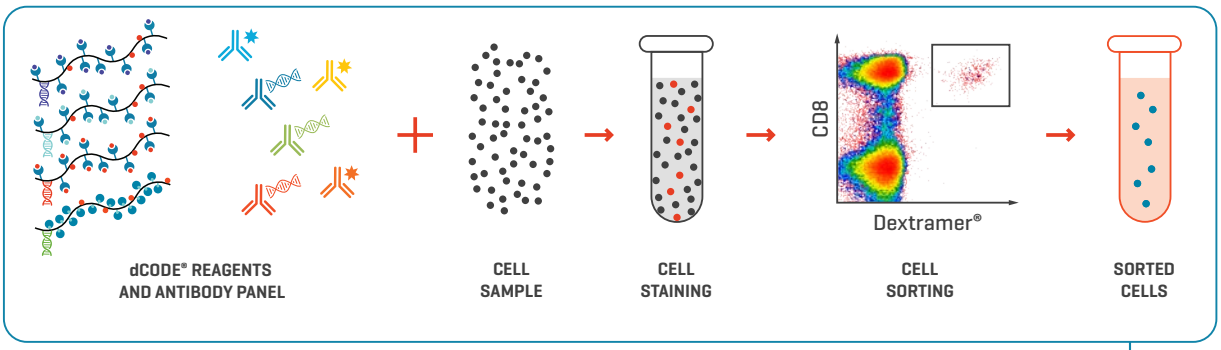
Save Precious Sample: Analyze T and B Cells Simultaneously

dCODE Dextramer® and dCODE Klickmer® can be used together and combined with DNA barcoded antibodies, enabling high-throughput single-cell multi-omics analysis of antigen-specific T cells, B cells and more, all in a single sample.

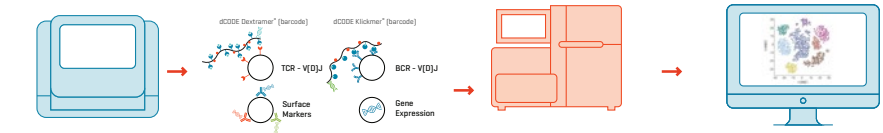


Learn more: immudex.com/dCODE-b-and-t

dCODE® Reagents Are Available in Three Formats

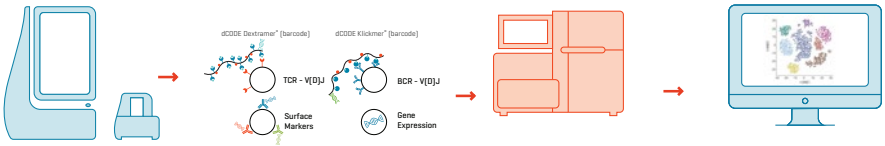


dCODE® (10x) for Single-Cell Multi-Omics



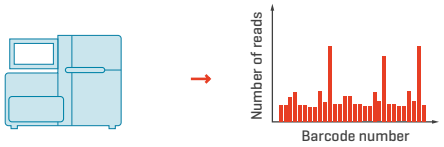
10x CHROMIUM SINGLE CELL ANALYSIS | NGS LIBRARIES | SEQUENCING | T/B CELL PROFILE

dCODE® (RiO) for Single-Cell Multi-Omics



BD RHAPSODY™ | NGS LIBRARIES | SEQUENCING | T/B CELL PROFILE

dCODE® (HiT) for Bulk Analysis of Immune Cells by NGS



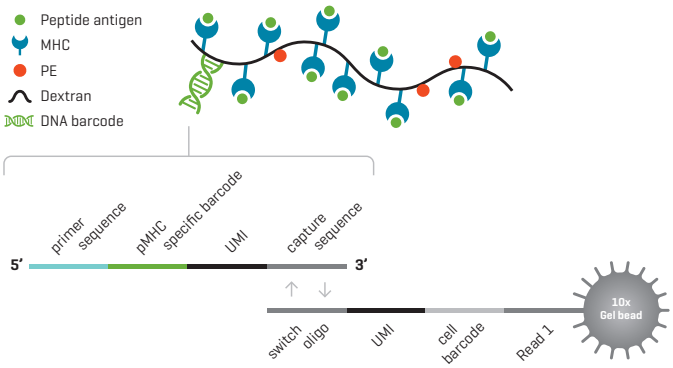
PCR AND DEEP SEQUENCING | IDENTIFICATION OF ANTIGEN-SPECIFICITIES

dCODE® Data Analysis Services

Looking for help with data analysis? We have partnered with Ardigen, a world-leading AI CRO to provide Immune Profiling Multi-Omics Data Analysis Services. Using advanced platforms and expertise, Ardigen transforms multi-omics datasets generated using dCODE® reagents into ready-to-use scientific insights.

Learn more: immudex.com/dCODE

dCODE Dextramer® (10x)



Designed to be compatible with the 10x Chromium System.

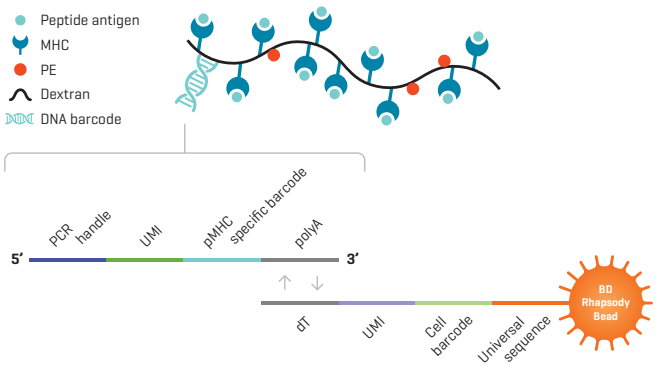
Couple information about gene expression, surface proteins, and V(D)J sequences with antigen specificity at the single-cell level.

The peptide-specific barcodes enable multiplexing with many epitopes specific for one allele or combining dCODE Dextramer® with different alleles – for example analysis of both $CD4^+$ and $CD8^+$ T cells in the same sample.

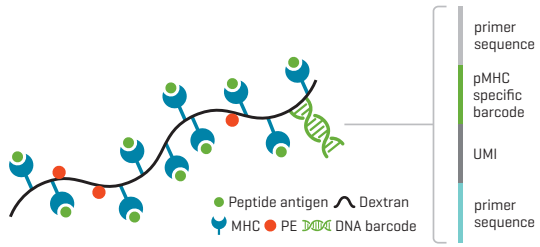
dCODE Dextramer® (RiO)

Designed to be compatible with the BD Rhapsody™ Single-Cell Analysis System, allowing you to obtain full immunological profiling in just one workflow.

Characterize antigen-specific $CD8^+$ or $CD4^+$ T cells by analysis of gene expression, surface markers and full length TCR sequences with applications in TCR discovery, cancer vaccine development and more.



dCODE Dextramer® (HiT)



Epitope discovery

dCODE Dextramer® (HiT) reagents are designed for multiplexing, allowing the identification of many different T-cell specificities in the same sample and the discovery of immunodominant epitopes. This assay is based on bulk immune cell NGS analysis without the need for single cell separation.

How to Order dCODE Dextramer® Products

When ordering, please specify:

- The desired dCODE Dextramer® product (HiT, RiO or 10x)
- The dCODE Dextramer® Grade (Gold or Explore)
- Your choice of peptide MHC combinations. See our list of available MHC alleles (page 33)
- Test size
- If you require specific barcodes (hundreds of unique barcodes available)

Explore	Gold
Reagent panels (16, 32, 48, 64, 80, 96, nx96 specificities) designed for large screenings	Single reagents designed for the analysis of few antigen specificities
Selected MHC I alleles available	Broadest allele coverage: all MHC I and MHC II alleles from Immudex's catalog are available.
Peptide binding based on peptide-MHC affinity prediction, not validated by a quality control	Peptide binding validated by quality control
25, 50 tests	25, 50, 150 tests

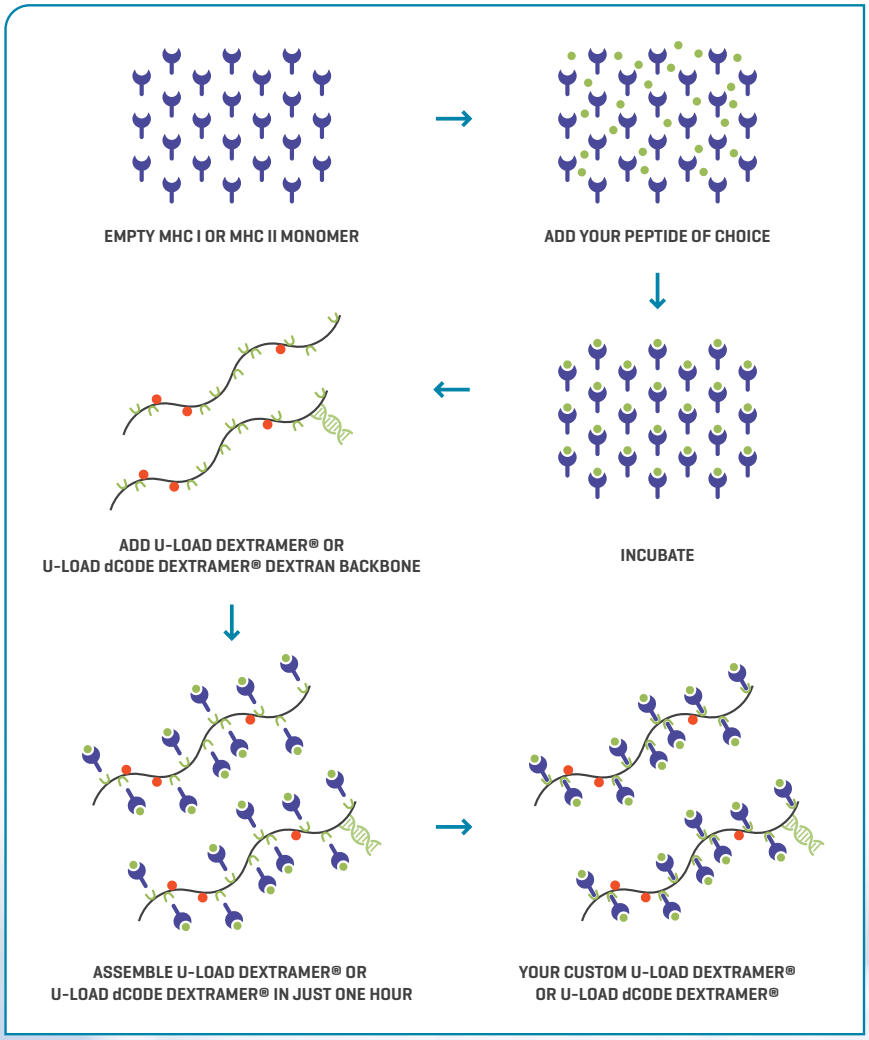
U-Load Dextramer® is also available with dCODE® DNA barcoded technology (see page 21).

3.8 Loadable Technology

Gain ultimate flexibility with our peptide-receptive MHC Monomers and U-Load® technology.

Bind your peptide of choice to an exceptional selection of MHC allotypes using peptide-receptive **MHC I easYmers®** and **U-Load® MHC II Monomers** to create your own MHC complexes.

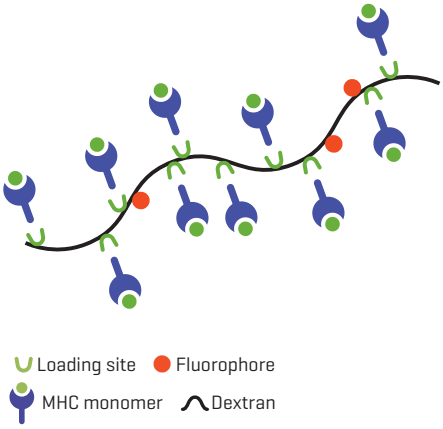
Using **U-Load Dextramer® Kits** for flow cytometry or **U-Load dCODE Dextramer® Kits** for single-cell multi-omics analysis, you can easily load your MHC complexes onto U-Load Dextramer® or U-Load dCODE Dextramer® to make custom reagents directly in your lab and streamline sample screening.



3.9 U-Load Dextramer®

Build Dextramer® Reagents in Your Lab

Combine your MHC-peptide complexes with the benefits of the Dextramer® technology. Build your multimer selecting from a broad range of peptide-receptive MHC I and MHC II alleles and use your own peptide sequence.



Product Benefits

- Create fit-for-purpose immune monitoring reagents
- Broadest allele coverage in the market
- Eliminate high reagent costs for high-throughput screening
- Fast and easy protocol with no UV-radiation

U-Load Dextramer® MHC I Kit

- Stabilizing dextran backbone (U-Load Dextramer®)
- Your choice of fluorochrome: BV421, FITC, PE, APC, or none
- Your selection of MHC I allele (page 33)
- Positive control peptide
- Test sizes available: 20, 50, 150 tests
- Let us do the loading for you! easYmers® on Dextran are available via our Custom Solutions and Services (page 29)

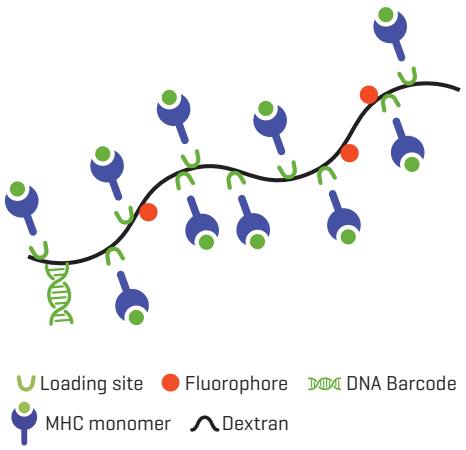
U-Load Dextramer® MHC II Kit

- Stabilizing dextran backbone (U-Load Dextramer®)
- Your choice of fluorochrome: BV421, FITC, PE, APC, or none
- Your selection of MHC II allele (page 33)
- Test sizes available: 50, 150 tests

3.10 U-Load dCODE Dextramer®

Fully flexible targeted T-cell monitoring coupled to the power of Single-Cell Multi-Omics.

Define an antigen peptide of interest and assemble a custom MHC-peptide allele complex with your choice of a broad range of allotype monomers.



Relevant Information

The product will provide you with:

- Barcoded dextran backbone
- Your choice of dCODE Dextramer®: 10x, RiO or HiT (page 19)
- Your selection of MHC allele monomers (page 33)

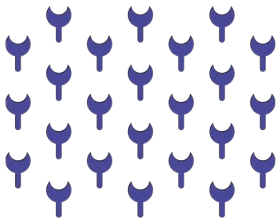
U-Load dCODE Dextramer® is provided as:

- Single reagents of 20 tests (24 µL), 50 tests (60 µL), or 150 tests (180 µL) each.
- Panels of 16, 32, 48, 64, 80, and 96 U-Load dCODE Dextramer® reagents for 20 tests (24 µL), or 50 tests (60 µL) each.

3.11 MHC and TCR Monomers

Whether ready-to-use or fully loadable, Immudex monomers are manufactured with the greatest attention to quality. The Immudex Monomer portfolio covers a broad spectrum of monomer formats, alleles, and labeling options. The one thing that remains constant is quality.

easYmers® and U-Load® MHC II – Loadable



Biotinylated, MHC I easYmers® and U-Load® MHC II Monomers are peptide-receptive monomers that can be loaded onto U-Load Dextramer® (page 21). This allows you to build your own Dextramer® or dCODE Dextramer® reagents or other MHC multimers with the epitope of your choice.

Relevant Information

easYmers®

Each easYmers® product contains the reagents necessary to:

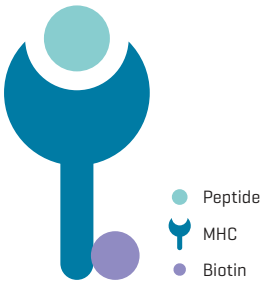
- Load peptides into MHC I creating peptide-monomer complexes
- Validate proper refolding of peptide-loaded complexes via flow cytometry
- Protocol to load MHC-peptide onto U-Load Dextramer®
- Number of tests available: 20, 50, 150
- easYmers® MHC I are powered by immunAware
- Let us load the easYmers® for you! easYmers® on Dextran are available via our Custom Solutions and Services (page 29)

U-Load® MHC II

Each U-Load® MHC II product contains the reagents necessary to:

- Load peptide into MHC II creating peptide-monomer complexes
- Peptide loading component
- Loading buffer
- Protocol to load MHC-peptide onto U-Load Dextramer®
- Number of tests available: 50, 150

MHC Monomers – Ready-to-Use



MHC I and MHC II biotinylated monomers with stringent quality control. Highly stable, they can be used whenever needed in your research.

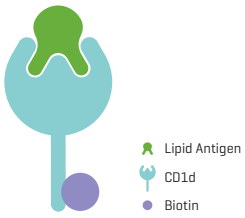
Product Benefits

- Strict production and quality testing
- Biotinylated molecules, ready-to-use
- Broadest MHC allele coverage available
- Stable and robust in long-term storage

Relevant Information

- MHC I and MHC II available
- Volumes available: 2µg, 100µg, 200µg, 1mg and 2mg. Higher volumes upon request.
- If different alleles, specificity, volume or even a non-biotinylated monomer is needed, it can be done via Custom Solutions and Services (page 26).
- GMP MHC Monomers also available (page 24).

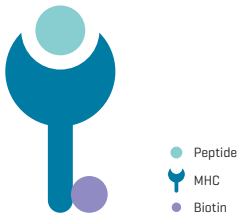
CD1d Monomers – Ready-to-Use



Relevant Information

- For more information on CD1d products, see page 12
- Human or mouse available
- Amounts available: 20, 100, 200 µg, 1 mg
- Choice of ligand: α-GalCer or unloaded

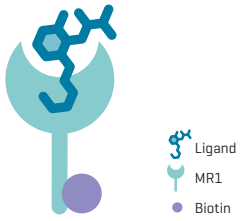
MR1 Monomers – Ready-to-Use



Relevant Information

- For more information on MR1 products, see page 13
- Human (Mouse and custom ligands available via Custom Solutions and Services)
- Amounts available: 20, 100, 200 µg, 1 mg
- Choice of ligand: 5-OP-RU or 6-FP

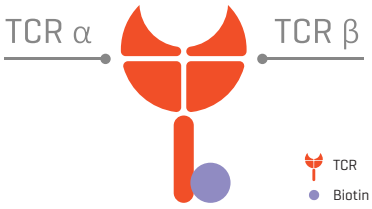
HLA-E and HLA-G Monomers – Ready-to-Use



Relevant Information

- For more information on HLA-E and HLA-G products, see page 14
- Human (Qa-1b and custom peptides available via Custom Solutions and Services)
- Amounts available: 20, 100 µg (HLA-E); 20, 100, 200 µg (HLA-G);
- Selected alleles (HLA-E*0103 / HLA-G*0101) and specificities

TCR Monomers – Ready-to-Use



- Extensive portfolio including MHC I, MR1 and HLA-E TCRs
- Rigorous quality control to confirm specificity and functionality
- Biotinylated molecules, ready-to-use

Relevant Information

- Custom Soluble TCR Monomers produced via Custom Solutions and Services (page 27).
- Amounts available: 20 µg, 100 µg and 200 µg. Higher amounts upon request.
- NY-ESO-1 Soluble TCR Monomers available for easy method optimization:
  - Specificity: SLLMWITQC/V
  - Clone: HA1 (affinity: 48 pM) or LA1 (affinity: 32 µM)
  - Cognate MHC: HLA-A*0201

4. Product Overview – GMP and IVD Products

Immune monitoring by flow cytometry is an increasingly important element in clinical research, cell therapy and vaccine development. With deep knowledge of immune monitoring and more than 10 years of experience with manufacturing, Immudex can help you achieve your clinical goals.

4.1 MHC Dextramer® (GMP)

Immudex offers MHC I Dextramer® (GMP) for applications that require excellent quality reagents produced with a high level of documentation, such as:

- Components for laboratory-developed tests (LDT)
- Reagents for medical devices governed by CLIA, FDA, and IVDD
- Tools for clinical trials and investigations in accordance with GC(L)P
- Materials for manufacturing and quality control of investigational and commercial pharmaceutical products

Applications of MHC I Dextramer® (GMP) include:

- Analysis of patient samples from clinical trials
- Quality control of cell-based immunotherapies by flow cytometry
- Efficient and accurate quantification of antigen-specific T cells in patients receiving treatment with drugs or vaccines

MHC I Dextramer® produced according to current good manufacturing practices (cGMP)

Immudex is ISO 13485:2016 certified, registered with the FDA and audited regularly, which guarantees that MHC I Dextramer® (GMP) are produced in compliance with strict international cGMP standards for medical devices regarding quality control and product traceability. Every step of the manufacturing process described in our Quality Management System (QMS) includes:

- Documented procedures
- Documented employee training
- Material traceability
- Equipment maintenance and monitoring records
- In-process quality control
- Final product quality control
- Established shelf-life and expiry date
- Batch record review of released products
- Material traceability
- Batch specific certificate of analysis
- Change notifications
- Supplier evaluation, including on-site audit – upon request

MHC Monomers (GMP)

Immudex also provide ready-to-use MHC Monomers produced according to cGMP.

Relevant Information

Contact us to discuss your projects and needs for GMP reagents.

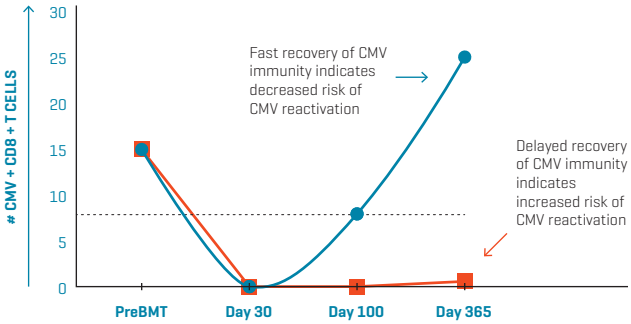
4.2 Dextramer® CMV Kit (IVD)

Several clinical trials have demonstrated the value of quantifying CMV-specific CD8⁺ T cells as a predictor of immune resistance to CMV after hematopoietic stem cell transplantation (HSCT).

The Dextramer® CMV Kit (IVD) is designed to enumerate CMV-specific CD8⁺ T cells in whole blood by flow cytometry. The kit is indicated in conjunction with other laboratory and clinical findings to assess CMV-specific immune status and risk of CMV reactivation in adult HSCT recipients following immunosuppression.

Identify Patients at Risk of CMV Infection

A semi-quantitative assay intended for the identification and enumeration of CMV-specific CD8⁺ T cells:



Model for CMV-specific T-cell immune monitoring in two post-transplant patients. The dashed line indicates the threshold for recovery of CMV T-cell immunity.

- Measure reconstitution of CMV-specific CD8⁺ T cells
- Manage patient stratification: Delayed recovery of T cells is associated with high-risk of CMV reactivation
- Guide therapeutic decision-making based on:
  - Cost-effective approach
  - Selection of optimal treatment

Relevant Information

The kit is for *in vitro* diagnostic (IVD) use in HSCT patients.

Cat. Number	Content	Regulatory Status
CX03	CMV-specific Dextramer® reagents: ▮ HLA-A*0101/VTEHDTLLY, ▮ HLA-A*0201/NLVPMVATV ▮ HLA-B*0702/TPRVTGGGAM ▮ HLA-B*0801/ELRRKMMYM ▮ HLA-B*3501/IPSINVHHY Negative control Dextramer® reagent Antibodies: Anti-CD8, Anti-CD3, Anti-CD4	For *in vitro* diagnostic use in the EU (CE-IVD) (CE certified in vitro diagnostic test in compliance with the General Safety and Performance requirements under the IVDR)
CX02	CMV-specific Dextramer® reagents: ▮ HLA-A*0101/VTEHDTLLY, ▮ HLA-A*0201/NLVPMVATV ▮ HLA-B*0702/TPRVTGGGAM ▮ HLA-B*0801/ELRRKMMYM ▮ HLA-B*3501/IPSINVHHY Negative control Dextramer® reagent Antibodies: Anti-CD8, Anti-CD3, Anti-CD4	For *in vitro* diagnostic use in US (K153538 510(k) premarket notification)

5. Custom Solutions and Services

Immudex is committed to empower scientists and clinicians worldwide to push the boundaries of their research.

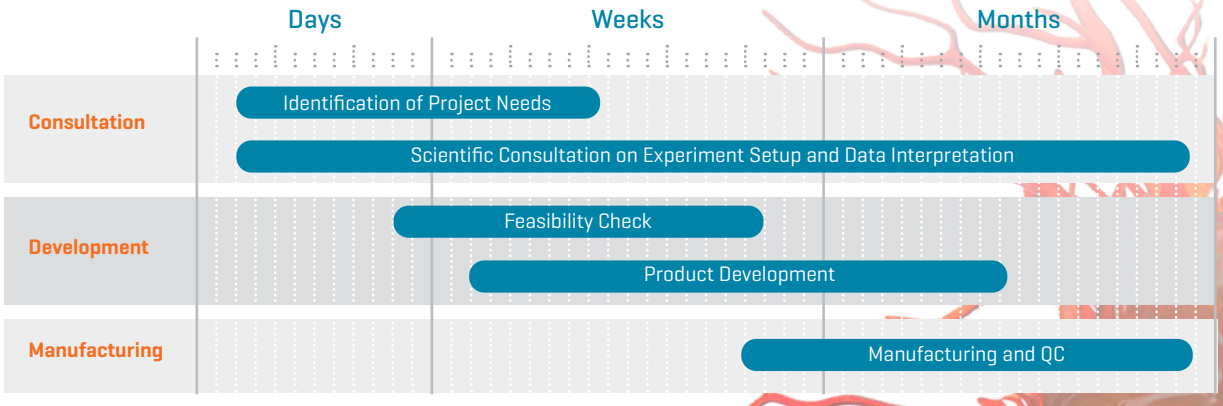
We offer custom solutions and services tailored to your needs providing unique Dextramer® products for unique research applications. Immudex experts accompany and see through every phase of the project. You will receive:

- A solution or service tailored specifically to your needs
- Access to extensive knowledge and expertise in immune monitoring
- Professional support and transparent communication
- The most advanced scientific insights

Custom Solutions	Custom Services
Immudex's experts consult with your team to address the experimental requirements needed to succeed: - TCR Solutions: production of your TCR candidates as Soluble TCR Monomers or TCR Dextramer® reagents - Dextramerization® Services: design of unique Dextramer® solutions suitable for your research - Custom protein expression and validation setup (TCR, MHC, or other) including custom alleles - pMHC Binding Screening Services - Establishment of GMP production with stage-gate, stringent - quality controls - Assistance in experimental design and data interpretation	Immudex provides you with adaptations of the products offered in our standard portfolio adjusted to your experiment: - Variation of the numbers of MHC monomers on the dextran backbone - Non-standard fluorophore labelling - QC assaying for reagent or monomer validation - Adjusted reagent concentration - Adjusted vial amount - Custom DNA barcodes - dCODE® reagents with BV421, FITC or APC fluorochromes, or no fluorochrome

Relevant Information

Every project is assessed individually. Depending on scope, complexity and resource needs, a Custom Solution or a Custom Service is matched to your research needs.

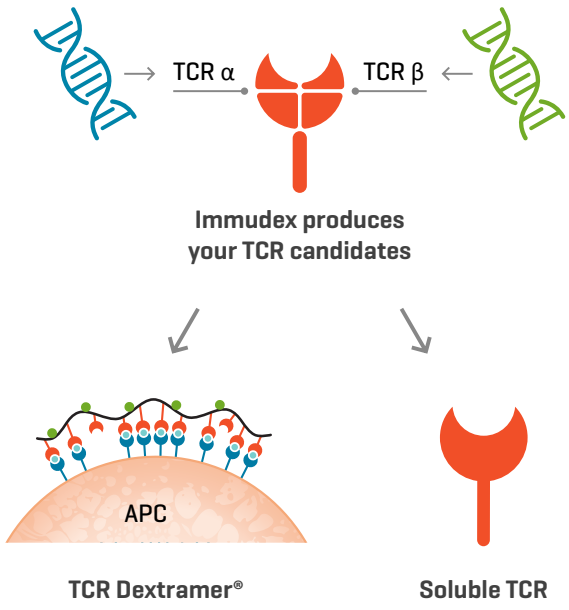


5.1 TCR Solutions

Immudex produces your TCR candidates, either as Soluble **TCR Monomers** or as **TCR Dextramer®** reagents.

Provide us with your candidate TCR sequences or discover them in your lab using dCODE Dextramer® reagents for single-cell multi-omics. Advance your research in:

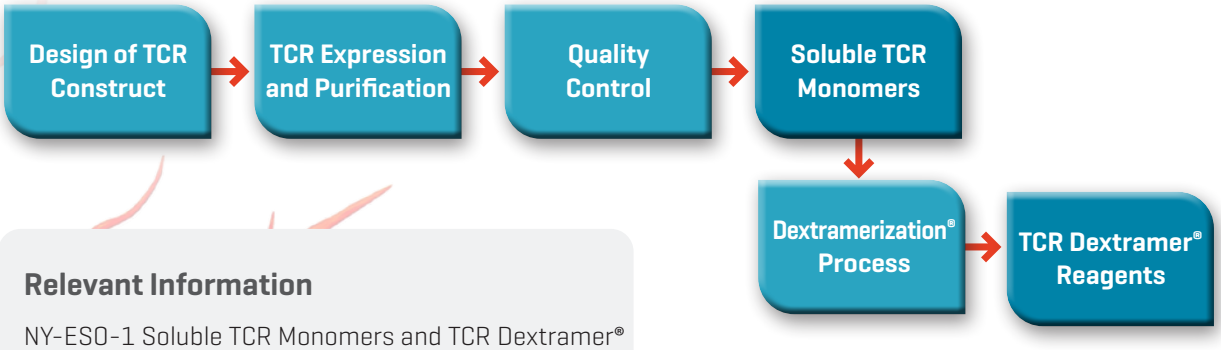
- Cross-reactivity screening
- TCR-like antibody applications
- Quantification of Antigen-Presenting Cells (APCs)
- Cell therapy e.g., TCR-T and CAR-T
- Analysis of TCR:pMHC complex affinity
- Validation and characterization of candidate TCRs
- Quality control of peptide or cell-based vaccines



Soluble TCR Monomers	TCR Dextramer®
Produced by expressing and refolding the TCR α and beta β chains. Soluble TCR Monomers are manufactured based on your candidate TCR sequences and undergo rigorous quality control to confirm specificity and functionality. ▪ 20 µg, 100 µg, and 200 µg*	Our experts combine your soluble TCR Monomers with the dextran backbone, enabling the detection of pMHC complexes by flow cytometry. ▪ 50, 150, or 500 tests* ▪ FITC, PE, or APC *Larger sizes upon request.

Support from start to finish

TCR Solutions consist of different phases designed to meet the success criteria of your research. Immudex experts will accompany you through every phase of the project.



Relevant Information

NY-ESO-1 Soluble TCR Monomers and TCR Dextramer® reagents are available for easy method optimization: ▪ Specificity: SLLMWITQC/V

- Clone: HA1 (affinity: 48 pM) or LA1 (affinity: 32 µM)
- Cognate MHC: HLA-A*0201

TCR Affinity Measurement Services

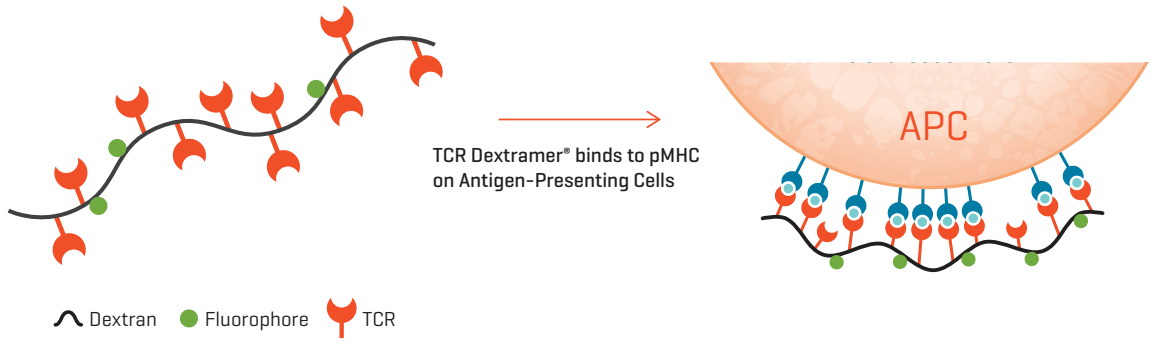
Immudex partners with Quality Assistance who offers TCR affinity measurement services using Immudex's pMHC and TCR Monomers.
Learn more: immudex.com/tcr-solutions

TCR Dextramer® – Novel Reagents for the Quantification of Antigen-Presenting Cells

When developing immunotherapies, the detection and quantification of Antigen-Presenting Cells (APCs) can be important to:

- Stratify and select patients with demonstrated expression of the target antigen
- Confirm if the target antigen is present predominantly in the target tissue (and absent in normal tissues), thus avoiding potential toxicity
- Monitor the presence of the target antigen during treatment and possible tumor escape.

TCR Dextramer® reagents are custom products, developed by Immudex's Custom Solutions and Services team, ideally suited to develop techniques for detection of antigen-presenting cells. These novel reagents open up new possibilities for studies detecting antigen-presenting cells, assessing pMHC levels by flow cytometry, or investigating the frequency of target epitope in tumor or normal tissue.



Immudex TCR Solutions at a Glance

>25 TCRs

Native and **Affinity-Optimized TCRs**
Model TCRs, e.g., NY-ESO-1

Optimized Manufacturing
>75% **Success Rate**

Our Clients' Tried and Tested Applications
QC of cell-based vaccines
TCR-like antibodies
TCR as bait in antibody discovery
TCR affinity assays (Biolayer Interferometry)

Milestones designed to **de-risk** the project at **every stage**

Extensive Portfolio
MHC I
MR1
HLA-E

Rigorous QC
including functionality testing

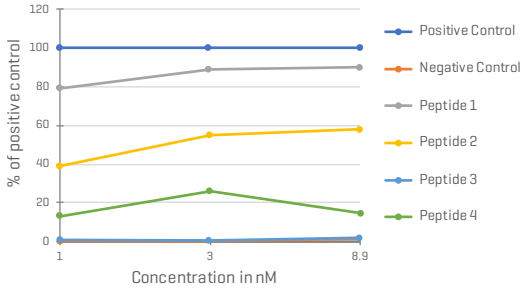
Detection of antigen presentation in
Peptide-Pulsed cells
Transduced cells
PBMCs

>10 Years' experience at Immudex, manufacturing MHC-like proteins

5.2 pMHC Binding Screening Services

Accelerate your epitope discovery and validation by assessing the ability of your peptides to bind to MHC alleles.

At Immudex, we utilize high-quality MHC molecules to evaluate the potential of your chosen peptides and alleles to form stable pMHC complexes.



Efficiency of test peptide loading (1-4) onto MHC I monomers relative to a positive control. Values shown as % of the positive control, which is set to 100%.

Relevant Information

- Broad coverage of MHC I and II alleles
- Binding assessments provided in a detailed report
- Transparent communication and consultation with study director

5.3 Custom Alleles

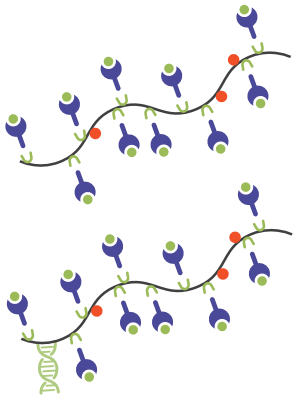
If our standard alleles don't align with your needs, our team can manufacture new alleles on request.

Count on us to assess feasibility, design and develop the manufacturing process, and deliver a fully quality-controlled Dextramer® reagent or ready-to-use Monomer directly to you.

5.4 easYmers® on Dextran

We simplify your workflow by loading and preparing easYmers® with your chosen peptides. Our team assembles the U-Load® reagent, conducts loading efficiency evaluation, and delivers a ready-to-use Dextramer® reagent tailored to your specifications.

The easYmers® technology is powered by immunAware.



5.5 Dextramerization® Services

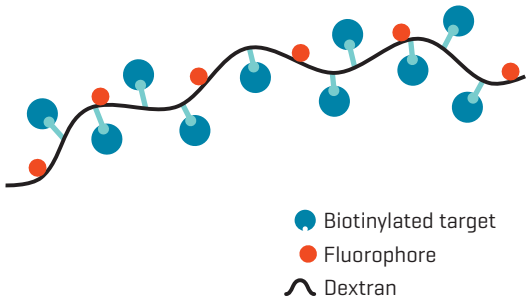
Let our experts design and manufacture unique Dextramer® solutions for your research. We assemble multimers decorated with your proteins or antigens or choice.

- **Protein Provision:** Provide your own mono-biotinylated protein or let us source it for you.
- **Validation:** Each protein undergoes rigorous quality testing.
- **Design and Delivery:** Your custom Klickmer® reagent will be designed with an optimal protein-to-dextran ratio and delivered to you ready to use.

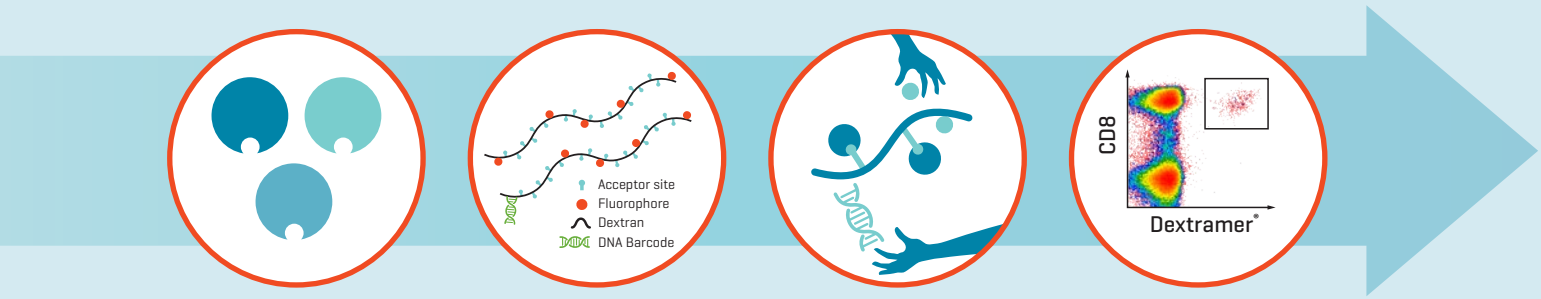
5.6 CAR-T Cell Detection and Quantification with Dextramer® Technology

Dextramer® reagents may provide a sensitive solution for direct detection and quantification of CAR-positive cells by flow cytometry.

Using Dextramer® technology, our Custom Solutions and Services team can work with you to develop custom antigen multimers and optimize detection of your CAR-T cells.



How does it work?



CD19, BCMA, CD22...

Flow cytometry:
BV421, FITC, PE, APC

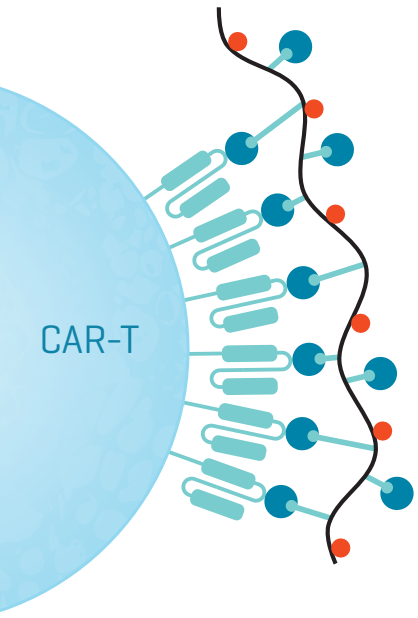
Single-cell multi-omics:
DNA barcode + PE

Customized reagent design

GMP possible

Assess % of target-specific Dextramer®-positive T cells by flow cytometry

Applications of Dextramer® Technology in CAR-T Cell Therapy



- Direct CAR-T cell detection
- Enhanced sensitivity for low-affinity CAR-Ts, due to the high avidity of Dextramer® technology and multiple fluorophores
- Assessment of transduction levels
- Determine the % of CAR-T-positive cells
- Demonstrate that the infusion product meets defined lot release criteria
- Monitor kinetics and persistence of infused CAR-T cells in patient blood samples
- Deeper characterization of target-specific CAR-T cells with gene and surface marker expression by single-cell multi-omics

Relevant Information

Please contact us if you are interested in Dextramer® for CAR-T detection and quantification.

6. Popular Epitopes and TCRs

T Cell Epitopes for Common Cancer Models

MOUSE MODEL	ANTIGEN	ALLELE	PEPTIDE	CAT. NO.
MC38	Rpl18	H-2 Kb	KILTFDRL	JD04286
	Adpgk	H-2 Db	ASMTNMELM	JA03803
	Cpne1	H-2 Db	SSPYSLHYL	JA03805
	Irgq	H-2 Db	AALLNSAVL	JA03801
	Reps1	H-2 Db	AQLANDVVL	JA03802
B16	TRP2	H-2 Kb	SVYDFFVWL	JD02199
	Gp100	H-2 Db	KVPRNQDWL	JA03570
	SIY	H-2 Kb	SIYRYYGL	JD02164
CT26	AH1	H-2 Ld	SPSYVYHQF	JG03294
MC38-OVA EG.7-OVA B16-OVA	OVA	H-2 Kb	SIINFEKL	JD02163

Popular Epitopes

CAT. NO.	ALLELE	PEPTIDE	ANTIGEN	CATEGORY	COMMENT
WD05314	HLA-A*1101	VVVGADGVGK	KRAS G12D	Cancer	
WB04476	HLA-A*0201	ALREEEEGV	MAGE-A1	Melanoma	
WB06614	HLA-A*0201	GTLEEVPTA	MAGE-A1	Melanoma	
WF03738	HLA-A*2402	NYKHCFPEI	MAGE-A1	Melanoma	
WH06468	HLA-B*0702	FPSLREAAL	MAGE-A1	Melanoma	
WB04880	HLA-A*0201	FLWGPRALA	MAGE-A4	Melanoma	
WA05257	HLA-A*0101	EVDPASNTY	MAGE-A4	Melanoma	
WB03578	HLA-A*0201	GVYDGREHTV	MAGE-A4	Melanoma	GMP available
WBM03578	HLA-A*0201mut†	GVYDGREHTV	MAGE-A4	Melanoma	GMP available
WB04198	HLA-A*0201	KVLEHVVRV	MAGE-A4	Melanoma	GMP available
WB04366	HLA-A*0201	GVYDGEEHSV	MAGE-A4	Melanoma	
WB05068	HLA-A*0201	KVDELAHFL	MAGE-A4	Melanoma	
WF05102	HLA-A*2402	NYKRCFPVI	MAGE-A4	Melanoma	
WB02162	HLA-A*0201	ELAGIGILTV	MART-1	Melanoma	GMP available
WB02696	HLA-A*0201	SLLMWITQC	NY-ESO-1	Cancer	GMP available
WB03247	HLA-A*0201	SLLMWITQV	NY-ESO-1	Cancer	GMP available
WB02132	HLA-A*0201	NLVPMVATV	pp65	CMV	GMP available
JA02195	H-2 Db	RAHYNIVTF	E7	HPV	

† HLA allele is mutated to enhance binding between MHC binding groove and peptide

Popular TCRs

CAT. NO.	COGNATE PMHC	SPECIFICITY	ANTIGEN	CATEGORY	COMMENT
CSS009M_1	HLA-A*0201	SLLMWITQC/V	NY-ESO-1	Cancer	TCR Monomer, clone LA1 (affinity: 32 µM)
CSS009M_10	HLA-A*0201	SLLMWITQC/V	NY-ESO-1	Cancer	TCR Monomer, clone HA1 (affinity: 48 pM)
CSS009_1	HLA-A*0201	SLLMWITQC/V	NY-ESO-1	Cancer	TCR Dextramer®, clone LA1 (affinity: 32 µM)
CSS009_10	HLA-A*0201	SLLMWITQC/V	NY-ESO-1	Cancer	TCR Dextramer®, clone HA1 (affinity: 48 pM)

Note: Soluble TCR Monomers and TCR Dextramer® Reagents for other TCRs are available via our Custom Solutions and Services team (see page 27).

7. MHC Alleles List

Available as Dextramer® Reagents and Ready-to-use MHC Monomers

MHC I	MHC II
HLA-A*0101	HLA-DRB1*0101
HLA-A*0201	HLA-DRB1*0301
HLA-A*0211	HLA-DRB1*0401
HLA-A*0301	HLA-DRB1*0701
HLA-A*0302	HLA-DRB1*1101
HLA-A*1101	HLA-DRB1*1501
HLA-A*2301	HLA-DPB1*0401
HLA-A*2402	
HLA-A*2902	
HLA-A*3303	
HLA-A*6801	
HLA-B*0702	
HLA-B*0801	
HLA-B*1302	
HLA-B*2705	
HLA-B*3501	
HLA-B*3902	
HLA-B*4201	
HLA-B*4403	
HLA-B*5101	
HLA-B*5701	
HLA-B*5703	
HLA-B*8101	
HLA-C*0304	
HLA-C*0602	
HLA-C*0702	
HLA-C*1502	
HLA-G*0101	
H-2 Dd	
H-2 Dk	
H-2 Kb	
H-2 Kd	
H-2 Kk	
H-2 Ld	
H-2 Db	
Mamu-A*01	
Mamu-A*08	
Mamu-B*17	
Qa-1b	

Alleles available as Loadable MHC Monomers

MHC I EASYMERS® POWERED BY IMMUNAWARE*	MHC II U-LOAD® MHC II MONOMERS
HLA-A*0101	HLA-DRB1*0101
HLA-A*0201	HLA-DRB1*0401
HLA-A*0203	HLA-DRB1*0701
HLA-A*0206	HLA-DRB1*1101
HLA-A*0301	
HLA-A*1101	
HLA-A*2301	
HLA-A*2402	
HLA-A*2407	
HLA-A*2501	
HLA-A*2601	
HLA-A*2902	
HLA-A*3002	
HLA-A*3101	
HLA-A*3201	
HLA-A*3601	
HLA-A*6801	
HLA-A*6802	
HLA-B*0702	
HLA-B*0801	
HLA-B*1401	
HLA-B*1501	
HLA-B*1502	
HLA-B*1509	
HLA-B*1801	
HLA-B*3501	
HLA-B*3508	
HLA-B*3701	
HLA-B*3801	
HLA-B*3901	
HLA-B*3906	
HLA-B*4001	
HLA-B*4101	
HLA-B*4402	
HLA-B*4403	
HLA-B*4601	
HLA-B*5101	
HLA-B*5201	
HLA-B*5501	
HLA-B*5701	
HLA-B*5702	
HLA-B*5801	
HLA-C*0303	
HLA-C*0304	
HLA-C*0401	
HLA-C*0501	
HLA-C*0602	
HLA-C*0701	
HLA-C*0702	
HLA-C*0802	
HLA-C*1203	
H-2 Db	
H-2 Kb	
H-2 Dd	
H-2 Ld	

MHC alleles available as Dextramer® Reagents or ready-to-use MHC Monomers via Custom Solutions and Services

HLA-A*0203	HLA-B*4001
HLA-A*0205	HLA-B*4002
HLA-A*0206	HLA-B*4101
HLA-A*0207	HLA-B*4201
HLA-A*2301	HLA-B*4202
HLA-A*2407	HLA-B*4402
HLA-A*2501	HLA-B*4501
HLA-A*2602	HLA-B*4601
HLA-A*3001	HLA-B*4701
HLA-A*3002	HLA-B*4801
HLA-A*3101	HLA-B*4901
HLA-A*3201	HLA-B*5001
HLA-A*3601	HLA-B*5301
HLA-A*6601	HLA-B*5501
HLA-A*6802	HLA-B*5601
HLA-A*6901	HLA-B*5701
HLA-B*1301	HLA-B*5702
HLA-B*1401	HLA-B*5703
HLA-B*1402	HLA-B*5801
HLA-B*1501	HLA-C*0202
HLA-B*1502	HLA-C*0303
HLA-B*1503	HLA-C*0401
HLA-B*1509	HLA-C*0501
HLA-B*1517	HLA-C*0602
HLA-B*1542	HLA-C*0701
HLA-B*1801	HLA-C*0802
HLA-B*2702	HLA-C*1203
HLA-B*2705	HLA-C*1601
HLA-B*3503	HLA-E*0103
HLA-B*3508	HLA-DRB1*1301
HLA-B*3701	HLA-DRB1*1501
HLA-B*3801	HLA-DQ2.5
HLA-B*3901	Mamu-A*04
HLA-B*3906	mMR1
HLA-B*3910	

VIEW FULL LIST

Need a Custom Allele or New Specificity?

Contact us and we will be happy to help!

*Immudex is the proud global distributor of easYmers® MHC I monomers powered by immunAware.

8. Resources

We are dedicated to empowering researchers and clinicians worldwide to push the boundaries of medicine through advanced antigen-specific immune-based tools.

Educational Material

Find a selection of posters, case studies, and application notes.
https://www.immudex.com/resources/educational-material/

Webinars

Watch these webinars from the Immudex team and our scientific collaborators.
https://www.immudex.com/resources/webcasts/

Technical Support

Let us know if you have any questions. Our dedicated Technical Support team is here to help you.
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Publications

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Custom Solutions and Services

Unique Dextramer® reagents for unique research applications. Contact us to discuss how we can help you:
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Let's Talk Science

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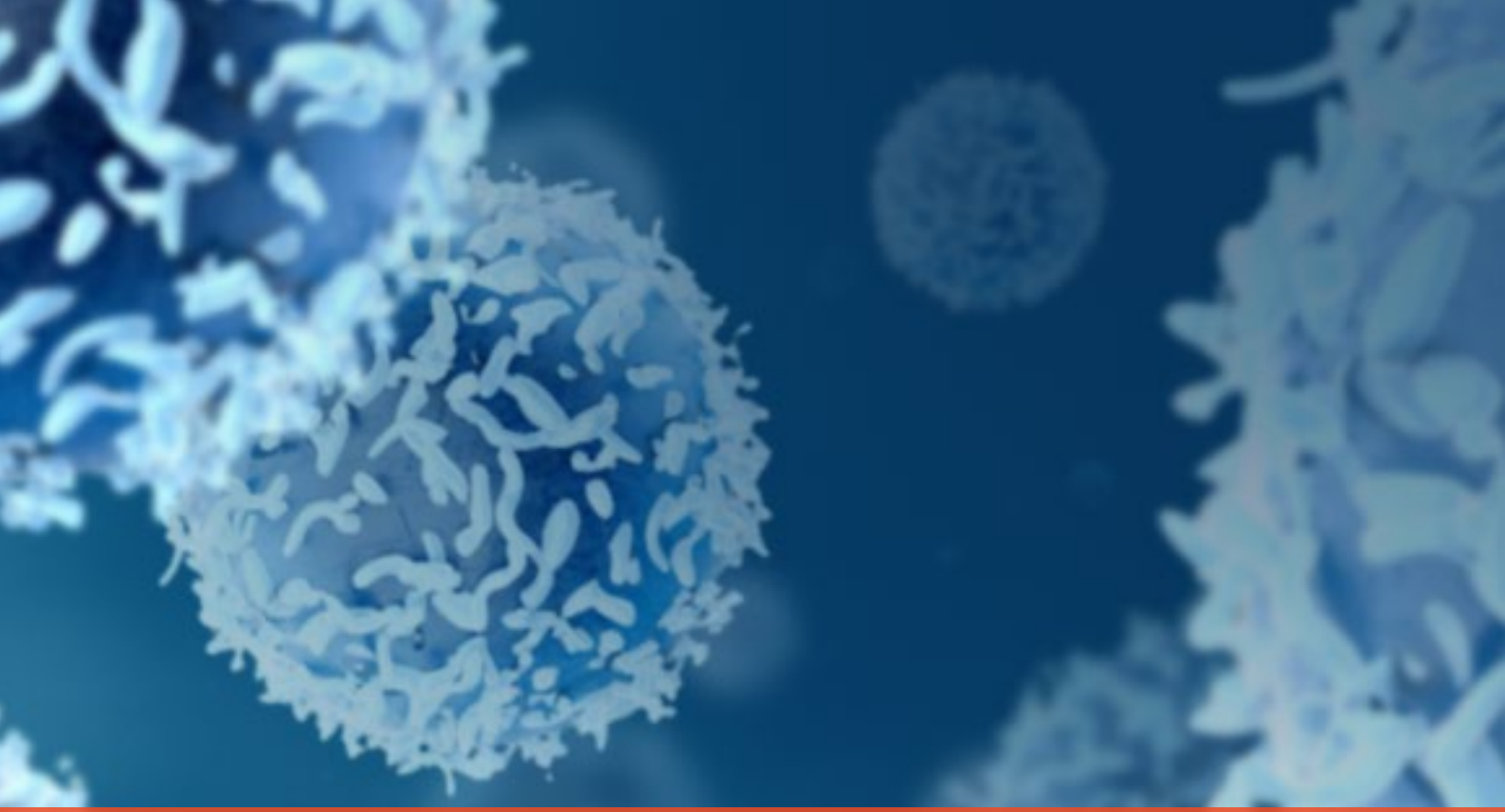
With Immudex reagents you can easily transition from basic research to GMP.



Get the full picture of the cellular immune response

For research use only. Not for use in diagnostic or therapeutic procedures.

Immudex is the sole manufacturer and provider of dCODE Dextramer® reagents, and support related to these products is through Immudex.

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