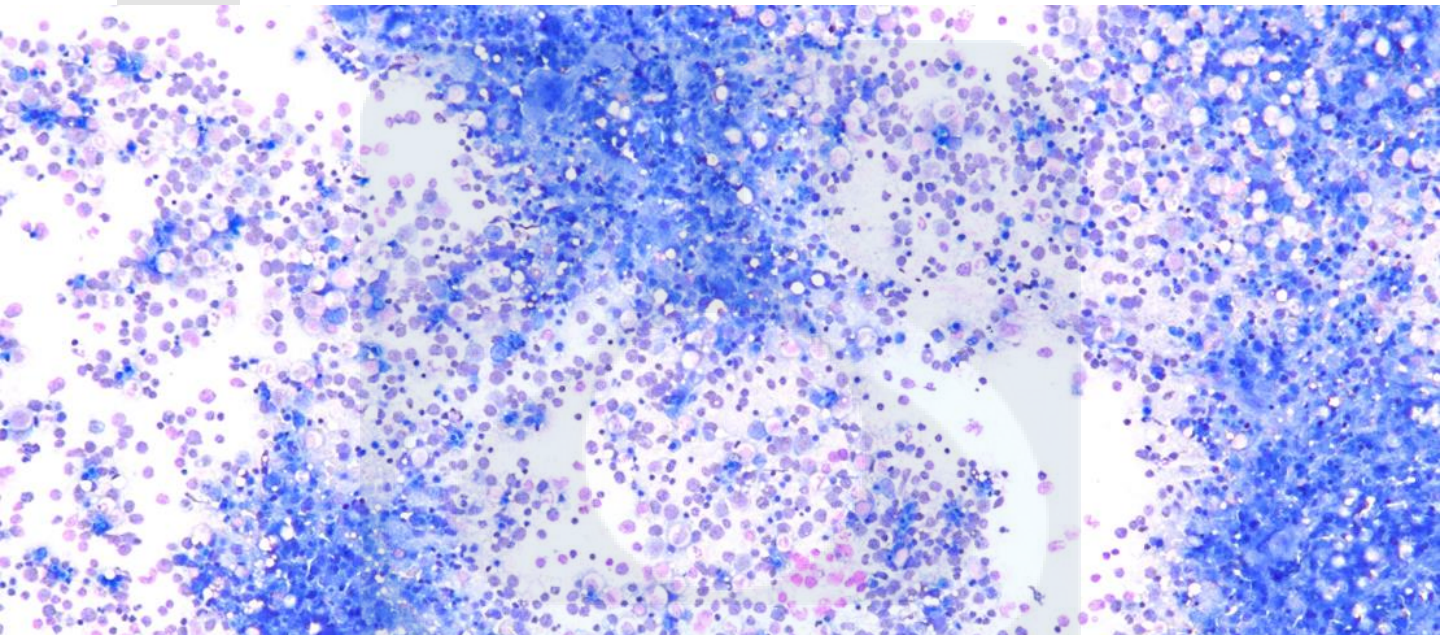


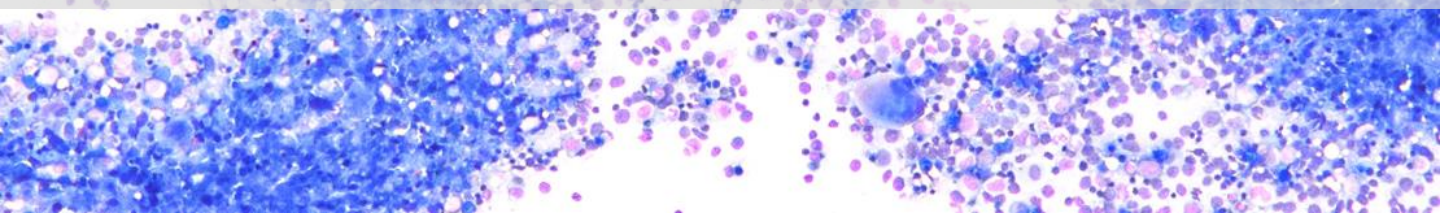


Payvand

Clinical and Specialty, Pathology, Genetics
and Molecular Diagnosis Laboratory



Flow Cytometry Panels eBooklet v1.0





Payvand

Clinical and Specialty, Pathology, Genetics and Molecular Diagnosis Laboratory

Table of Contents

Introduction

Insurance Information

Flow Cytometry Panels Starting Page

References





مقدمه

این راهنما به منظور استانداردسازی و همسانسازی درخواست آزمایش های فلوسایتومتری برای گروه بیماری های بدخیمی و غیربدخیمی های خونی لحاظ گردیده است. مبنای انتخاب CD مارکر ها، گایدلاین های بین المللی از جمله EuroFlow Consortium و Bethesda International Consensus می باشد. این روند به منظور درخواست صحیح و متناسب CD مارکرها، کاهش هزینه بیماران، و از طرفی دیگر، تکمیل روش تشخیصی به منظور مطابقت با استاندارد های بین المللی و افزایش حساسیت، اختصاصیت و عدم از دست دادن تشخیص های مختلف و بیماری های غیرشایع یا نادر به علت محدودیت در انتخاب CD مارکر ها می باشد.

به تفکیک نوع و مرحله بیماری، تست ها طبقه بندی شده اند که با کلیک کردن بر آن ها دسترسی به CD مارکر های لازم خواهید داشت. همچنین در مواردی که لازم است بر اساس تشخیص اولیه، تشخیص تکمیلی گذاشته شود، به عنوان مثال پس از تشخیص اولیه لوسمی حاد، برای تشخیص تکمیلی و طبقه بندی لوسمی حاد لنفوئیدی B-cell، شما با کلمه اگر (If) به پنل تکمیلی هدایت می شوید. پنل اولیه با نشان **Required** که جهت تشخیص صحیح شامل CD مارکرهای الزامی می باشد، و پنل ثانویه با نشان **Recommended** که جهت طبقه بندی و تعیین پیش آگهی و شامل CD مارکرهای توصیه شده می باشند، مشخص شده اند. لذا این دو پنل تکمیل کننده همدیگر هستند.

بخشی هم به منظور راهنمایی در خصوص بیمه جهت ثبت آنلاین صحیح CD مارکر های سطحی با کد ۸۰۲۵۹۰ و CD مارکر های داخل سلولی با کد ۸۰۲۵۹۱ مطرح شده است. با توجه به اینکه یک کد برای هر کدام از CD مارکر ها استفاده می شود، در مواردی که تعدد مارکر وجود دارد، شما با توجه به تعداد مارکر درخواستی، درخواست پذیرش کد ها را ثبت خواهید کرد.



Introduction

This document intends to standardize and harmonize flow cytometry tests requesting for hematologic malignancies and non-malignant disorders. Cluster of Differentiation (CD) markers selection criteria was based on international guidelines including EuroFlow Consortium and Bethesda International Consensus. We aimed to optimize the process of requesting CD markers and decrease patient's expenses, while simultaneously increase sensitivity, specificity, concordance with international standards and minimize miss rate of uncommon and rare diseases due to limited CD marker selection.

The panels are divided with respect to the type and time point of different disorders. You will have access to the number and individual CD markers by clicking on each panel. In cases which a complimentary (secondary) panel is recommended or needed in addition to the orientation panel, you will be guided to all of the necessary CD markers with the keyword "If". For example, after confirming the diagnosis of B-cell acute lymphoblastic leukemia/lymphoma (B-ALL), a complimentary panel with the following link will be recommended: "If B-Cell Lymphoblastic Leukemia/Lymphoma (B-ALL)". Orientation panels are tagged as "Required" for obligatory CD markers in order to correctly reaching the diagnosis. Complimentary panels are tagged as "Recommended" for suggested CD markers for further classification, subtyping and prognostication. These two panels are complementary of one another.

A section is also devoted to guiding through the correct process of online CD marker registration for different insurance companies websites. Considering that a single code (802590 for all surface CD markers and 802591 for all intracellular CD markers) is used for different CD markers, you will correctly request the CD markers with respect to the number of required and recommended CD markers.



اطلاعات بیمه

نوع بیمه	سقف CD مارکر سطحی با کد ۸۰۲۵۹۰	سقف CD مارکر داخل سلولی با کد ۸۰۲۵۹۱	تخصص پزشک
تأمین اجتماعی	۲۴	۴	خون و انکولوژی بزرگسال و اطفال و تخصص مرتبط
خدمات درمانی	۱۴	۴	
ارتش	۲۴	۴	نکته: پزشک عمومی قادر به درخواست نمی باشد

روش ثبت CD مارکر در سایت تأمین اجتماعی:

- انتخاب کد ۸۰۲۵۹۰: با توجه به پنل بیماری تعداد مارکر بصورت ضریب در مجموع در قسمت تجویز خدمت وارد شود (غیرقابل ویرایش برای آزمایشگاه). به عنوان مثال: کد ۸۰۲۵۹۰ ← ۱۲ آیتم
- انتخاب کد ۸۰۲۵۹۰: با توجه به پنل بیماری تعداد CD مارکر ها در سیستم ثبت شود. لازم به ذکر است که همه مارکر ها در سایت تأمین اجتماعی تعریف نشده است، لذا می توان به علت یکی بودن تعرفه، از مارکر های دیگر استفاده کرد (قابل ویرایش برای آزمایشگاه، فقط جهت کاهش CD مارکر. لازم به ذکر است که امکان ویرایش تست برای آزمایشگاه جهت افزودن CD مارکر وجود ندارد).

روش ثبت CD مارکر جهت بیمه های خدمات درمانی و ارتش:

- انتخاب کد ۸۰۲۵۹۰: با توجه به پنل بیماری تعداد CD مارکر بصورت ضریب در مجموع در قسمت تجویز خدمت وارد شود (قابل ویرایش برای آزمایشگاه، فقط جهت کاهش CD مارکر. لازم به ذکر است که امکان ویرایش تست برای آزمایشگاه جهت افزودن CD مارکر وجود ندارد).

سقف کد ۸۰۲۵۹۱ (CD مارکر سیتوپلاسمی یا داخل سلولی) طبق جدول فوق برای کلیه بیمه ها، فقط ۴ مارکر می باشد.

نکات:

- جهت بیمه های دیگر اعم از بانک ها، شرکت نفت و... به علت عدم نیاز به ثبت نسخ در سایت، درخواست بر روی سربرگ نسخه کاغذی بلامانع است و محدودیتی برای درخواست CD مارکر ها وجود ندارد.
- نسخ شهرداری جهت انجام آزمایش فلوسایتومتری، نیاز به تأیید سازمان مربوطه دارد.
- آزمایشگاه پیوند با اکثر بیمه های تکمیلی قرارداد دارد (جهت اطلاع به وبسایت www.payvandlab.com مراجعه نمایید).



Insurance Information

Insurance Company	Maximum surface CD markers, code 802590	Maximum intracellular CD markers, code 802591	Physician’s Specialty
Tamin Ejtemaei	24	4	Pediatric and Adult Hematology and Oncology and related specialties Note: General practitioners do not have access to this section
Khadamat Darmani	14	4	
Artesh	24	4	

Requesting CD markers in Tamin Ejtemaei website:

- 1) Selecting code 802590:** With respect to the specific panel requested, the number of total CD markers should be inserted as a factor in section “Tajviz-e-khedmat” (unmodifiable for the laboratory). For example: Code 802590 → 12 items
- 2) Selecting code 802590:** With respect to the specific panel requested, each CD marker should be inserted individually. Of note, not all CD markers are defined in the website. You can use other CD markers since the tariff is the same (modifiable for the laboratory, only to reduce the number. Of note, the laboratory cannot increase the number of CD markers).

Requesting CD markers for Khadamat Darmani and Artesh services:

- 1) Selecting code 802590:** With respect to the specific panel requested, the number of total CD markers should be inserted as a factor in section “Tajviz-e-khedmat” (modifiable for the laboratory, only to reduce the number. Of note, the laboratory cannot increase the number of CD markers).

The maximum number of code 802591 (cytoplasmic or intracellular CD markers) covered by all insurance companies, as mentioned in the chart, is 4 markers.

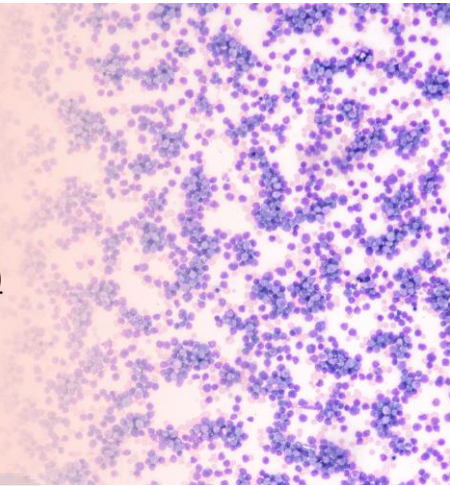
Notes:

- For other insurances such as banks, Oil Company, etc., since it is not necessary to register prescriptions in websites, writing paper prescriptions is acceptable and there is no limitations in requesting CD markers.
- “Shahrdari” insurance prescriptions for flow cytometry tests need approval from associated organization.
- Payvand Clinical and Specialty laboratory is in contract with most of the insurance companies (for more information, visit www.payvandlab.com).



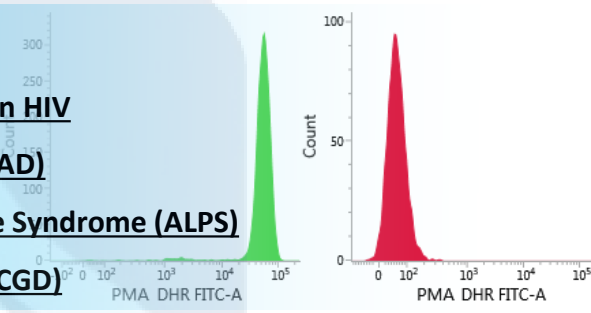
Hematopoietic & Lymphoid Malignancies Panels

- Acute Leukemias
- DNA Index
- Mature Lymphoid Neoplasms
- Plasma Cell Dyscrasias (PCDs)
- Minimal/Measurable Residual Disease (MRD)
- Myeloproliferative Neoplasms (MPNs)
- Myelodysplastic Neoplasms (MDS)
- Chronic Myelomonocytic Leukemia (CMML)



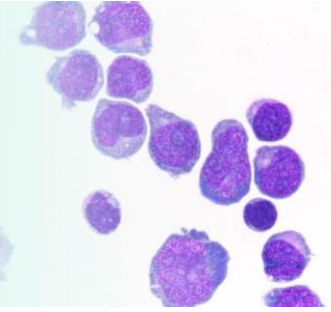
Immunodeficiencies

- Lymphocytes Subsets
- CD4-Positive T-Cell Enumeration in HIV
- Leukocyte Adhesion Deficiency (LAD)
- Autoimmune Lymphoproliferative Syndrome (ALPS)
- Chronic Granulomatous Disease (CGD)



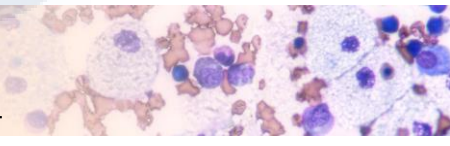
Body Fluid Analysis

- Cerebrospinal Fluid (CSF)
- Pleural Fluid
- Ascitic Fluid
- Pericardial Fluid
- BronchoAlveolar Lavage (BAL)



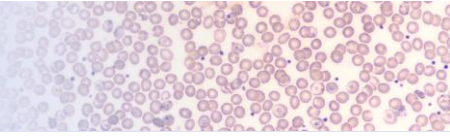
Non-Hematopoietic Malignancies

- Diagnostic Panel
- Minimal/Measurable Residual Disease (MRD)



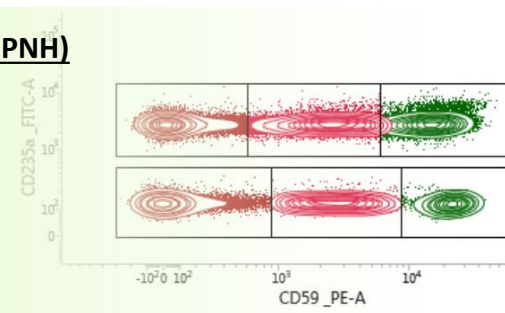
Screening Panels

- Peripheral Blood (PB)
- Bone Marrow Aspiration (BMA)



Other Panels

- Paroxysmal Nocturnal Hemoglobinuria (PNH)
- Hereditary Spherocytosis (HS)
- Langerhans Cell Histiocytosis (LCH)
- Platelet Markers
- Stem Cell Enumeration





Acute Leukemias

Intended Use: For cases with high suspicion of acute leukemia

REQUIRED

Orientation Panel

CD Markers: CD2, iCD3, CD7, CD10, CD13, CD19, CD22, CD33, CD34, CD45, iCD79a, CD117, iMPO, TdT, HLA-DR

of Code 802590 Markers (Surface): 11

of Code 802591 Markers (Intracellular): 4

Complimentary Panels:

- If Acute Myeloid Leukemia (AML)
- If B-Cell Lymphoblastic Leukemia/Lymphoma (B-ALL)
- If T-Cell Lymphoblastic Leukemia/Lymphoma (T-ALL)
- If NK-Cell Lymphoblastic Leukemia/Lymphoma (NK-ALL)
- If Blastic Plasmacytoid Dendritic Cell Neoplasm (BPDCN)

Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.





Acute Leukemias

REQUIRED

Orientation Panel +

RECOMMENDED

Acute Myeloid Leukemia (AML) Complimentary Panel

AML-M0/M1/M2/M3/M6

CD Markers: CD14, CD38, CD56, CD64, CD123

of Code 802590 Markers (Surface): 5

of Code 802591 Markers (Intracellular): 0

AML-M4/M5

CD Markers: CD4, CD11c, CD14, CD38, CD56, CD64, CD123, iLysozyme

of Code 802590 Markers (Surface): 7

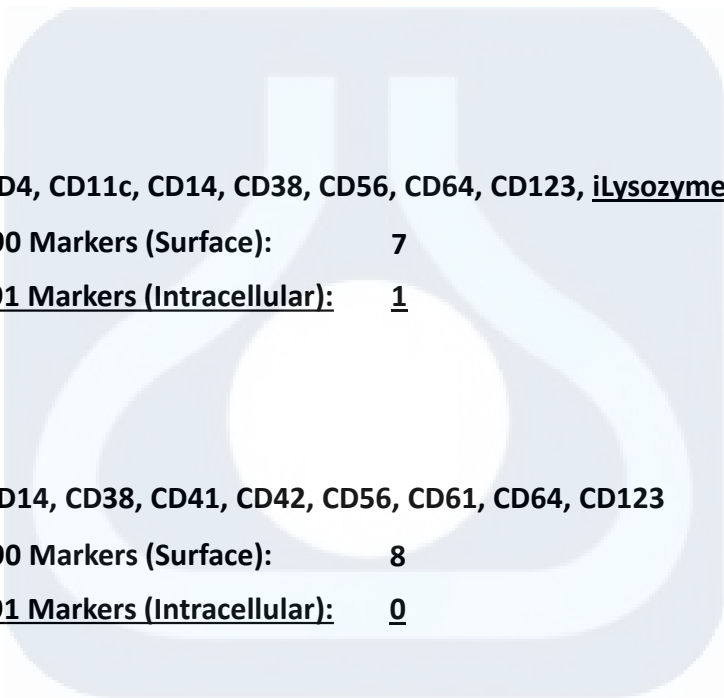
of Code 802591 Markers (Intracellular): 1

AML-M7

CD Markers: CD14, CD38, CD41, CD42, CD56, CD61, CD64, CD123

of Code 802590 Markers (Surface): 8

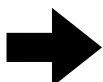
of Code 802591 Markers (Intracellular): 0



Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.



[Go To First Page](#)



[Go Back](#)



Acute Leukemias

REQUIRED

Orientation Panel +

RECOMMENDED

B-Cell Lymphoblastic Leukemia/Lymphoma (B-ALL) Complimentary Panel

Pro/Common/Pre B-ALL

CD Markers: CD20, CD58, CD66c, CD123, ilgM, DNA Index

of Code 802590 Markers (Surface): 4

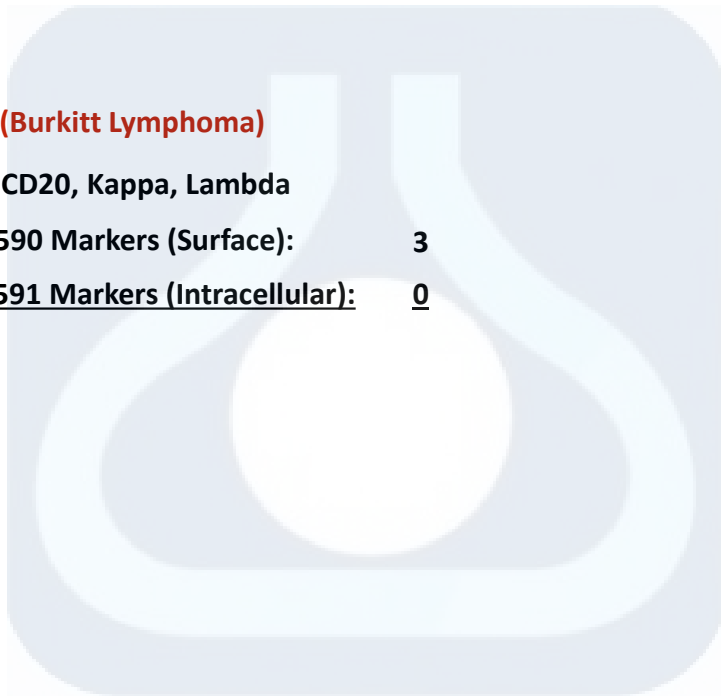
of Code 802591 Markers (Intracellular): 0

Mature B-ALL (Burkitt Lymphoma)

CD Markers: CD20, Kappa, Lambda

of Code 802590 Markers (Surface): 3

of Code 802591 Markers (Intracellular): 0



Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.



[Go To First Page](#)



[Go Back](#)



Acute Leukemias

REQUIRED

Orientation Panel +

REQUIRED

T-Cell Lymphoblastic Leukemia/Lymphoma (T-ALL) Complimentary Panel

CD Markers: CD1a, CD3, CD4, CD5, CD8, CD56, CD99

of Code 802590 Markers (Surface): 7

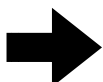
of Code 802591 Markers (Intracellular): 0



Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.



[Go To First Page](#)



[Go Back](#)



Acute Leukemias

REQUIRED

Orientation Panel +

REQUIRED

NK-Cell Lymphoblastic Leukemia/Lymphoma (NK-ALL) Complimentary Panel

CD Markers: CD1a, CD3, CD4, CD5, CD8, CD16, CD56, CD57, CD94, CD99

of Code 802590 Markers (Surface): 10

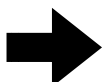
of Code 802591 Markers (Intracellular): 0



Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.



[Go To First Page](#)



[Go Back](#)



Acute Leukemias

REQUIRED

Orientation Panel +

REQUIRED

Blastic Plasmacytoid Dendritic Cell Neoplasm (BPDCN) Complimentary Panel

CD Markers: CD4, CD14, CD38, CD56, CD64, CD123, CD304

of Code 802590 Markers (Surface): 7

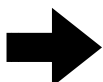
of Code 802591 Markers (Intracellular): 0



Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.



[Go To First Page](#)



[Go Back](#)



DNA Index

Intended Use: To measure the DNA content of tumor cells compared to normal cells

If B-Cell Lymphoblastic Leukemia/Lymphoma (B-ALL)

CD Markers: CD19, CD45, DNA Index

of Code 802590 Markers (Surface): 2

of Code 802591 Markers (Intracellular): 1

If T-Cell Lymphoblastic Leukemia/Lymphoma (T-ALL)

CD Markers: CD7, CD45, DNA Index

of Code 802590 Markers (Surface): 2

of Code 802591 Markers (Intracellular): 1

If Acute Myeloid Leukemia (AML)

CD Markers: CD34, CD45, CD117, DNA Index

of Code 802590 Markers (Surface): 3

of Code 802591 Markers (Intracellular): 1

Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.





Mature Lymphoid Neoplasms

Intended Use: For cases with lymphocytosis and lymphadenopathy

REQUIRED

Orientation Panel

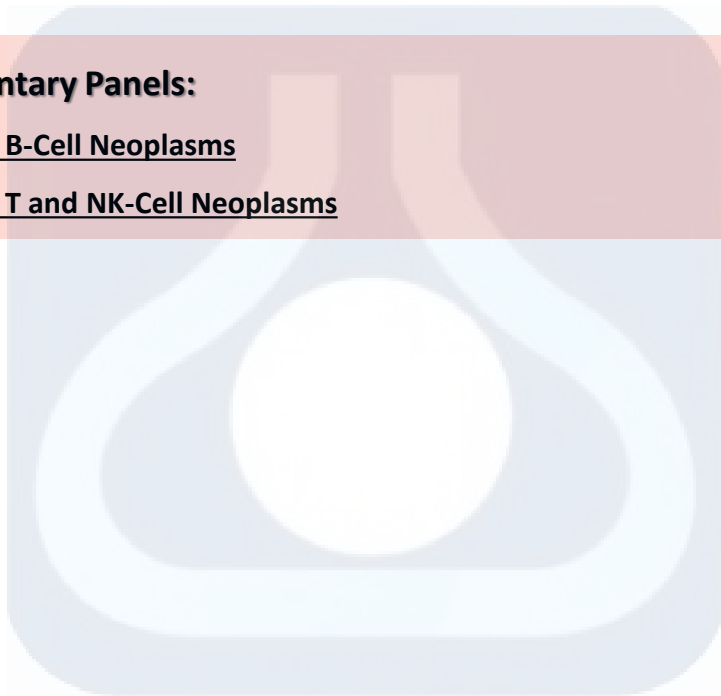
CD Markers: CD3, CD5, CD10, CD19, CD20, Kappa, Lambda

of Code 802590 Markers (Surface): 7

of Code 802591 Markers (Intracellular): 0

Complimentary Panels:

- If Mature B-Cell Neoplasms
- If Mature T and NK-Cell Neoplasms



Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.





Mature Lymphoid Neoplasms

REQUIRED

Orientation Panel +

RECOMMENDED

Mature B-Cell Neoplasms

De Novo Cases

CD Markers: CD5, CD19, CD23, CD38, CD43, CD49d, CD79b, CD81, CD200, ROR1

of Code 802590 Markers (Surface): 10

of Code 802591 Markers (Intracellular): 0

Cases with Known History of CLL

CD Markers: CD19, CD23, CD79b, CD200, FMC7

of Code 802590 Markers (Surface): 5

of Code 802591 Markers (Intracellular): 0

Monoclonal B-Cell Lymphocytosis (MBL)

CD Markers: CD19, CD23, CD79b, CD200, FMC7

of Code 802590 Markers (Surface): 5

of Code 802591 Markers (Intracellular): 0

Hairy Cell Leukemia (HCL)/Splenic Marginal Zone Lymphoma (SMZL) Suspected Cases

CD Markers: CD11c, CD19, CD24, CD25, CD103, CD123, CD200

of Code 802590 Markers (Surface): 7

of Code 802591 Markers (Intracellular): 0

Lymphoplasmacytic Lymphoma (LPL)/Waldenstrom Macroglobulinemia (WM) Suspected Cases

CD Markers: CD5, CD13, CD19, CD23, CD38, CD43, CD49d, CD79b, CD81, CD200, sIgM, ROR1

of Code 802590 Markers (Surface): 12

of Code 802591 Markers (Intracellular): 0

Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.



[Go To First Page](#)



[Go Back](#)



Mature Lymphoid Neoplasms

REQUIRED

Orientation Panel +

RECOMMENDED

Mature T-Cell Neoplasms

Adult T-Cell Leukemia/Lymphoma (ATLL)

CD Markers: CD1a, CD2, iCD3, CD4, CD7, CD8, CD16, CD25, CD34, CD56, CD57, CD94, CD99,

TdT

of Code 802590 Markers (Surface): 12

of Code 802591 Markers (Intracellular): 2

T-Cell Prolymphocytic Leukemia (T-PLL)

CD Markers: CD1a, CD2, iCD3, CD4, CD7, CD8, CD16, CD25, CD34, CD56, CD57, CD94, CD99,

TdT

of Code 802590 Markers (Surface): 12

of Code 802591 Markers (Intracellular): 2

Lymphocyte-Variant Hypereosinophilic Syndrome (L-HES) Panel

CD Markers: CD2, CD4, CD7, CD8, CD13, CD33, CD34, CD38, CD45, CD56, CD117,

of Code 802590 Markers (Surface): 11

of Code 802591 Markers (Intracellular): 0

Sezary Syndrome (SS) Panel

CD Markers: CD2, CD4, CD7, CD8, CD45, CD56

of Code 802590 Markers (Surface): 6

of Code 802591 Markers (Intracellular): 0

Other Mature T and NK-Cell Neoplasms

CD Markers: CD1a, CD2, iCD3, CD4, CD7, CD8, CD16, CD25, CD34, CD56, CD57, CD94, CD99,

TdT

of Code 802590 Markers (Surface): 12

of Code 802591 Markers (Intracellular): 2

Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.



[Go To First Page](#)



[Go Back](#)



Plasma Cell Dyscrasias (PCDs)

Intended Use: For cases with suspicion of Plasma Cell (Multiple) Myeloma, Plasma Cell Leukemia (PCL), Smoldering Myeloma or Monoclonal Gammopathy of Undetermined Significance (MGUS)

Comprehensive Panel

CD Markers: CD2, CD3, CD7, CD10, CD13, CD19, CD20, CD33, CD34, CD38, CD45, CD56,
CD81, CD117, CD138, iKappa, iLambda

of Code 802590 Markers (Surface): 15

of Code 802591 Markers (Intracellular): 2



Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.





Minimal/Measurable Residual Disease (MRD)

Intended Use: For MRD monitoring after chemotherapy

- If Acute Myeloid Leukemia (AML) MRD Panel
- If B-Cell Lymphoblastic Leukemia/Lymphoma (B-ALL) MRD Panel
- If T-Cell Lymphoblastic Leukemia/Lymphoma (T-ALL) MRD Panel
- If Mature B-Cell Neoplasms MRD Panel
- If Plasma Cell/Multiple Myeloma (PCM/MM) MRD Panel





Minimal/Measurable Residual Disease (MRD)

Acute Myeloid Leukemia (AML) MRD Panel

Non-M3 Acute Myeloid Leukemia (AML)

CD Markers: CD13, CD19, CD33, CD34, CD38, CD45, CD56, CD117, HLA-DR

of Code 802590 Markers (Surface): 9

of Code 802591 Markers (Intracellular): 0

Acute Promyelocytic Leukemia (APL, AML-M3)

CD Markers: CD2, CD3, CD7, CD10, CD13, CD19, CD20, CD33, CD34, CD38, CD45, CD56,
CD117

of Code 802590 Markers (Surface): 13

of Code 802591 Markers (Intracellular): 0

Important note:

It is strongly recommended to submit the first pull of bone marrow aspirate for MRD analysis, as sample quality is critical for accurate results. Minimum sample volume is 2ml. No more than 5ml should be submitted.

Of note:

According to ELN 2021 Guideline for AML MRD, APL therapy should be monitored by RT-qPCR for t(15;17) translocation as flow cytometric evaluation is not conclusive or definitive.

Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.



[Go To First Page](#)



[Go Back](#)



Minimal/Measurable Residual Disease (MRD)

B-Cell Lymphoblastic Leukemia/Lymphoma (B-ALL) MRD Panel

CD Markers: CD10, CD19, CD20, CD34, CD38, CD45, CD81, CD66c/CD123 or CD73/CD304

of Code 802590 Markers (Surface): 9

of Code 802591 Markers (Intracellular): 0

Important note:

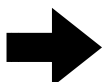
It is strongly recommended to submit the first pull of bone marrow aspirate for MRD analysis, as sample quality is critical for accurate results. Minimum sample volume is 2ml. No more than 5ml should be submitted.



Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.



[Go To First Page](#)



[Go Back](#)



Minimal/Measurable Residual Disease (MRD)

T-Cell Lymphoblastic Leukemia/Lymphoma (T-ALL) MRD Panel

CD Markers: CD1a, CD2, iCD3, CD3, CD4, CD5, CD7, CD7, CD8, CD10, CD34, CD45, CD45, CD56, CD56, CD99, TdT

of Code 802590 Markers (Surface): 16

of Code 802591 Markers (Intracellular): 2

Important note:

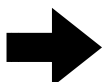
It is strongly recommended to submit the first pull of bone marrow aspirate for MRD analysis, as sample quality is critical for accurate results. Minimum sample volume is 2ml. No more than 5ml should be submitted.



Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.



[Go To First Page](#)



[Go Back](#)



Minimal/Measurable Residual Disease (MRD)

Mature B-Cell Neoplasms MRD Panel

Chronic Lymphocytic Leukemia (CLL)/Mantle Cell Lymphoma (MCL) MRD Panel

CD Markers: CD3, CD5, CD19, CD20, CD43, CD45, CD56, CD200, ROR1

of Code 802590 Markers (Surface): 9

of Code 802591 Markers (Intracellular): 0

Hairy Cell Leukemia (HCL) MRD Panel

CD Markers: CD11c, CD19, CD45, CD103, CD123, CD200

of Code 802590 Markers (Surface): 6

of Code 802591 Markers (Intracellular): 0

Other Mature B-Cell Neoplasms MRD Panel

CD Markers: CD10, CD19, CD20, CD34, CD38, CD45, Kappa, Lambda

of Code 802590 Markers (Surface): 8

of Code 802591 Markers (Intracellular): 0

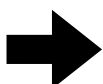
Important note:

It is strongly recommended to submit the first pull of bone marrow aspirate for MRD analysis, as sample quality is critical for accurate results. Minimum sample volume is 2ml. No more than 5ml should be submitted.

Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.



[Go To First Page](#)



[Go Back](#)



Minimal/Measurable Residual Disease (MRD)

Plasma Cell/Multiple Myeloma (PCM/MM) MRD Panel

CD Markers: CD19, CD38, CD45, CD56, CD138, B2-Micro, iKappa, iLambda

of Code 802590 Markers (Surface): 6

of Code 802591 Markers (Intracellular): 2

Important note:

It is strongly recommended to submit the first pull of bone marrow aspirate for MRD analysis, as sample quality is critical for accurate results. Minimum sample volume is 2ml. No more than 5ml should be submitted.



Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.



[Go To First Page](#)



[Go Back](#)



Myeloproliferative Neoplasms (MPNs)

Primary Myelofibrosis (PMF)

Intended Use: To Count CD34-Positive Blasts

CD Markers: CD2, CD3, CD7, CD10, CD13, CD19, CD20, CD33, CD34, CD38, CD45, CD56,
CD117

of Code 802590 Markers (Surface): 13

of Code 802591 Markers (Intracellular): 0

Chronic Myeloid Leukemia (CML)

Intended Use: To determine Blast percentage and confirm/rule out Blast Phase (BP) or transformation to BP

CD Markers: CD2, CD3, CD7, CD10, CD13, CD19, CD20, CD33, CD34, CD38, CD45, CD56,
CD117

of Code 802590 Markers (Surface): 13

of Code 802591 Markers (Intracellular): 0

Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.





Myelodysplastic Neoplasms (MDS)

Intended Use: For cases with bone marrow failure and suspected dysplasia

Comprehensive Panel

CD Markers: CD2, CD3, CD7, CD10, CD13, CD19, CD20, CD33, CD34, CD38, CD45, CD56,
CD117

of Code 802590 Markers (Surface): 13

of Code 802591 Markers (Intracellular): 0



Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.





Chronic Myelomonocytic Leukemia (CMML)

Intended Use: For cases with sustained monocytosis

Comprehensive Panel

CD Markers: CD2, CD3, CD7, CD10, CD13, CD14, CD16, CD19, CD20, CD33, CD34, CD38, CD45, CD56, CD64, CD117, CD123, HLA-DR

of Code 802590 Markers (Surface): 18

of Code 802591 Markers (Intracellular): 0



Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.





Immunodeficiencies

Lymphocytes Subsets

CD Markers: CD3, CD4, CD8, CD16, CD19, CD20, CD45, CD56

of Code 802590 Markers (Surface): 8

of Code 802591 Markers (Intracellular): 0

CD4-Positive T-Cell Enumeration in Human Immunodeficiency Virus (HIV)

CD Markers: CD3, CD4

of Code 802590 Markers (Surface): 2

of Code 802591 Markers (Intracellular): 0

Leukocyte Adhesion Deficiency (LAD)

CD Markers: CD11a, CD11b, CD11c, CD18

of Code 802590 Markers (Surface): 4

of Code 802591 Markers (Intracellular): 0

Autoimmune Lymphoproliferative Syndrome (ALPS)

CD Markers: CD3, CD4, CD8, CD45, TCR-ab

of Code 802590 Markers (Surface): 5

of Code 802591 Markers (Intracellular): 0

Chronic Granulomatous Disease (CGD)

CD Markers: DHR

of Code 802590 Markers (Surface): 1

of Code 802591 Markers (Intracellular): 0

Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.





Screening Panels

Intended Use: For inconclusive cases, cases with suspicion of inflammation, to rule out hematopoietic malignancies and bone marrow involvement by non-hematopoietic malignancies

Peripheral Blood (PB)

CD Markers: CD3, CD4, CD5, CD8, CD10, CD19, CD20, CD45, CD56, Kappa, Lambda

of Code 802590 Markers (Surface): 11

of Code 802591 Markers (Intracellular): 0

Bone Marrow Aspiration (BMA)

CD Markers: CD2, CD3, CD7, CD10, CD13, CD19, CD20, CD33, CD34, CD38, CD45, CD56, CD117

of Code 802590 Markers (Surface): 13

of Code 802591 Markers (Intracellular): 0

Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.





Body Fluid Analysis

Intended Use: For the detection of body fluid involvement by hematopoietic or non-hematopoietic malignancies and differential diagnosis of inflammatory or infectious conditions

CerebroSpinal Fluid (CSF)

Screening

CD Markers: CD3, CD10, CD19, CD20, CD33, CD34, CD45, CD56

of Code 802590 Markers (Surface): 8

of Code 802591 Markers (Intracellular): 0

Known Case of Involvement by AML

CD Markers: CD3, CD13, CD14, CD19, CD33, CD34, CD45, CD117

of Code 802590 Markers (Surface): 8

of Code 802591 Markers (Intracellular): 0

Known Case of Involvement by B-Cell Leukemia/Lymphoma

CD Markers: CD3, CD10, CD19, CD20, CD33, CD34, CD45

of Code 802590 Markers (Surface): 7

of Code 802591 Markers (Intracellular): 0

Known Case of Involvement by T-Cell Leukemia/Lymphoma

CD Markers: CD3, CD4, CD7, CD8, CD33, CD45, CD56, CD99

of Code 802590 Markers (Surface): 8

of Code 802591 Markers (Intracellular): 0

Known Case of Involvement by Non-Hematopoietic Malignancy

CD Markers: CD3, CD33, CD45, CD56, CD81, CD117, CD326

of Code 802590 Markers (Surface): 7

of Code 802591 Markers (Intracellular): 0

Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.





Body Fluid Analysis

Pleural Fluid

CD Markers: CD3, CD4, CD5, CD8, CD10, CD19, CD20, CD45, CD56, Kappa, Lambda

of Code 802590 Markers (Surface): 11

of Code 802591 Markers (Intracellular): 0

Ascitic Fluid

CD Markers: CD3, CD4, CD5, CD8, CD10, CD19, CD20, CD45, CD56, Kappa, Lambda

of Code 802590 Markers (Surface): 11

of Code 802591 Markers (Intracellular): 0

Pericardial Fluid

CD Markers: CD3, CD4, CD5, CD8, CD10, CD19, CD20, CD45, CD56, Kappa, Lambda

of Code 802590 Markers (Surface): 11

of Code 802591 Markers (Intracellular): 0

BronchoAlveolar Lavage (BAL)

CD Markers: CD3, CD4, CD5, CD8, CD10, CD19, CD20, CD45, CD56, Kappa, Lambda

of Code 802590 Markers (Surface): 11

of Code 802591 Markers (Intracellular): 0

Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.





Non-Hematopoietic Malignancies

Diagnostic Panel

CD Markers: CD45, CD56, CD81, CD99, CD117, CD326 (EpCAM)

of Code 802590 Markers (Surface): 6

of Code 802591 Markers (Intracellular): 0

Minimal/Measurable Residual Disease (MRD)

CD Markers: CD45, CD56, CD81, CD99, CD117, CD326 (EpCAM)

of Code 802590 Markers (Surface): 6

of Code 802591 Markers (Intracellular): 0

Of note:

Flow Cytometric immunophenotyping can only determine and relatively quantify an involvement by non-hematopoietic malignancies. For definitive subtyping, notice to Immunohistochemistry (IHC) and histopathology results, clinical findings, and other laboratory tests should be considered.

Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.





Other Panels

Paroxysmal Nocturnal Hemoglobinuria (PNH) Panel

Granulocytes & Monocytes

CD Markers: CD14, CD15, CD24, CD45, CD64, CD157, FLAER

of Code 802590 Markers (Surface): 7

of Code 802591 Markers (Intracellular): 0

Erythrocytes

CD Markers: CD59, CD71, CD235a

of Code 802590 Markers (Surface): 3

of Code 802591 Markers (Intracellular): 0

Of note:

Anticoagulated whole peripheral blood is used for the Granulocytes and Monocytes assay. Bone marrow aspiration is not recommended due to the presence of immature mono-myeloid cells.

Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.





Other Panels

Hereditary Spherocytosis (HS)

CD Markers: EMA

of Code 802590 Markers (Surface): 1

of Code 802591 Markers (Intracellular): 0

Langerhans Cell Histiocytosis (LCH)

CD Markers: CD1a, CD14, CD34, CD45, CD64, CD117, CD123, HLA-DR

of Code 802590 Markers (Surface): 8

of Code 802591 Markers (Intracellular): 0

Platelet Markers

Intended Use: For cases with suspicion of congenital thrombocytopenias

CD Markers: CD41, CD42b, CD61

of Code 802590 Markers (Surface): 3

of Code 802591 Markers (Intracellular): 0

Stem Cell Enumeration

CD Markers: CD34, CD45, 7AAD

of Code 802590 Markers (Surface): 3

of Code 802591 Markers (Intracellular): 0

Underlines indicate cytoplasmic (c/cy) or intracellular (i) markers.





References

- Swerdlow SH, Campo E, Harris NL, Jaffe ES, Pileri SA, Stein H, Thiele J (Eds): WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues (Revised 4th edition). IARC: Lyon 2017
- Wood BL, Arroz M, Barnett D, et al. 2006 Bethesda International Consensus recommendations on the immunophenotypic analysis of hematolymphoid neoplasia by flow cytometry: optimal reagents and reporting for the flow cytometric diagnosis of hematopoietic neoplasia. *Cytometry B Clin Cytom.* 2007;72 (Suppl 1):S14-22.
- van Dongen JJ, Lhermitte L, Böttcher S, Almeida J, van der Velden VH, Flores-Montero J, Rawstron A, Asnafi V, Lécresse Q, Lucio P, Mejstrikova E, Szczepański T, Kalina T, de Tute R, Brüggemann M, Sedek L, Cullen M, Langerak AW, Mendonça A, Macintyre E, Martin-Ayuso M, Hrusak O, Vidrales MB, Orfao A; EuroFlow Consortium (EU-FP6, LSHB-CT-2006-018708). EuroFlow antibody panels for standardized n-dimensional flow cytometric immunophenotyping of normal, reactive and malignant leukocytes. *Leukemia.* 2012 Sep;26(9):1908-75. doi: 10.1038/leu.2012.120. Epub 2012 May 3. PMID: 22552007; PMCID: PMC3437410.