



# Isolate truly untouched cells

Dynabeads® negative isolation  
of human and mouse cells





# When you need truly untouched human and mouse cells

## Dynabeads® negative cell isolation—the most gentle method

- Minimal stress on cells with column-free method
- High cell viability, purity, and recovery
- Minimal effort and maximum reproducibility

Preparation of pure and viable cell samples is paramount to achieving optimal results. For the best cell separation, all you need are Dynabeads® and a DynaMag™ magnet (Figure 1). Your target cells do not interact with beads, avoiding potential activation of intracellular pathways. Simple and gentle Dynabeads® technology ensures reproducibility, which reduces variability in your research. The attraction is simply *magnetisk*.\*

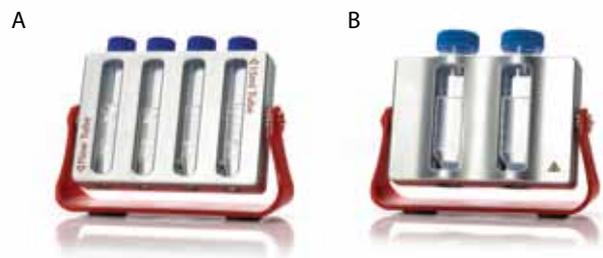
### Gentle tube-based cell isolation

Negative cell isolation takes place in a single tube (Figure 2). With only a few simple liquid handling steps, the tube-based Dynabeads® method provides an efficient approach to cell separation and assures high cell purity and recovery.

Tube-based separation is very gentle to your cells. The cell viability is very high, both short-term (directly after isolation) and long-term (over time, e.g., in culture). Why expose cells to the unnecessary stress of being passed through a dense column?

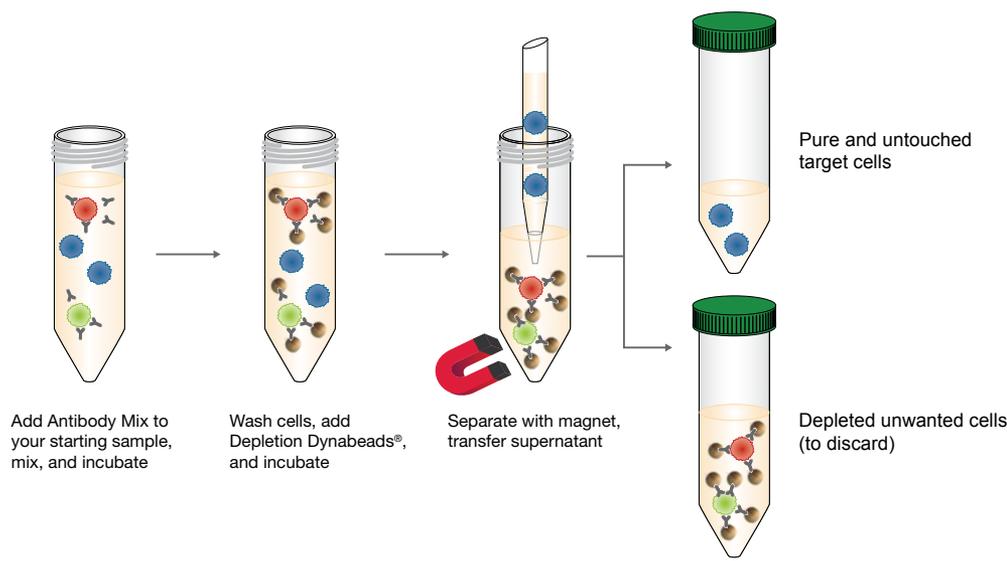
### Isolate untouched cells

A range of ready-to-use kits are available for negative isolation of human and mouse cells. Starting samples are typically human peripheral blood mononuclear cells (PBMC) or mouse spleens or lymph nodes. To ensure the best results, each specific antibody mix includes multiple markers. Extra antibodies can be added, should you want to refine and increase specificity for a specific subpopulation.



**Figure 1. New magnets enable efficient cell isolation.** The new DynaMag™-15 (A) and DynaMag™-50 (B) magnets combine strong magnetic attraction with flexible and smart ergonomic design. A tilting mechanism enables you to rest your elbows while pipetting. The magnet provides good control and visibility for your isolations.

\**Magnetisk* is the Norwegian word for magnetic. Did you know that Dynabeads® magnetic separation technology was pioneered in the 1980s by the Norwegian company Dynal®, now part of Life Technologies? To learn more, visit [www.invitrogen.com/dynal](http://www.invitrogen.com/dynal).



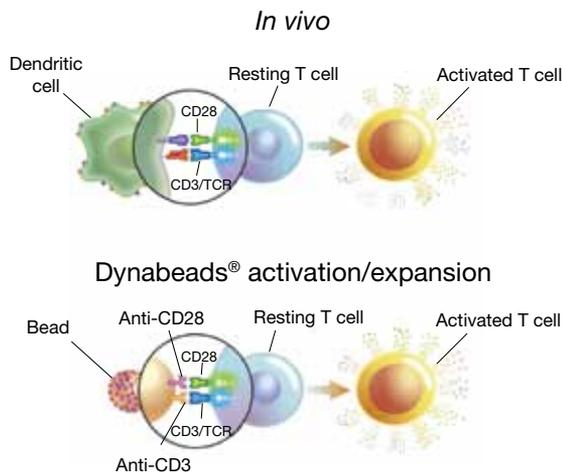
**Figure 2. The tube-based Dynabeads® method utilizes liquid kinetics and avoids the stress of cells going through a dense column.** Dynabeads® enable gentle and efficient negative cell isolation. Using a highly optimized Antibody Mix, the unwanted cells are depleted from your starting sample, and your bead- and antibody-free target cells are left untouched.

### For any application

The truly untouched isolated cells are left bead- and antibody-free. The cells are highly viable, and in perfect condition for flow cytometry or any functional assays used in research areas such as cancer, HIV, or autoimmune diseases. A large number of published articles document the performance of Dynabeads® negative cell isolation (key citations are referenced throughout this brochure).

### Cell activation and expansion

The isolated T cells can be further activated or expanded using Dynabeads® T cell activation and expansion products. These specific beads mimic *in vivo* T cell activation via antigen-presenting cells (APCs) (Figure 3). This gentle and efficient technology allows *ex vivo* physiological activation and expansion of both mouse and human T cells. Products for basic research, preclinical, and clinical applications are available, allowing you to move from mouse studies to clinical research using the same technology platform.



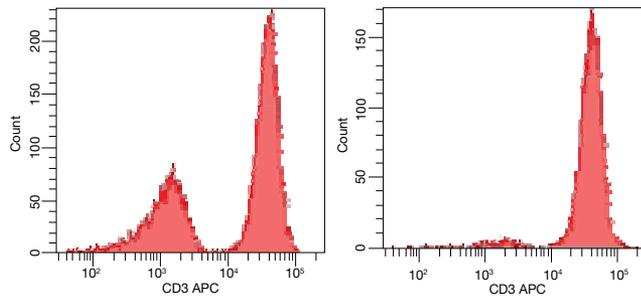
**Figure 3. Consistent and efficient T cell activation/expansion.** Dynabeads® offer a simple solution for mimicking the *in vivo* interaction of T cells with antigen-presenting cells (APCs) by utilizing the two activation signals present on APCs (CD3 and CD28) and a three-dimensional bead similar in size to APCs. This method provides physiological activation more similar to the *in vivo* state than with traditional methods. T cells expanded with Dynabeads® retain their functional properties, and can be restimulated several times without preparing antigen-presenting cells or feeder cells.



## Human cells

### Dynabeads® Untouched™ Human T Cells

<b>Cat. No.</b>	113-44D
<b>Kit capacity</b>	Processes $1 \times 10^9$ cells
<b>Contains</b>	Depletion Dynabeads® (10 mL) Antibody Mix (Human T Cells) (2 mL)
<b>Antibody mix</b>	Mouse IgG antibodies against non-T cells: human CD14, CD16 (specific for CD16a and CD16b), CD19, CD36, CD56, CDw123, and CD235a (glycophorin A). The antibody on the Dynabeads® is a monoclonal human IgG4 anti-mouse IgG.
<b>Cells removed</b>	The kit depletes human B cells, NK cells, monocytes, macrophages, platelets, dendritic cells, granulocytes, and erythrocytes. Isolated T cells are untouched and suitable for any downstream application. The cells proliferate in response to polyclonal stimulation with Dynabeads® activation/expansion technology (CFSE assay).



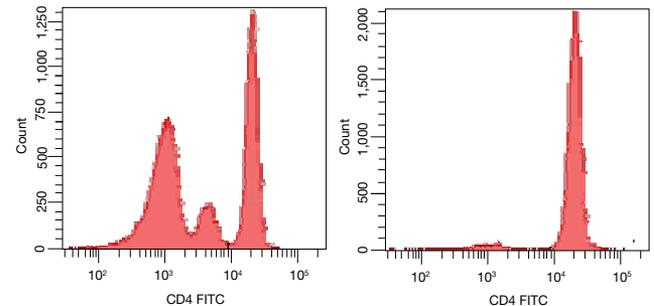
**Figure 4. Purity of human T cells.** Purity before (left) and after (right) negative isolation from PBMC using Dynabeads® Untouched™ Human T Cells.

#### Selected references

- Haas C et al. (2006) A tumor vaccine containing anti-CD3 and anti-CD28 bispecific antibodies triggers strong and durable antitumor activity in human lymphocytes. *Int J Cancer* 118:658–667.
- Hintzen C et al. (2008) Oncostatin M-induced and constitutive activation of the JAK2/STAT5/CIS pathway suppresses CCL1, but not CCL7 and CCL8, chemokine expression. *J Immunol* 181:7341–7349.
- Luissint A-C et al. (2008) JAM-L-mediated leukocyte adhesion to endothelial cells is regulated in cis by  $\alpha_4\beta_1$  integrin activation. *J Cell Biol* 183:1159–1173.
- Reynolds JL et al. (2009) Modulation of the proteome of peripheral blood mononuclear cells from HIV-1 infected patients by drugs of abuse. *J Clin Immunol* 29(5):646–656.

### Dynabeads® Untouched™ Human CD4 T Cells

<b>Cat. No.</b>	113-46D
<b>Kit capacity</b>	Processes $1 \times 10^9$ cells
<b>Contains</b>	Depletion MyOne™ Dynabeads® (10 mL) Antibody Mix (Human CD4 T Cells) (2 mL)
<b>Antibody mix</b>	Mouse IgG antibodies against non-CD4 <sup>+</sup> T cells: human CD8, CD14, CD16 (specific for CD16a and CD16b), CD19, CD36, CD56, CDw123, and CD235a (glycophorin A). The antibody on the Dynabeads® is a monoclonal human IgG4 anti-mouse IgG.
<b>Cells removed</b>	The kit depletes human B cells, NK cells, monocytes, macrophages, platelets, dendritic cells, CD8 <sup>+</sup> T cells, granulocytes, and erythrocytes. The isolated CD4 <sup>+</sup> cells are untouched and suitable for any downstream application. The cells up-regulate CD25 and CD69 and proliferate in response to Dynabeads® activation/expansion technology (CFSE assay).



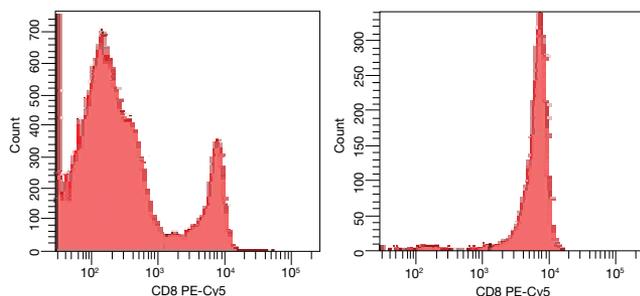
**Figure 5. Purity of human CD4<sup>+</sup> T cells.** Purity before (left) and after (right) negative isolation from PBMC using Dynabeads® Untouched™ Human CD4 T Cells.

#### Selected references

- Attia P et al. (2006) Selective elimination of human regulatory T lymphocytes in vitro with the recombinant immunotoxin LMB-2. *J Immunother* 29:208–214.
- Dendrou CA et al. (2009) Cell-specific protein phenotypes for the autoimmune locus IL2RA using a genotype-selectable human bioresource. *Nat Genet* 41:1011–1015.
- Ghannam A et al. (2008) Human C3 deficiency associated with impairments in dendritic cell differentiation, memory B cells, and regulatory T cells. *J Immunol* 181:5158–5166.
- Hamzeh-Cognasse H et al. (2008) Direct contact of platelets and their released products exert different effects on human dendritic cell maturation. *BMC Immunol* 9:54–69.
- Toscano MA et al. (2007) Differential glycosylation of TH1, TH2 and TH-17 effector cells selectively regulates susceptibility to cell death. *Nature Immunol* 8:825–834.

## Dynabeads® Untouched™ Human CD8 T Cells

<b>Cat. No.</b>	113-48D
<b>Kit capacity</b>	Processes 1 x 10 <sup>9</sup> cells
<b>Contains</b>	Depletion MyOne™ SA Dynabeads® (10 mL) Antibody Mix (Human CD8 T Cells) (2 mL)
<b>Antibody mix</b>	Biotinylated monoclonal mouse IgG antibodies against non-CD8 <sup>+</sup> T cells: human CD4, CD14, CD16 (specific for CD16a and CD16b), CD19, CD36, CD56, CDw123, and CD235a (glycophorin A). The Dynabeads® are coupled with streptavidin.
<b>Cells removed</b>	The kit depletes human B cells, NK cells, monocytes, dendritic cells, macrophages, CD4 <sup>+</sup> T cells, granulocytes, erythrocytes, and platelets. The isolated CD8 <sup>+</sup> cells are untouched and suitable for any downstream application. The cells proliferate in response to polyclonal stimulation with Dynabeads® activation/expansion technology (CFSE assay) and proliferate in an antigen-specific manner when stimulated with PBMC and CMV peptide. (Antigen-specific clonal expansion detected with CMV-specific pentamer in flow.)



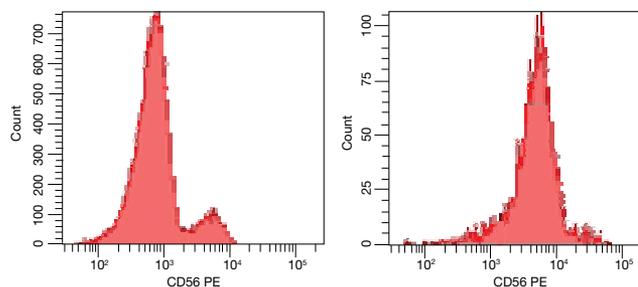
**Figure 6. Purity of human CD8<sup>+</sup> T cells.** Purity before (left) and after (right) negative isolation from PBMC using Dynabeads® Untouched™ Human CD8 T Cells.

### Selected references

- Frasca L et al. (2010) Differential mechanisms of memory CD8 T cell maintenance by individual myeloid cell types. *J Leukoc Biol* 88, doi:10.1189/jlb.1209816.
- Majumder B et al. (2007) Dendritic cells infected with vpr-positive human immunodeficiency virus type 1 induce CD8<sup>+</sup> T-cell apoptosis via upregulation of tumor necrosis factor alpha. *J Virol* 81:7388–7399.
- Monteiro M et al. (2007) Cartography of gene expression in CD8 single cells: novel CCR7<sup>-</sup> subsets suggest differentiation independent of CD45RA expression. *Blood* 109:2863–2870.
- Van Rhee F et al. (2005) NY-ESO-1 is highly expressed in poor prognosis multiple myeloma and induces spontaneous humoral and cellular immune responses. *Blood* 105:3939–3944.

## Dynabeads® Untouched™ Human NK Cells

<b>Cat. No.</b>	113-49D
<b>Kit capacity</b>	Processes 1 x 10 <sup>9</sup> cells
<b>Contains</b>	Depletion MyOne™ SA Dynabeads® (10 mL) Antibody Mix (Human NK Cells) (2 mL)
<b>Antibody mix</b>	Biotinylated monoclonal mouse IgG antibodies against non-NK cells: human CD3, CD14, CD36, CDw123, HLA class II DR/DP, and CD235a (glycophorin A). The Dynabeads® are coupled with streptavidin.
<b>Cells removed</b>	The kit depletes human T cells, B cells, monocytes, dendritic cells, platelets, macrophages, and erythrocytes. The isolated NK cells are untouched and suitable for any downstream application. The cells retain cytotoxic activity when cultured with K562 cells, express CD107a, and produce IFN-γ.



**Figure 7. Purity of human NK cells.** Purity before (left) and after (right) negative isolation from PBMC using Dynabeads® Untouched™ Human NK Cells.

### Selected references

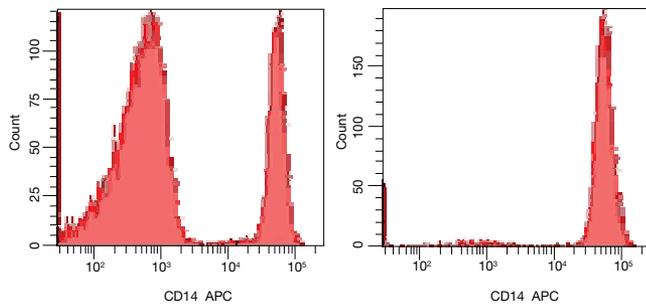
- Eissmann P and Watzl C (2006) Molecular analysis of NTB-A signaling: A role for EAT-2 in NTB-A-mediated activation of human NK cells. *J Immunol* 177:3170–3177.
- Jarahian M et al. (2007) Blockade of natural killer cell-mediated lysis by NCAM140 expressed on tumor cells. *Int J Cancer* 120:2625–2634.
- Lundqvist A (2006) Bortezomib and depsipeptide sensitize tumors to tumor necrosis factor-related apoptosis-inducing ligand: A novel method to potentiate natural killer cell tumor cytotoxicity. *Cancer Res* 66:7317–7325.



# Negative Cell Isolation

## Dynabeads® Untouched™ Human Monocytes

<b>Cat. No.</b>	113-50D
<b>Kit capacity</b>	Processes 1 x 10 <sup>9</sup> cells
<b>Contains</b>	Depletion MyOne™ SA Dynabeads® (10 mL) Antibody Mix (Human Monocytes) (2 mL) Blocking Reagent (2 mL)
<b>Antibody mix</b>	Biotinylated monoclonal mouse IgG antibodies against non-monocytes: human CD3, CD7, CD16 (specific for CD16a and CD16b), CD19, CD56, CDw123, and CD235a (glycophorin A). The Dynabeads® are coupled with streptavidin.
<b>Cells removed</b>	The kit depletes human T cells, B cells, NK cells, dendritic cells, erythrocytes, granulocytes, and macrophages. Depletes all T cells—important for deriving monocytes to dendritic cells. The isolated monocytes are untouched and suitable for any downstream application. The cells readily differentiate into dendritic cells after culture with IL-4 and GM-CSF for 5–6 days.



**Figure 8. Purity of human monocytes.** Purity before (left) and after (right) negative isolation from PBMC using Dynabeads® Untouched™ Human Monocytes.

### Selected references

Ghannam A et al. (2008) Human C3 deficiency associated with impairments in dendritic cell differentiation, memory B cells, and regulatory T cells. *J Immunol* 181:5158–5166.

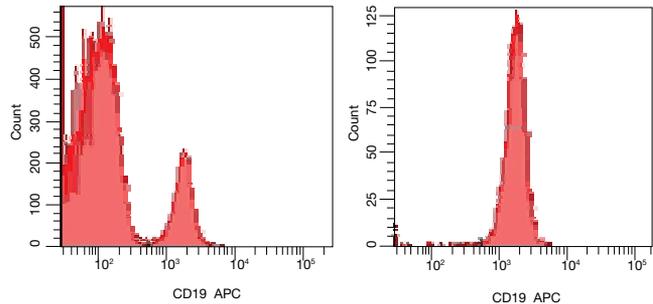
Hamzeh-Cognasse H et al. (2008) Direct contact of platelets and their released products exert different effects on human dendritic cell maturation. *BMC Immunol* 9:54–69.

Hintzen C et al. (2008) Oncostatin M-induced and constitutive activation of the JAK2/STAT5/CIS pathway suppresses CCL1, but not CCL7 and CCL8, chemokine expression. *J Immunol* 181:7341–7349.

Luissint A-C et al. (2008) JAM-L-mediated leukocyte adhesion to endothelial cells is regulated in cis by  $\alpha_5\beta_1$  integrin activation. *J Cell Biol* 183:1159–1173.

## Dynabeads® Untouched™ Human B Cells

<b>Cat. No.</b>	113-51D
<b>Kit capacity</b>	Processes 1 x 10 <sup>9</sup> cells
<b>Contains</b>	Depletion MyOne™ SA Dynabeads® (10 mL) Antibody Mix (Human B Cells) (2 mL)
<b>Antibody mix</b>	Biotinylated monoclonal mouse IgG antibodies against non-B cells: human CD2, CD14, CD16 (specific for CD16a and CD16b), CD36, CD43, and CD235a (glycophorin A). The Dynabeads® are coupled with streptavidin.
<b>Cells removed</b>	The kit depletes human T cells, monocytes, NK cells, macrophages, granulocytes, plasma cells, platelets, and erythrocytes. The isolated B cells are untouched and suitable for any downstream application. The cells up-regulate costimulatory molecules such as HLA II, CD86, CD54, and CD40 when stimulated with activating CpG oligos.



**Figure 9. Purity of human B cells.** Purity before (left) and after (right) negative isolation from PBMC using Dynabeads® Untouched™ Human B Cells.

### Selected references

Avery DT et al. (2008) IL-21-induced isotype switching to IgG and IgA by human naive B cells is differentially regulated by IL-41. *J Immunol* 181:1767–1779.

Ghannam A et al. (2008) Human C3 deficiency associated with impairments in dendritic cell differentiation, memory B cells, and regulatory T cells. *J Immunol* 181:5158–5166.

Keymeulen B et al. (2010) Transient Epstein-Barr virus reactivation in CD3 monoclonal antibody-treated patients. *Blood* 115(6):1145–1155.

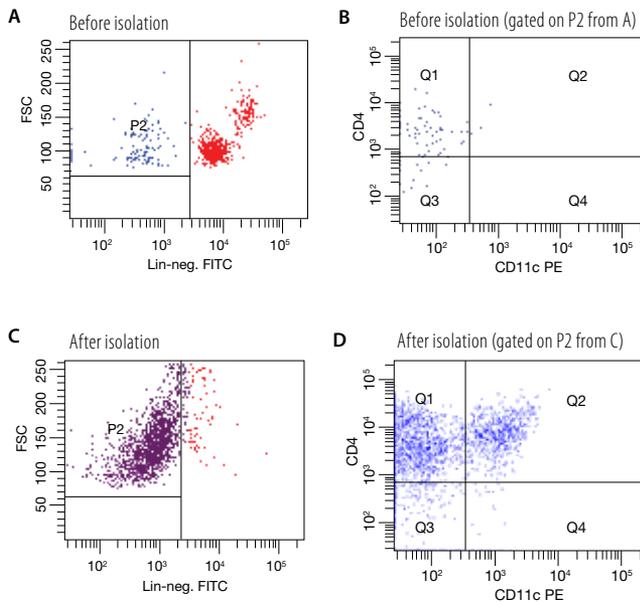
Lobo PI et al. (2008) Naturally occurring IgM anti-leukocyte autoantibodies (IgM-ALA) inhibit T cell activation and chemotaxis. *J Immunol* 180:1780–1791.

Veri MC et al. (2007) Monoclonal antibodies capable of discriminating the human inhibitory Fcγ-receptor IIB (CD32B) from the activating Fcγ-receptor IIA (CD32A): biochemical, biological and functional characterization. *Immunology* 121:392–404.

## Dynabeads® Human DC Enrichment Kit

For preenrichment of total DCs prior to flow sorting.

<b>Cat. No.</b>	113-08D
<b>Kit capacity</b>	Processes $2 \times 10^9$ cells
<b>Contains</b>	Depletion MyOne™ SA Dynabeads® (20 mL) Antibody Mix (Human DC Cells) (4 mL)
<b>Antibody mix</b>	Biotinylated monoclonal mouse anti-human antibodies against non-DC cells: human CD3, CD14, CD16, CD19, CD56, and glycoporphin A. The Dynabeads® are coupled with streptavidin.
<b>Cells removed</b>	The kit depletes human T cells, B cells, monocytes/macrophages, NK cells, erythrocytes, and most granulocytes. This kit is well suited for preenrichment of the total DC population with very high recovery. To obtain the DC subpopulation of choice, proceed with, e.g., flow sorting.



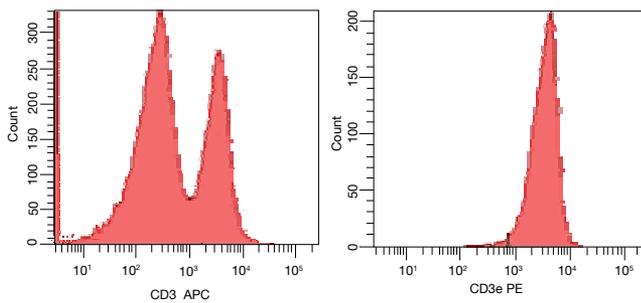
**Figure 10. Enrichment of human dendritic cells.** Human DC population in PBMC prior to (A, B) and after (C, D) enrichment using the Dynabeads® Human DC Enrichment Kit. As seen when gating on the DC population found in P2 (A, C), the kit yields a high recovery of human DCs, suitable for further isolation into, e.g., plasmacytoid (Q1) and myeloid (Q2) DCs (B, D).



## Mouse cells

### Dynal® Mouse T Cell Negative Isolation Kit

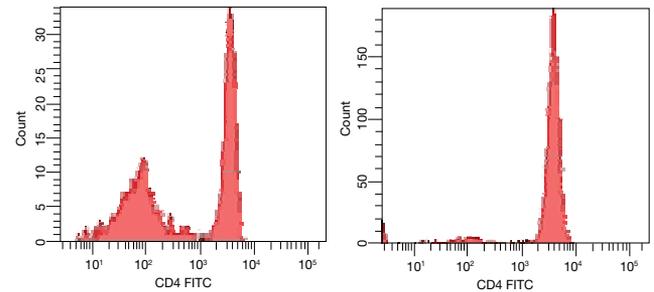
<b>Cat. No.</b>	114-13D
<b>Kit capacity</b>	Processes 1 x 10 <sup>9</sup> cells
<b>Contains</b>	Depletion Dynabeads® (20 mL) Antibody Mix (Mouse T Cells) (2 mL)
<b>Antibody mix</b>	Monoclonal rat antibodies against non-T cells: mouse CD45R (B220), CD11b (Mac1), Ter-119, and CD16/32. The antibody on the Dynabeads® is a polyclonal sheep anti-rat IgG.
<b>Cells removed</b>	The kit depletes mouse B cells, monocytes/macrophages, NK cells, erythrocytes, and granulocytes.



**Figure 11. Purity of mouse T cells.** Purity before (left) and after (right) negative isolation from spleen using the Dynal® Mouse T Cell Negative Isolation Kit.

### Dynal® Mouse CD4 Negative Isolation Kit

<b>Cat. No.</b>	114-15D
<b>Kit capacity</b>	Processes 1 x 10 <sup>9</sup> cells
<b>Contains</b>	Depletion Dynabeads® (20 mL) Antibody Mix (Mouse CD4 Cells) (2 mL)
<b>Antibody mix</b>	Monoclonal rat antibodies against non-CD4 <sup>+</sup> T cells: mouse CD45R (B220), CD11b (Mac1), Ter-119, CD16/32, and CD8. The antibody on the Dynabeads® is a polyclonal sheep anti-rat IgG.
<b>Cells removed</b>	The kit depletes mouse CD8 <sup>+</sup> T cells, B cells, monocytes/macrophages, NK cells, erythrocytes, and granulocytes.



**Figure 12. Purity of mouse CD4<sup>+</sup> T cells.** Purity before (left) and after (right) negative isolation from spleen using the Dynal® Mouse CD4 Negative Isolation Kit.

### Selected references

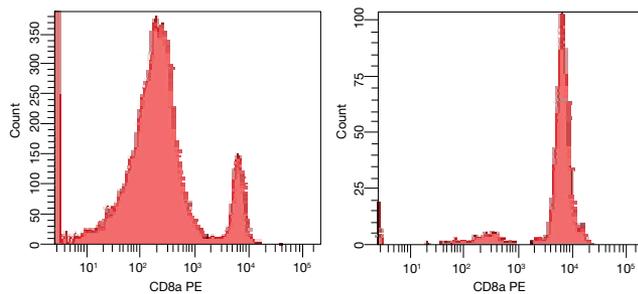
- Derrick SC et al. (2006) Characterization of the protective T-cell response generated in CD4-deficient mice by a live attenuated *Mycobacterium tuberculosis* vaccine. *Immunology* 120:192–206.
- Heal KG, Taylor-Robinson AW (2010) Tomatine adjuvantation of protective immunity to a major pre-erythrocytic vaccine candidate of malaria is mediated via CD8<sup>+</sup> T cell release of IFN- $\gamma$ . *J Biomed Biotechnol* doi:10.1155/2010/834326
- Puliaeva I et al. (2008) Fas expression on antigen-specific T cells has costimulatory, helper, and down-regulatory functions *in vivo* for cytotoxic T cell responses but not for T cell-dependent B cell responses. *J Immunol* 181:5912–5929.
- Radojic V et al. (2010) STAT3 signaling in CD4<sup>+</sup> T cells is critical for the pathogenesis of chronic sclerodermatous graft-versus-host disease in a murine model. *J. Immunol.* 184:764–774.
- Rajakariar R et al. (2008) Novel biphasic role for lymphocytes revealed during resolving inflammation. *Blood* 111:4184–4192.
- Sevigny CP et al. (2007) Activation of adenosine 2A receptors attenuates allograft rejection and alloantigen recognition. *J Immunol* 178:4240–4249.
- Zhang Y et al. (2006) Allograft rejection requires STAT5a/b-regulated antiapoptotic activity in T cells but not B cells. *J Immunol* 176:128–137.

### Selected references

- Donaldson M et al. (2009) p47phox-deficient immune microenvironment signals dysregulate naive T-cell apoptosis. *Cell Death Diff* 16:125–138.
- Heal KG, Taylor-Robinson AW (2010) Tomatine adjuvantation of protective immunity to a major pre-erythrocytic vaccine candidate of malaria is mediated via CD8<sup>+</sup> T cell release of IFN- $\gamma$ . *J Biomed Biotechnol* doi:10.1155/2010/834326
- Huan C et al. (2006), Transcription factors TFE3 and TFEB are critical for CD40 ligand expression and thymus-dependent humoral immunity. *Nature Immunol* 7:1082–1091.
- Ostanin DV et al. (2009) T cell transfer model of chronic colitis: concepts, considerations, and tricks of the trade. *Am J Physiol Gastrointest Liver Physiol* 296:135–146.
- Puliaeva I et al. (2008) Fas expression on antigen-specific T cells has costimulatory, helper, and down-regulatory functions *in vivo* for cytotoxic T cell responses but not for T cell-dependent B cell responses. *J Immunol* 181:5912–5929.
- Toscano MA et al. (2007) Differential glycosylation of TH1, TH2 and TH-17 effector cells selectively regulates susceptibility to cell death. *Nature Immunol* 8:825–834.

## Dynal® Mouse CD8 Negative Isolation Kit

<b>Cat. No.</b>	114-17D
<b>Kit capacity</b>	Processes 1 x 10 <sup>9</sup> cells
<b>Contains</b>	Depletion Dynabeads® (20 mL) Antibody Mix (Mouse CD8 Cells) (2 mL)
<b>Antibody mix</b>	Monoclonal rat antibodies against non-CD8 <sup>+</sup> T cells: mouse CD45R (B220), CD11b (Mac1), Ter-119, and CD16/32 and CD4. The antibody on the Dynabeads® is a polyclonal sheep anti-rat IgG.
<b>Cells removed</b>	The kit depletes CD4 <sup>+</sup> T cells, B cells, monocytes/macrophages, NK cells, erythrocytes, and granulocytes.



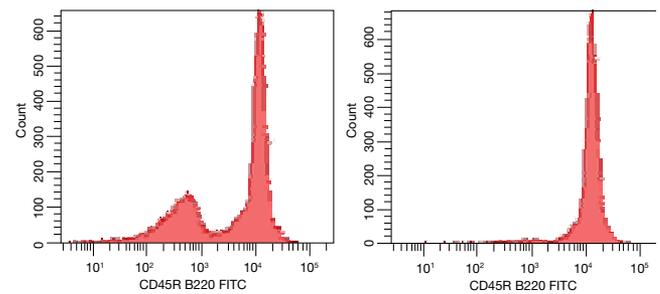
**Figure 13. Purity of mouse CD8<sup>+</sup> T cells.** Purity before (left) and after (right) negative isolation from spleen using the Dynal® Mouse CD8 Negative Isolation Kit.

### Selected references

- Bonefeld CM et al. (2008) TCR down-regulation controls virus-specific CD8<sup>+</sup> T cell responses. *J Immunol* 181:7786–7799.
- Donaldson M et al. (2009) p47phox-deficient immune microenvironment signals dysregulate naive T-cell apoptosis. *Cell Death Differ* 16:125–138.
- Heal KG, Taylor-Robinson AW (2010) Tomatine adjuvantation of protective immunity to a major pre-erythrocytic vaccine candidate of malaria is mediated via CD8<sup>+</sup> T cell release of IFN- $\gamma$ . *J Biomed Biotechnol* doi:10.1155/2010/834326
- Puliaev R et al. (2008) CTL-promoting effects of CD40 stimulation outweigh B cell-stimulatory effects resulting in B cell elimination and disease improvement in a murine model of lupus. *J Immunol* 181:47–61.
- Puliaeva I et al. (2008) Fas expression on antigen-specific T cells has costimulatory, helper, and down-regulatory functions in vivo for cytotoxic T cell responses but not for T cell-dependent B cell responses. *J Immunol* 181:5912–5929.

## Dynabeads® Mouse CD43 (Untouched B Cells)

<b>Cat. No.</b>	114-22D
<b>Capacity</b>	Processes 2 x 10 <sup>9</sup> cells
<b>Contains</b>	Depletion MyOne™ Dynabeads® (10 mL). The Dynabeads® are coupled with monoclonal rat anti-mouse CD43 antibody.
<b>Cells removed</b>	The product depletes non-B cells: T cells, monocytes/macrophages, dendritic cells, NK cells, granulocytes, erythrocytes, and CD43-positive B cells (activated B cells, plasma cells, CD5 <sup>+</sup> B1a cells). The isolated B cells are untouched and suitable for any downstream application. The cells proliferate in response to LPS.



**Figure 14. Purity of mouse B cells.** Purity before (left) and after (right) negative isolation from spleen using Dynabeads® Mouse CD43 (Untouched™ B Cells).

### Selected references

- Zhang, Y. et al. (2006) Allograft rejection requires STAT5 $\alpha$ /b-regulated antiapoptotic activity in T cells but not B cells. *J Immunol* 176:128–137.
- Rajakariar, R. et al. (2008) Novel biphasic role for lymphocytes revealed during resolving inflammation. *Blood* 111:4184–4192.
- Huan, C. et al. (2006) Transcription factors TFE3 and TFEB are critical for CD40 ligand expression and thymus-dependent humoral immunity. *Nature Immunol* 7:1082–1091.
- Heal KG, Taylor-Robinson AW (2010) Tomatine adjuvantation of protective immunity to a major pre-erythrocytic vaccine candidate of malaria is mediated via CD8<sup>+</sup> T cell release of IFN- $\gamma$ . *J Biomed Biotechnol* doi:10.1155/2010/834326



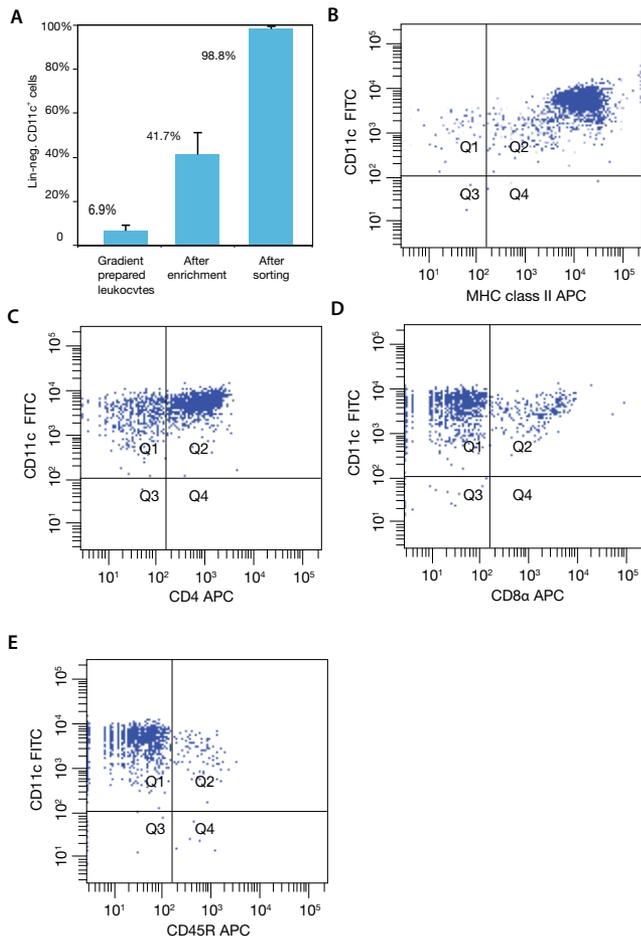
## Negative Cell Isolation

### Dynabeads® Mouse DC Enrichment Kit

<b>Cat. No.</b>	114-29D
<b>Kit capacity</b>	Processes 4 x 10 <sup>9</sup> cells
<b>Contains</b>	Depletion MyOne™ SA Dynabeads® (5 mL) Antibody Mix (Mouse DC Cells) (1 mL)
<b>Antibody mix</b>	Biotinylated monoclonal rat antibodies against non-DC cells: mouse CD2, CD3ε, CD49b, mIgM, and Ter-119. The Dynabeads® are coupled with streptavidin.
<b>Cells removed</b>	The kit depletes T cells, mIgM <sup>+</sup> B cells, NK cells, erythrocytes, and most granulocytes. This kit is well suited for preenrichment of the total DC population, with a very high recovery. To obtain the DC subpopulation of choice, proceed with, e.g., flow sorting.

### Selected references

- Neurauter AA et al. (2007) Cell isolation and expansion using Dynabeads. *Adv Biochem Eng Biotechnol* 106:41–73.
- Tan AM et al. (2010) TLR4 signaling in stromal cells is critical for the initiation of allergic Th2 responses to inhaled antigen. *J Immunol* 184:3535–3544.
- Yokoi S et al. (2009) Adjuvant effect of lipopolysaccharide on the induction of contact hypersensitivity to haptens in mice. *J Dermatol Sci* 53:120–128.



**Figure 15. Enrichment of mouse dendritic cells.** Purity after removal of non-DC cells from spleen cells using the Dynabeads® Mouse DC Enrichment Kit, followed by flow sorting on CD11c and MHC (A). The sorted DC population (B) expresses relevant DC markers, as seen when labeling, e.g., for myeloid CD4 (C), lymphoid CD8α (D), and plasmacytoid CD45R (E) DC subpopulations.

### Build your own negative isolation kit

Can't find a ready-to-use kit for your particular target cells? Remember that you can add extra antibodies to the supplied antibody mix, should you want to refine and increase specificity for a specific subpopulation. We also offer a range of Dynabeads® to which you can add your own antibody mix to build your very own kit. Dynabeads® Pan Mouse IgG with a mouse IgG antibody mix is well suited for isolation of human cells, while Dynabeads® Sheep Anti-Rat IgG with a rat IgG antibody mix is well suited for mouse cell isolation. In combination with your choice of biotinylated antibody mix, Dynabeads® Biotin Binder is ideal for isolating untouched cells from any species.

### Alternative isolation methods

A wide range of Dynabeads® cell separation products is available in addition to those presented in this brochure. Depending on your specific application, choose between products for positive or negative isolation/depletion. Learn more at [www.invitrogen.com/cellisolation](http://www.invitrogen.com/cellisolation).

## Ordering information

Products	Processes	Cat. No.
<b>Human cell isolation</b>		
Dynabeads® Untouched™ Human T Cells	1 x 10 <sup>9</sup> cells	113-44D
Dynabeads® Untouched™ Human CD4 T Cells	1 x 10 <sup>9</sup> cells	113-46D
Dynabeads® Untouched™ Human CD8 T Cells	1 x 10 <sup>9</sup> cells	113-48D
Dynabeads® Untouched™ Human NK Cells	1 x 10 <sup>9</sup> cells	113-49D
Dynabeads® Untouched™ Human Monocytes	1 x 10 <sup>9</sup> cells	113-50D
Dynabeads® Untouched™ Human B Cells	1 x 10 <sup>9</sup> cells	113-51D
Dynabeads® Human DC Enrichment Kit	2 x 10 <sup>9</sup> cells	113-08D

### Mouse cell isolation

Dynal® Mouse T Cell Negative Isolation Kit	1 x 10 <sup>9</sup> cells	114-13D
Dynal® Mouse CD4 Negative Isolation Kit	1 x 10 <sup>9</sup> cells	114-15D
Dynal® Mouse CD8 Negative Isolation Kit	1 x 10 <sup>9</sup> cells	114-17D
Dynabeads® Mouse CD43 (Untouched™ B Cells)	2 x 10 <sup>9</sup> cells	114-22D
Dynabeads® Mouse DC Enrichment Kit	4 x 10 <sup>9</sup> cells	114-29D

### Related products

Related products	Quantity	Cat. No.
<b>Magnets</b>		
DynaMag™-15 (Magnet holding 4 x 15 mL or 4 x 5 mL tubes)	1 unit, working volume: 1–15 mL	123-01D
DynaMag™-50 (Magnet holding 2 x 5 mL–50 mL tubes)	1 unit, working volume: 5–50 mL	123-02D

### Mixer

HulaMixer™ Sample Mixer	1 unit, holds 0.5–50 mL tubes	159-20D
-------------------------	-------------------------------	---------

### Other Dynabeads® for negative cell isolation

Dynabeads® Pan Mouse IgG (for use with mouse IgGs)	5 mL	110-41
	25 mL	110-42
Dynabeads® Sheep Anti-Rat IgG (for use with rat IgGs)	5 mL	110-35
Dynabeads® Biotin Binder (for use with biotinylated antibodies)	5 mL	110-47

### Dynabeads® for cell activation/expansion

Dynabeads® Mouse T-Activator CD3/CD28 (for polyclonal T cell activation/expansion)	0.4 mL	114-56D
	2 mL	114-52D
	10 mL	114-53D
Dynabeads® Human T-Activator CD3/CD28 (for polyclonal T cell activation/expansion)	0.4 mL	111-61D
	2 mL	111-31D
	10 mL	111-32D
Dynabeads® Human T-Activator CD3/CD28/CD137 (for antigen-specific T cell expansion)	0.4 mL	111-62D
	2 mL	111-63D
Dynabeads® Mouse T-Activator CD3/CD28/CD137 (for antigen-specific T cell expansion)	0.4 mL	114-54D
	2 mL	114-55D
Dynabeads® Human Treg Expander	2 mL	111-29D
Dynabeads® Human T-Expander CD3/CD28 (for polyclonal T cell activation/expansion)	10 mL	111-41D
Dynabeads® ClinExVivo™ CD3/CD28	10 mL	402-03D

For pricing and further information, please visit [www.invitrogen.com](http://www.invitrogen.com). In addition to the products mentioned here, a range of products for positive isolation or depletion of human and mouse cells is available. Learn more about the best starting point for your cell research at [www.invitrogen.com/cellisolation](http://www.invitrogen.com/cellisolation).

## Customers speak out about Dynabeads®

"As an experienced user of column-based separation techniques, I utilized the tube-based Dynal® Mouse CD4 Negative Isolation Kit with very convincing results by obtaining highly pure CD4 cells. Overall, the advantages of the Dynal® product compared to the column-based systems are its easy and fast handling as well as its high cell yield."

*Dr. Carsten Wiethe, University of Erlangen*

**DYNAL®** has pioneered magnetic separation technology for biological discovery that is both simple and highly reproducible. Based on patented superparamagnetic, monodisperse beads, Dynabeads® technologies represent a superior paradigm for cell and biomolecule separation in a wide range of basic and clinical research applications, diagnostic assays, and therapeutic protocols.



**DYNAL®**