AI 輔助翻譯與醫療參考提醒

認識檢驗數據：簡明版中英對照

閱讀前請先留意

本 PDF 由 AI 協助翻譯、整理與重排，目的是協助病友與家屬對照英文原文，理解多發性骨髓瘤相關檢驗資訊。

本資料僅供一般資訊參考，不能取代醫師診斷、治療建議、用藥調整或個別化醫療判斷。

不同醫院、不同實驗室的檢驗方法與參考區間可能不同；若檢驗數值偏高、偏低或有疑問，請以您的主治醫師說明為準。

若您打算分享本 PDF，請一併保留本提醒頁，避免下載者誤以為這是正式醫囑或個人化治療建議。

資料來源：Simplified Version of Understanding Your Labs；本頁為繁體中文 AI 輔助翻譯與閱讀版重排。

網站：https://healthtreetw.org/posts/know-04/

HealthTree Cure Hub
FOR MULTIPLE MYELOMA

Understanding your Myeloma Labs

了解您的骨髓瘤實驗室

By monitoring your labs you can prevent end organ damage and significant disease.

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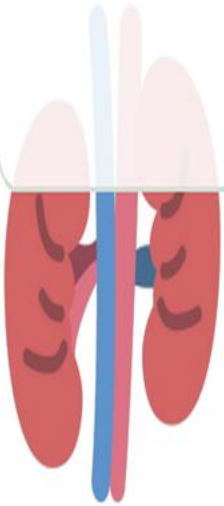
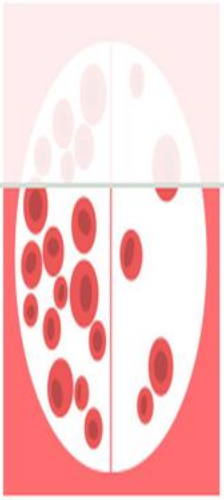
透過監控您的實驗室，您可以預防終末器官損傷和重大疾病。





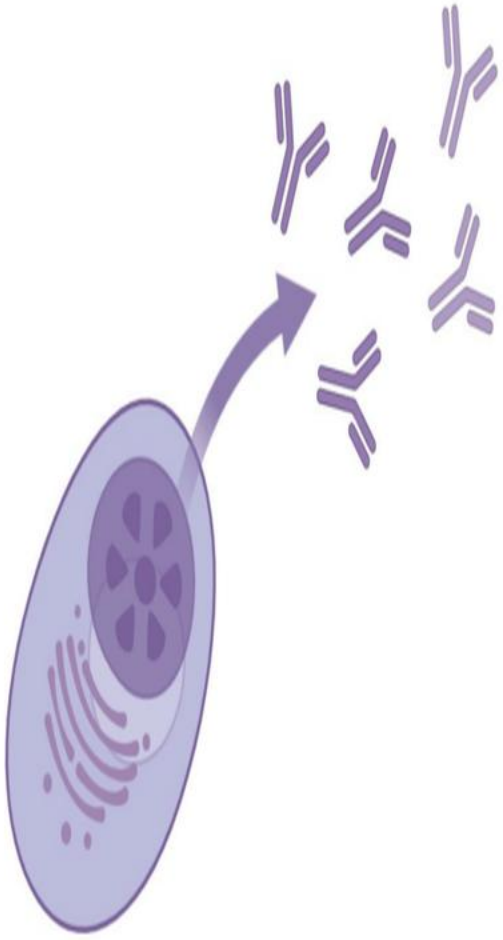
Multiple Myeloma is a type of cancer of plasma cells

Multiple Myeloma is a type of cancer of plasma cells

多發性骨髓瘤是漿細胞癌的一種

Plasma cells produce proteins called immunoglobulins

漿細胞產生稱為免疫球蛋白的蛋白質



- Immunoglobulins are proteins that attach to foreign substances entering the body,
- 免疫球蛋白是蛋白質 附著異物 進入體內，

- Helping fight infections
- 幫助對抗感染

- There are many different types and they are specialized for different things.
- 有許多不同的類型和 他們專門針對不同的 事物。

Multiple Myeloma and Monoclonal Proteins

- Myeloma, secretes abnormal immunoglobulins of only one type that cannot properly fight infections.
- 骨髓瘤，分泌異常 只有一種類型的免疫球蛋白 無法正確對抗感染。

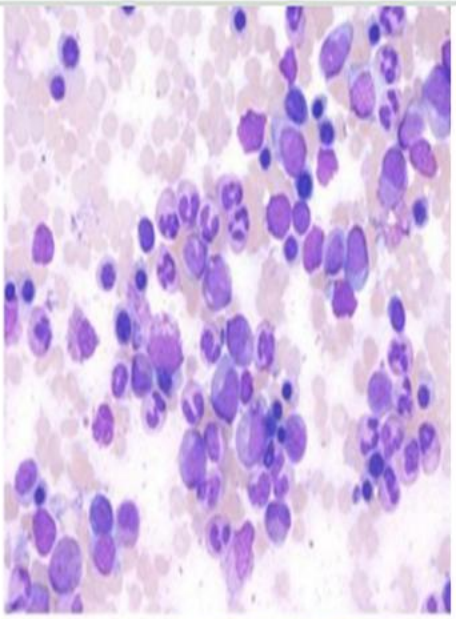
- They are called Monoclonal Proteins
- 他們叫單株蛋白

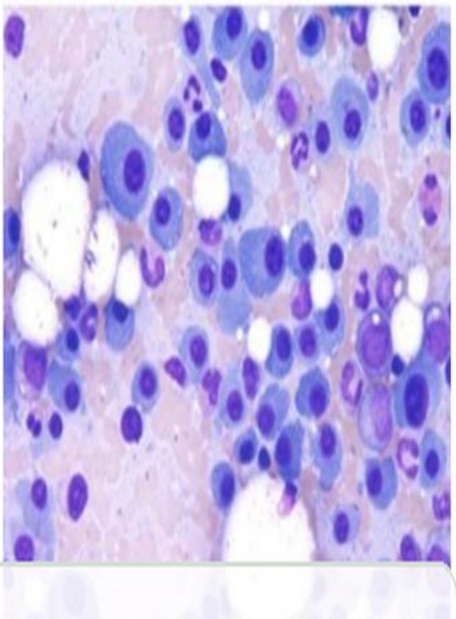
- Also called M-protein, M-spike, and other names.
- 也叫M蛋白,M-spike等名稱。

- Crowding out the other antibodies and other components of the immune system.
- 排擠其他抗體和 免疫系統的其他組成部分。

- Making too much of one type reduces the ability to create a wide spectrum of immunoglobulins to fight infections.
- 過度使用一種類型會降低能力 創造廣泛的免疫球蛋白 對抗感染。

- As Myeloma cells grow, they start Crowding out the other Blood cells in the bone marrow.
- 隨著骨髓瘤細胞的生長，它們開始擁擠 排除其他血球在骨髓中。





Top: Normal Bone Marrow;
上圖：正常骨髓；

Bottom: Multiple Myeloma Bone Marrow
底部：多發性骨髓瘤骨髓

MGUS is a precursor of Myeloma

MGUS 是骨髓瘤的前兆

Diagnosed with the following

診斷為以下情況

Serum monoclonal protein <3 g/dL

血清單株蛋白 <3 g/dL

Clonal bone marrow plasma cells <10%

克隆骨髓漿細胞 <10%

Absence of end-organ damage such as hypercalcemia, renal insufficiency, anemia, and bone lesions (CRAB) that can be attributed to the plasma cell proliferative disorder

缺席 終末器官損傷，如高血鈣、腎功能不全、貧血及骨骼病變 (螃蟹) 可歸因於漿細胞增殖性疾病

Smoldering Myeloma is another precursor closer to Myeloma

冒煙性骨髓瘤是另一種更接近骨髓瘤的前兆

Diagnosed with the following

診斷為以下情況

Serum monoclonal protein >=3 g/dL, or urinary monoclonal protein >=500 mg per 24 h

血清單株蛋白 >=3 克/分升，或尿單株蛋白 >=500 mg/24 小時

Clonal bone marrow plasma cells 10-60%

克隆骨髓漿細胞 10-60%

Absence of end-organ damage such as hypercalcemia, renal insufficiency, anemia, and bone lesions (CRAB) that can be attributed to the plasma cell proliferative disorder, or

缺席終末器官損傷，如高血鈣、腎功能不全、貧血及骨骼病變（螃蟹）可歸因於漿細胞增殖性疾病，或者

amyloidosis

澱粉樣變性

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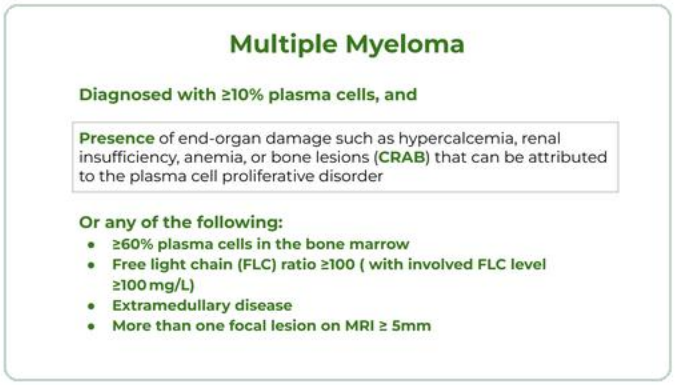

Multiple Myeloma

Diagnosed with ≥10% plasma cells, and

Presence of end-organ damage such as hypercalcemia, renal insufficiency, anemia, or bone lesions (**CRAB**) that can be attributed to the plasma cell proliferative disorder

Or any of the following:

- **≥60% plasma cells in the bone marrow**
- **Free light chain (FLC) ratio ≥100 (with involved FLC level ≥100 mg/L)**
- **Extramedullary disease**
- **More than one focal lesion on MRI ≥ 5mm**

原始頁面參考：位置與頁碼保留；下方重排為手機較易閱讀的中英對照。

中英重點對照

AI 輔助翻譯與重排，僅供資訊參考；醫療決策請諮詢主治醫師。

1. Multiple Myeloma
   多發骨髓瘤
2. Diagnosed with >=10% plasma cells, and
   診斷漿細胞>=10%，且
3. Presence of end-organ damage such as hypercalcemia, renal insufficiency, anemia, or bone lesions (CRAB) that can be attributed to the plasma cell proliferative disorder
   在場 終末器官損傷，如高血鈣、腎功能不全、貧血或骨骼病變（ 螃蟹 ）可歸因於漿細胞增殖性疾病
4. Or any of the following:
   或以下任何一項：
5. ● >=60% plasma cells in the bone marrow
   ● 骨髓中漿細胞>=60%
6. ● Free light chain (FLC) ratio >=100 (with involved FLC level >=100 mg/L)
   ● 遊離輕鏈（ FLC ）比例>=100（ 涉及FLC水準>=100 mg/L ）

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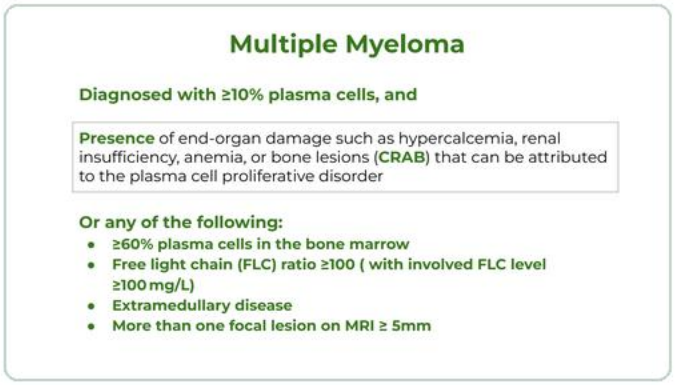

Multiple Myeloma

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Presence of end-organ damage such as hypercalcemia, renal insufficiency, anemia, or bone lesions (**CRAB**) that can be attributed to the plasma cell proliferative disorder

Or any of the following:

- **≥60% plasma cells in the bone marrow**
- **Free light chain (FLC) ratio ≥100 (with involved FLC level ≥100 mg/L)**
- **Extramedullary disease**
- **More than one focal lesion on MRI ≥ 5mm**

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中英重點對照

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7
- Extramedullary disease
- 髓外疾病

8
- More than one focal lesion on MRI >= 5mm
- MRI 上有超過 1 個局部病變 >= 5mm

9 CRAB

螃蟹

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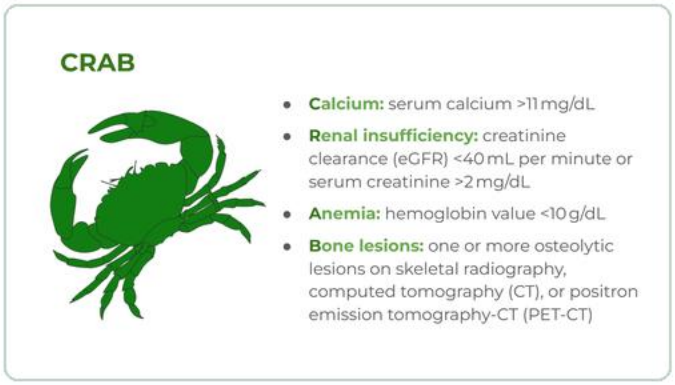

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中英重點對照

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1. ● Calcium: serum calcium >11 mg/dL
   ● 鈣： 血清鈣>11 mg/dL
2. ● Renal insufficiency: creatinine
   ● 腎功能不全： 肌酸酐
3. clearance (eGFR) <40 mL per minute or
   清除率 (eGFR) <40 mL 每分鐘或
4. serum creatinine >2 mg/dL
   血清肌酸酐>2 mg/dL
5. ● Anemia: hemoglobin value <10 g/dL
   ● 貧血： 血紅素值<10 g/dL
6. ● Bone lesions: one or more osteolytic
   ● 骨病變： 一種或多種溶骨劑
7. lesions on skeletal radiography,
   骨骼射線照相上的病變，

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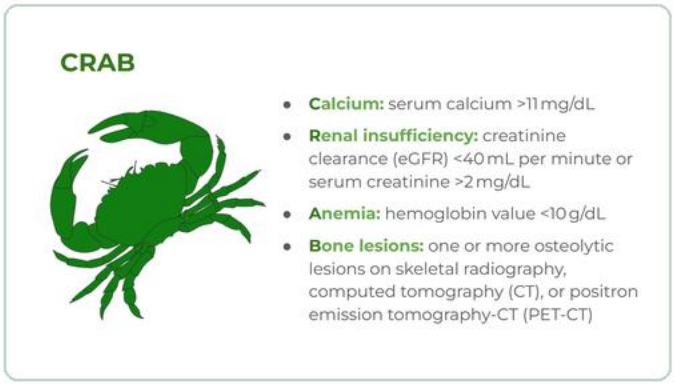

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中英重點對照

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8 computed tomography (CT), or positron
電腦斷層掃描 (CT) 或正電子

9 emission tomography-CT (PET-CT)
發射斷層掃描-CT (PET-CT)

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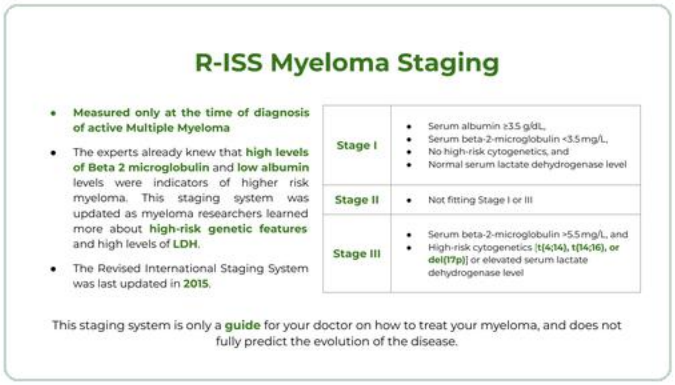

R-ISS Myeloma Staging

- **Measured only at the time of diagnosis of active Multiple Myeloma**
- The experts already knew that **high levels of Beta 2 microglobulin** and **low albumin** levels were indicators of higher risk myeloma. This staging system was updated as myeloma researchers learned more about **high-risk genetic features** and high levels of **LDH**.
- The Revised International Staging System was last updated in **2015**.

Stage I	• Serum albumin ≥3.5 g/dL, • Serum beta-2-microglobulin <3.5 mg/L, • No high-risk cytogenetics, and • Normal serum lactate dehydrogenase level
Stage II	• Not fitting Stage I or III
Stage III	• Serum beta-2-microglobulin >5.5 mg/L, and • High-risk cytogenetics [**t(4;14), t(14;16), or del(17p)**] or elevated serum lactate dehydrogenase level

This staging system is only a **guide** for your doctor on how to treat your myeloma, and does not fully predict the evolution of the disease.

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1. R-ISS Myeloma Staging
   R-ISS 骨髓瘤分期
2. ● Measured only at the time of diagnosis
   ● 僅在診斷時測量
3. of active Multiple Myeloma
   活動性多發性骨髓瘤
4. ● The experts already knew that high levels of Beta 2 microglobulin and low albumin levels were indica tors of higher risk
   ● 專家已經知道 高水平的 Beta 2 微球蛋白 和 低白蛋白 水平為秈稻 風險較高的人
5. Stage I
   階段I
6. ● Serum albumin >=3.5 g/dL,
   ● 血清白蛋白>=3.5 g/dL，
7. ● Serum beta-2-microglobulin <3.5 mg/L, ● No high-risk cytogenetics, and
   ● 血清β-2-微球蛋白<3.5mg/L， ● 沒有高風險的細胞遺傳學，並且

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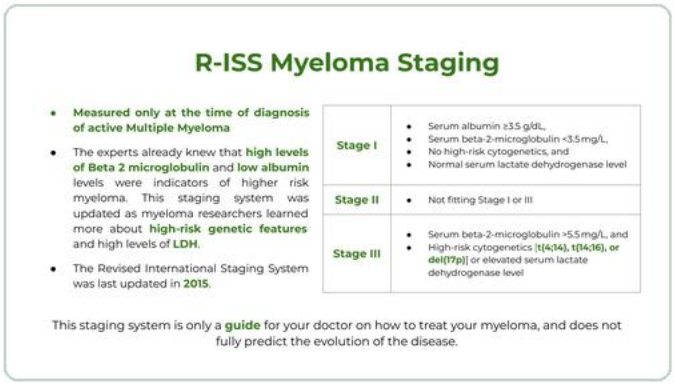

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8 ● Normal serum lactate dehydrogenase level
● 血清乳酸脫氫酶正常值

9 myeloma. This staging system was updated as myeloma researchers learned more about high-risk genetic features
骨髓瘤。隨著骨髓瘤研究人員了解更多信息，該分期系統進行了更新 高風險遺傳特徵

10 Stage II ● Not fitting Stage I or III
第二階段 ● 不適合第一階段或第三階段

11 ● Serum beta-2-microglobulin >5.5 mg/L, and
● 血清 β-2-微球蛋白 >5.5mg/L，且

12 and high levels of LDH .
和高水準的 乳酸脫氫酶 。

13 ● The Revised International Staging System was last updated in 2015 .
● 修訂後的國際分期系統最後更新於 2015年 。

14 Stage III
第三階段

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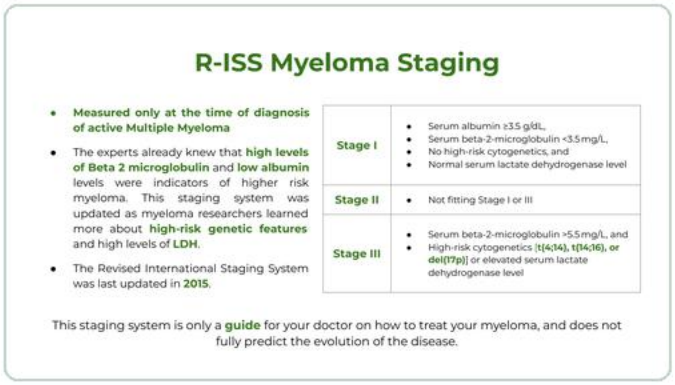

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15 ● High-risk cytogenetics [t(4;14), t(14;16), or del(17p)] or elevated serum lactate dehydrogenase level

● 高危險細胞遺傳學 [t(4;14)、t(14;16) 或 del(17p)] 或血清乳酸脫氫酶濃度升高

16 This staging system is only a guide for your doctor on how to treat your myeloma, and does not fully predict the evolution of the disease.

這個分期系統只是一個 指導 向您的醫生介紹如何治療您的骨髓瘤，並且不能完全預測疾病的演變。

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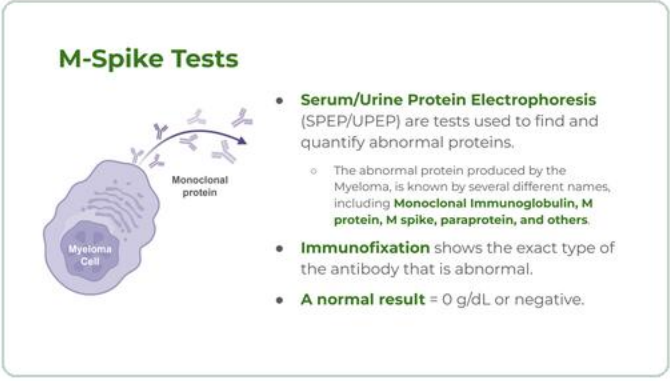

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中英重點對照

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1. M-Spike Tests
   M-尖峰測試
2. ● Serum/Urine Protein Electrophoresis
   ● 血清/尿蛋白電泳
3. (SPEP/UPEP) are tests used to find and
   (SPEP/UPEP) 是用於查找和
4. quantify abnormal proteins.
   量化異常蛋白質。
5. Monoclonal
   單複製
6. protein
   蛋白質
7. Myeloma
   骨髓瘤

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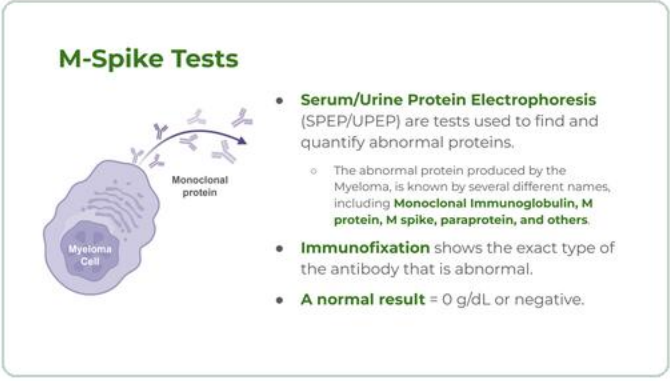

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中英重點對照

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8 Cell
細胞

9 ○ The abnormal protein produced by the Myeloma, is known by several different names, including Monoclonal Immunoglobulin, M protein, M spike, paraprotein, and others .
○ 骨髓瘤產生的異常蛋白質有幾個不同的名稱，包括 單株免疫球蛋白、M 蛋白、M 刺突蛋白、副蛋白等 。

10 ● Immunofixation shows the exact type of the antibody that is abnormal.
● 免疫固定 顯示異常抗體的確切類型。

11 ● A normal result = 0 g/dL or negative.
● 正常結果 = 0 g/dL 或負值。

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When treated with a monoclonal antibody, like Darzalex, this antibody will be shown in the electrophoresis and Immunofixation studies as a little M spike.

原始頁面參考：位置與頁碼保留；下方重排為手機較易閱讀的中英對照。

中英重點對照

AI 輔助翻譯與重排，僅供資訊參考；醫療決策請諮詢主治醫師。

1. When treated with a monoclonal antibody, like Darzalex, this antibody will be shown in the electrophoresis and Immunofixation studies as a little M spike.
   當用單株抗體（如 Darzalex）處理時，該抗體將在電泳和免疫固定研究中顯示為一個小 M 尖峰。

逐頁中英對照

第 13 頁（1/2） / Page 13

原始頁面參考：位置與頁碼保留；下方重排為手機較易閱讀的中英對照。

中英重點對照

AI 輔助翻譯與重排，僅供資訊參考；醫療決策請諮詢主治醫師。

1. Free Light Chains
   自由輕鏈
2. ● This test measures the free light
   ● 此測試測量自由光
3. chains, Kappa and Lambda
   鏈條， 卡帕和拉姆達
4. ● It is important to know your myeloma
   ● 了解您的情況很重要 骨髓瘤
5. subtype in order to monitor the
   亞型 為了監控
6. relevant light chain.
   相關輕鏈。
7. ● Kappa reference values: 3.3 to 19.4 mg/L
   ● Kappa參考值： 3.3至19.4毫克/公升

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原始頁面參考：位置與頁碼保留；下方重排為手機較易閱讀的中英對照。

中英重點對照

AI 輔助翻譯與重排，僅供資訊參考；醫療決策請諮詢主治醫師。

8 ● Lambda reference values: 5.71 to 26.3 mg/L
● 拉姆達參考值： 5.71至26.3毫克/公升

9 Reference values may vary from lab to lab
參考值可能因實驗室而異

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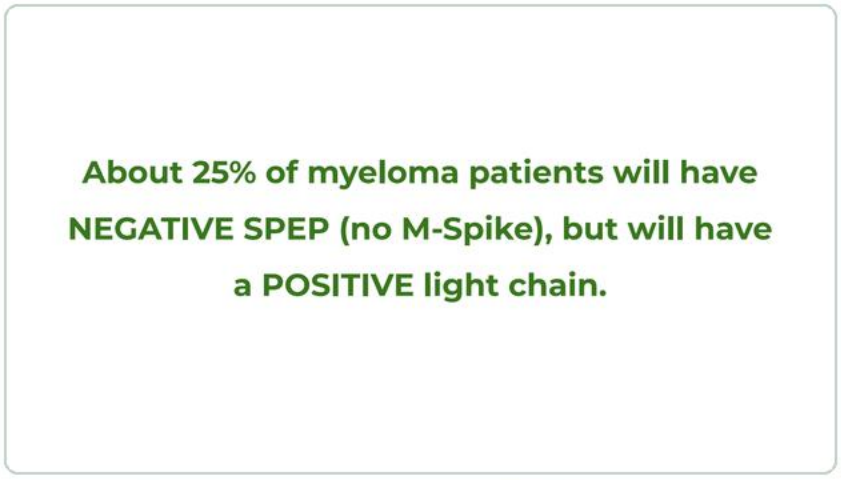
第 14 頁 / Page 14



原始頁面參考：位置與頁碼保留；下方重排為手機較易閱讀的中英對照。

中英重點對照

AI 輔助翻譯與重排，僅供資訊參考；醫療決策請諮詢主治醫師。

1. About 25% of myeloma patients will have NEGATIVE SPEP (no M-Spike), but will have a POSITIVE light chain.
   約 25% 的骨髓瘤患者會出現陰性 SPEP（無 M-Spike），但會出現陽性輕鏈。

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原始頁面參考：位置與頁碼保留；下方重排為手機較易閱讀的中英對照。

中英重點對照

AI 輔助翻譯與重排，僅供資訊參考；醫療決策請諮詢主治醫師。

1. Free Light Chains in the blood can help detect an early progression or relapse.
   血液中的遊離輕鏈可以幫助檢測早期進展或復發。

2. X
   X

3. RELAPSE D
   復發 D

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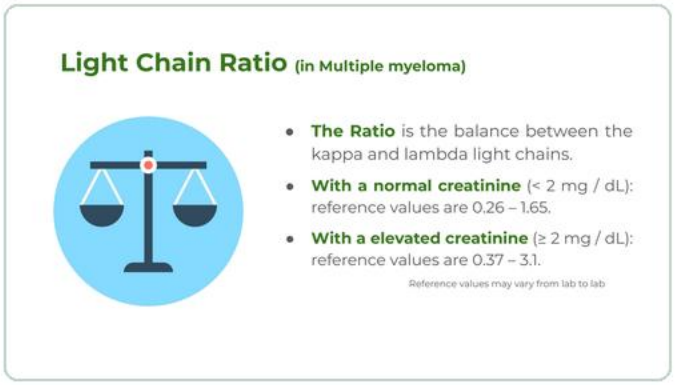

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中英重點對照

AI 輔助翻譯與重排，僅供資訊參考；醫療決策請諮詢主治醫師。

1. Light Chain Ratio (in Multiple myeloma)
   輕鏈比率（多發性骨髓瘤）
2. ● The Ratio is the balance between the
   ● 比例 是之間的平衡
3. kappa and lambda light chains.
   kappa 和 lambda 輕鏈。
4. ● With a normal creatinine (< 2 mg / dL):
   ● 肌酸酐正常（< 2 毫克/分升）：
5. reference values are 0.26 - 1.65.
   參考值為0.26 - 1.65。
6. ● With a elevated creatinine (>= 2 mg / dL):
   ● 肌酸酐升高（>=2毫克/分升）：
7. reference values are 0.37 - 3.1.
   參考值為0.37 - 3.1。

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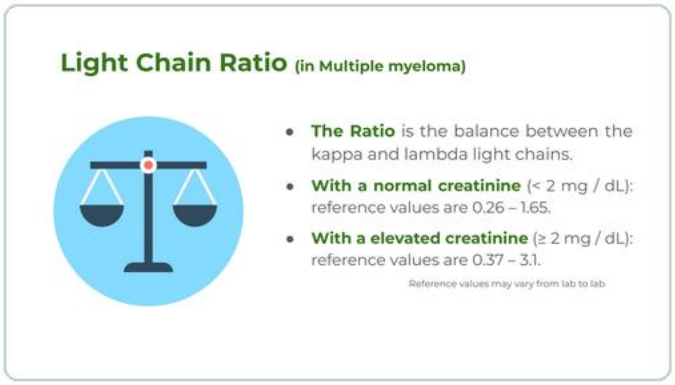

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中英重點對照

AI 輔助翻譯與重排，僅供資訊參考；醫療決策請諮詢主治醫師。

8 Reference values may vary from lab to lab
參考值可能因實驗室而異

9 Light Chain Ratio (in Multiple myeloma)
輕鏈比率（多發性骨髓瘤）

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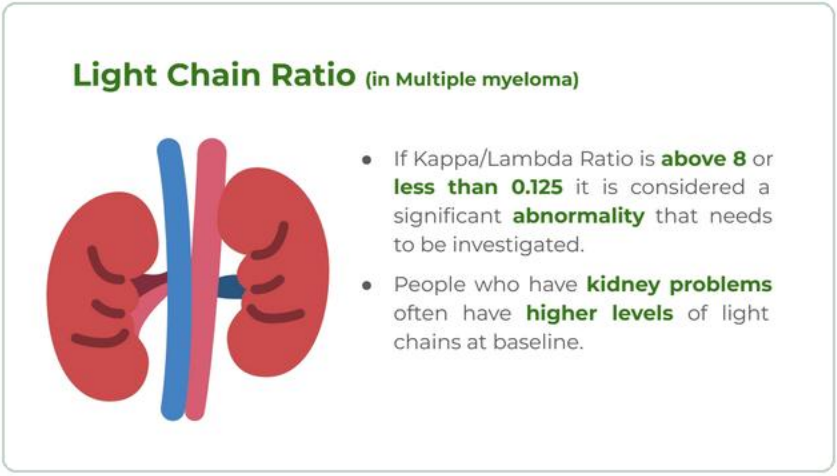

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中英重點對照

AI 輔助翻譯與重排，僅供資訊參考；醫療決策請諮詢主治醫師。

1. If Kappa/Lambda Ratio is above 8 or
   如果 Kappa/Lambda 比率為 8以上 或者
2. less than 0.125 it is considered a
   小於0.125 它被認為是
3. significant abnormality that needs
   重要的 異常 需要
4. to be investigated.
   待調查。
5. People who have kidney problems
   擁有的人 腎臟問題
6. often have higher levels of light
   經常有 更高水準 光的
7. chains at baseline.
   基線上的鏈。

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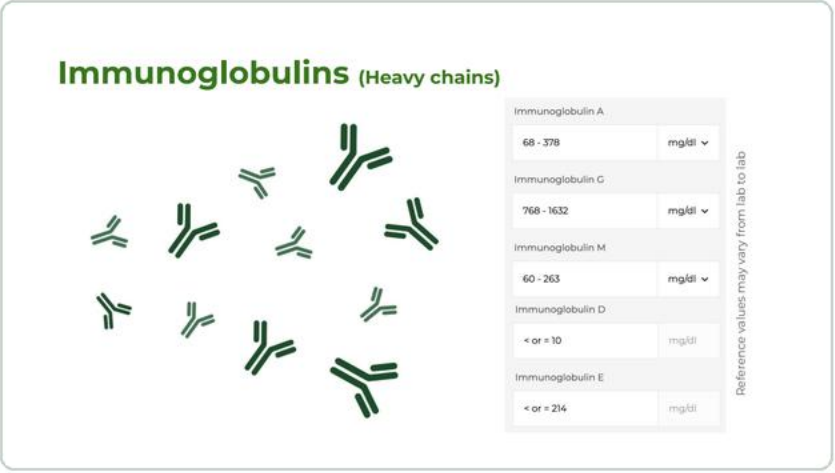

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中英重點對照

AI 輔助翻譯與重排，僅供資訊參考；醫療決策請諮詢主治醫師。

1. Immunoglobulins (Heavy chains)
   免疫球蛋白（重鏈）

2. Reference values may vary from lab to lab
   參考值可能因實驗室而異

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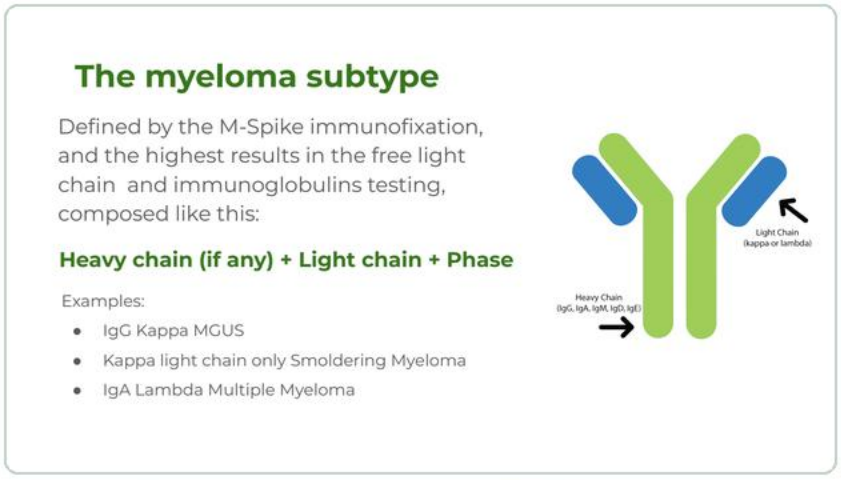
第 19 頁 / Page 19



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中英重點對照

AI 輔助翻譯與重排，僅供資訊參考；醫療決策請諮詢主治醫師。

1. The myeloma subtype
   骨髓瘤亞型
2. Defined by the M-Spike immunofixation, and the highest results in the free light chain and immunoglobulins testing, composed like this:
   由M-Spike免疫固定定義，以及遊離輕鍊和免疫球蛋白測試的最高結果，組成如下：
3. Heavy chain (if any) + Light chain + Phase
   重鏈（如果有）+輕鏈+相
4. Examples:
   例子：
5. ● IgG Kappa MGUS
   ● IgG 卡帕 MGUS
6. ● Kappa light chain only Smoldering Myeloma ● IgA Lambda Multiple Myeloma
   ● 僅 Kappa 輕鏈 冒煙性骨髓瘤 ● IgA Lambda 多發性骨髓瘤

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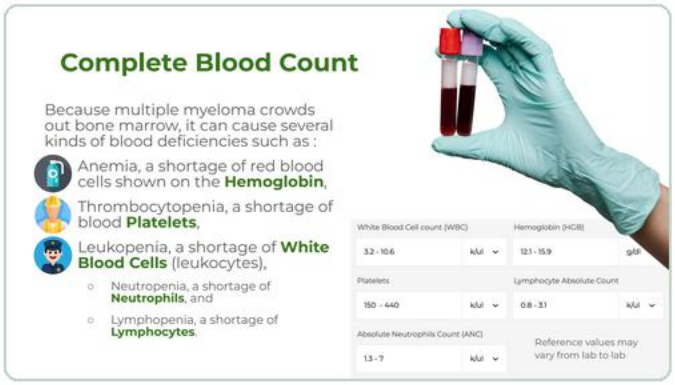

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中英重點對照

AI 輔助翻譯與重排，僅供資訊參考；醫療決策請諮詢主治醫師。

1. Complete Blood Count
   全血球計數
2. Because multiple myeloma crowds
   因為多發性骨髓瘤族群
3. out bone marrow, it can cause several
   進入骨髓後，可能會導致以下幾種情況
4. kinds of blood deficiencies such as :
   各種血液缺乏症，例如：
5. Anemia, a shortage of red blood
   貧血，紅血不足
6. cells shown on the Hemoglobin ,
   上顯示的儲存格 血紅素 ,
7. Thrombocytopenia, a shortage of
   血小板減少症，缺乏

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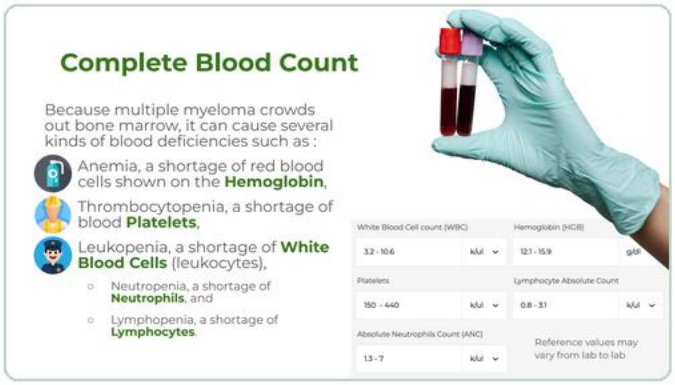

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中英重點對照

AI 輔助翻譯與重排，僅供資訊參考；醫療決策請諮詢主治醫師。

8 blood Platelets ,
血 血小板 ,

9 Leukopenia, a shortage of White
白血球減少症，缺乏 白色的

10 Blood Cells (leukocytes),
血球（白血球），

11 ○ Neutropenia, a shortage of
○ 中性白血球減少症，缺乏

12 Neutrophils , and
嗜中性球 ， 和

13 ○ Lymphopenia, a shortage of
○ 淋巴球減少症，缺乏

14 Lymphocytes . Reference values may vary from lab to lab
淋巴球 。 參考值可 因實驗室而異

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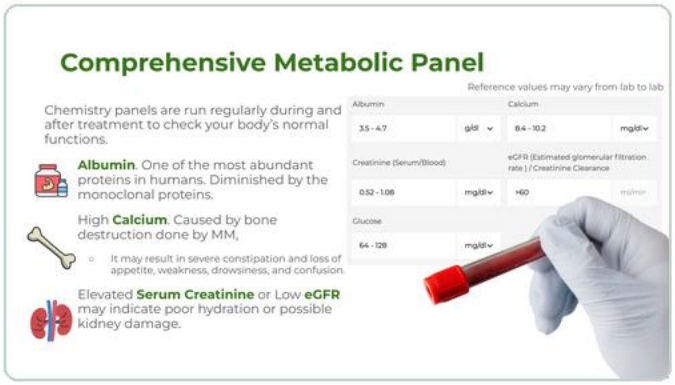

原始頁面參考：位置與頁碼保留；下方重排為手機較易閱讀的中英對照。

中英重點對照

AI 輔助翻譯與重排，僅供資訊參考；醫療決策請諮詢主治醫師。

1. Comprehensive Metabolic Panel
   綜合代謝組
2. Reference values may vary from lab to lab
   參考值可能因實驗室而異
3. Chemistry panels are run regularly during and
   化學小組在期間和期間定期運行
4. after treatment to check your body’ s normal
   治療後檢查您的身體是否正常
5. functions.
   功能。
6. Albumin . One of the most abundant
   白蛋白 。最豐富的之一
7. proteins in humans. Diminished by the
   人體中的蛋白質。減少了

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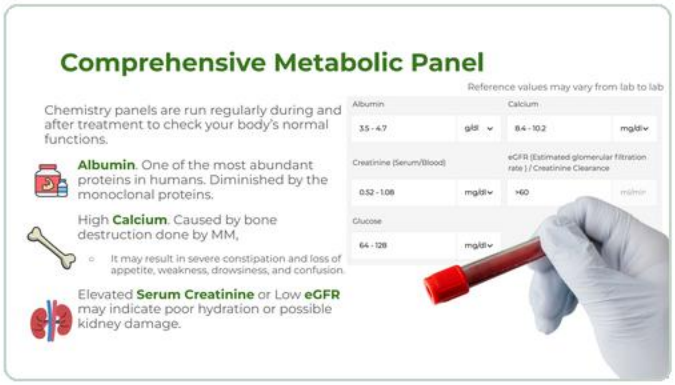

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中英重點對照

AI 輔助翻譯與重排，僅供資訊參考；醫療決策請諮詢主治醫師。

8 monoclonal proteins.
單克隆蛋白。

9 High Calcium . Caused by bone
高的 鈣 。骨頭引起的

10 destruction done by MM,
MM造成的破壞，

11 ○ It may result in severe constipation and loss of
○ 它可能會導致嚴重的便秘和喪失

12 appetite, weakness, drowsiness, and confusion.
食慾、虛弱、嗜睡和意識混亂。

13 Elevated Serum Creatinine or Low eGFR
高架 血清肌酸酐 或低 腎小球濾過率

14 may indicate poor hydration or possible
可能表示水分不足或可能

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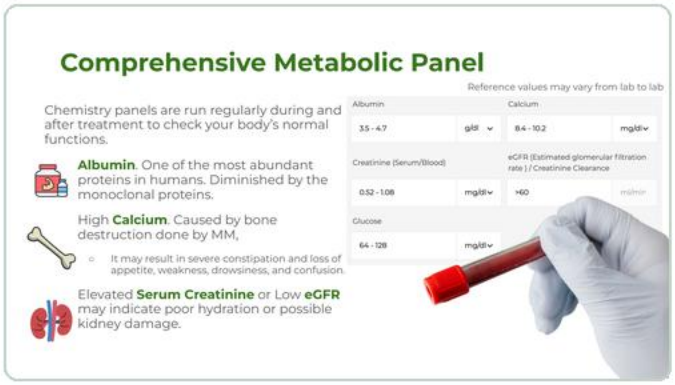

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中英重點對照

AI 輔助翻譯與重排，僅供資訊參考；醫療決策請諮詢主治醫師。

15 kidney damage.
腎臟損傷。

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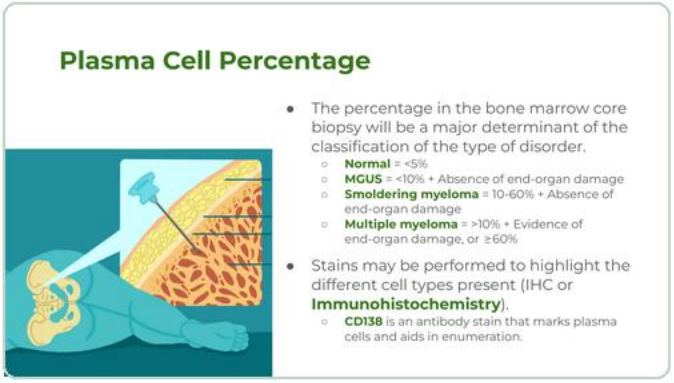

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中英重點對照

AI 輔助翻譯與重排，僅供資訊參考；醫療決策請諮詢主治醫師。

1. Plasma Cell Percentage
   漿細胞百分比
2. ● The percentage in the bone marrow core
   ● 佔骨髓核心的百分比
3. biopsy will be a major determinant of the
   活檢將是主要決定因素
4. classification of the type of disorder.
   疾病類型的分類。
5. ○ Normal = <5%
   ○ 普通的 = <5%
6. ○ MGUS = <10% + Absence of end-organ damage
   ○ MGUS = <10% + 沒有終末器官損傷
7. ○ Smoldering myeloma = 10-60% + Absence of
   ○ 冒煙性骨髓瘤 = 10-60% + 不存在

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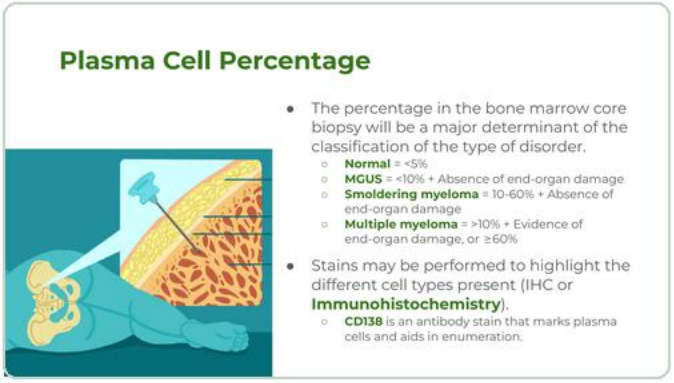

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中英重點對照

AI 輔助翻譯與重排，僅供資訊參考；醫療決策請諮詢主治醫師。

8 end-organ damage
終末器官損傷

9 ○ Multiple myeloma = >10% + Evidence of
○ 多發骨髓瘤 = >10% + 證據

10 end-organ damage, or >= 60%
終末器官損傷，或 >= 60%

11 ● Stains may be performed to highlight the
● 可以進行染色以突出顯示

12 different cell types present (IHC or
存在不同的細胞類型（IHC 或

13 Immunohistochemistry).
免疫組織化學）。

14 ○ CD138 is an antibody stain that marks plasma
○ CD138 是一種標記血漿的抗體染色劑

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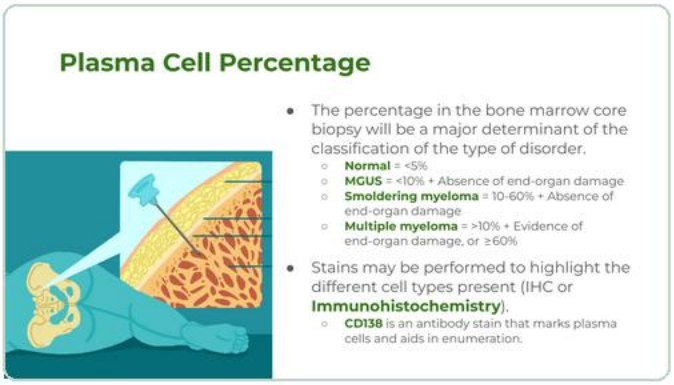

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中英重點對照

AI 輔助翻譯與重排，僅供資訊參考；醫療決策請諮詢主治醫師。

15 cells and aids in enumeration.
細胞和計數輔助工具。

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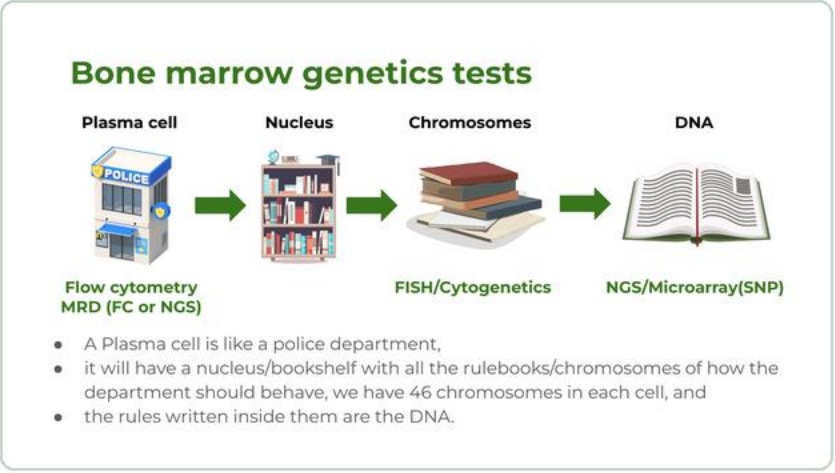

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中英重點對照

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1. Bone marrow genetics tests
   骨髓遺傳學測試

2. Plasma cell Nucleus Chromosomes DNA Flow cytometry FISH/Cytogenetics NGS/Microarray(SNP) MRD (FC or NGS)
   漿細胞 細胞核 染色體 DNA 流式細胞儀 FISH/細胞遺傳學 NGS/微陣列 (SNP) MRD（FC 或 NGS）

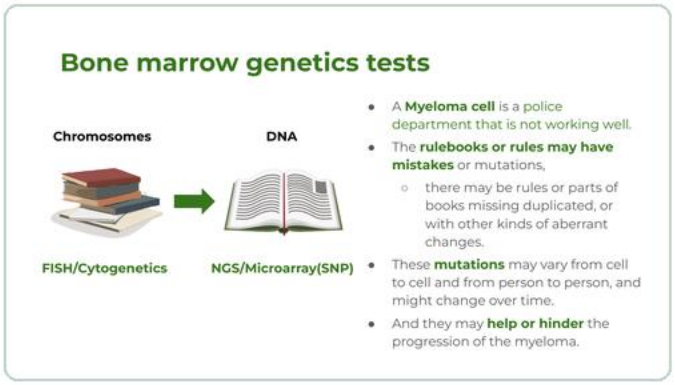
3. ● A Plasma cell is like a police department,
   ● 等離子細胞就像一個警察局，

4. ● it will have a nucleus/bookshelf with all the rulebooks/chromosomes of how the department should behave, we have 46 chromosomes in each cell, and ● the rules written inside them are the DNA.
   ● 它將有一個細胞核/書架，裡面有該部門應如何表現的所有規則手冊/染色體，每個細胞中有 46 條染色體，並且 ● 它們裡面寫的規則就是DNA。

5. Bone marrow genetics tests
   骨髓遺傳學測試

逐頁中英對照

第 24 頁（1/2） / Page 24



原始頁面參考：位置與頁碼保留；下方重排為手機較易閱讀的中英對照。

中英重點對照

AI 輔助翻譯與重排，僅供資訊參考；醫療決策請諮詢主治醫師。

1. ● A Myeloma cell is a police
   ● A 骨髓瘤細胞 是一個 警察
2. Chromosomes DNA FISH/Cytogenetics NGS/Microarray(SNP)
   染色體DNA FISH/細胞遺傳學NGS/微陣列(SNP)
3. department that is not working well .
   運作不佳的部門 。
4. ● The rulebooks or rules may have mistakes or mutations,
   ● 這 規則手冊或規則可能有錯誤 或突變，
5. ○ there may be rules or parts of books missing duplicated, or
   ○ 可能有規則或書籍的某些部分缺失、重複，或者
6. with other kinds of aberrant
   與其他類型的異常
7. changes.
   變化。

逐頁中英對照

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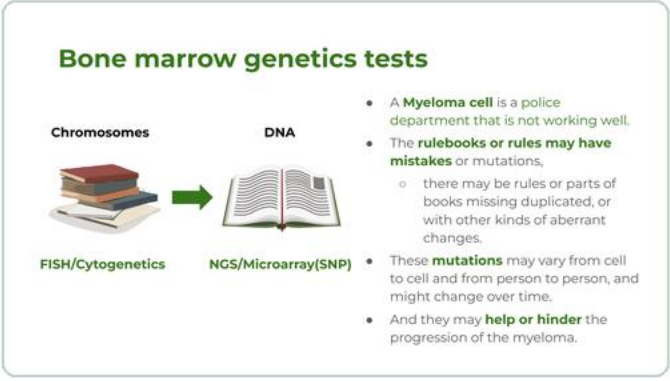

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8 ● These mutations may vary from cell to cell and from person to person, and might change over time.

● 這些 突變 可能因細胞和人而異，並且可能隨時間而改變。

9 ● And they may help or hinder the progression of the myeloma.

● 他們可能 幫助或阻礙 骨髓瘤的進展。

逐頁中英對照

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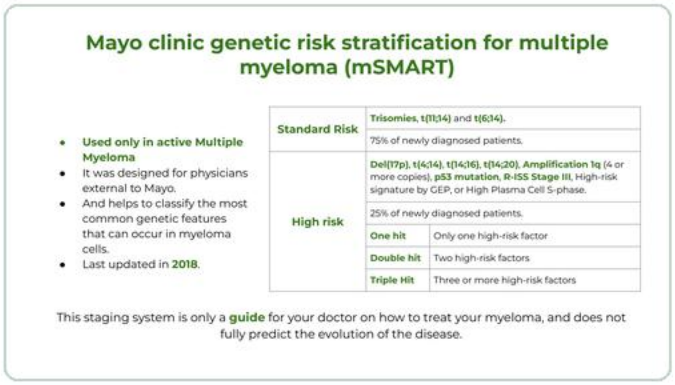

Mayo clinic genetic risk stratification for multiple myeloma (mSMART)

- **Used only in active Multiple Myeloma**
- It was designed for physicians external to Mayo.
- And helps to classify the most common genetic features that can occur in myeloma cells.
- Last updated in **2018**.

Standard Risk	**Trisomies, t(11;14) and t(6;14).**	
	75% of newly diagnosed patients.	
High risk	**Del(17p), t(4;14), t(14;16), t(14;20), Amplification 1q** (4 or more copies), **p53 mutation, R-ISS Stage III**, High-risk signature by GEP, or High Plasma Cell S-phase.	
	25% of newly diagnosed patients.	
	One hit	Only one high-risk factor
	Double hit	Two high-risk factors
	Triple Hit	Three or more high-risk factors

This staging system is only a **guide** for your doctor on how to treat your myeloma, and does not fully predict the evolution of the disease.

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中英重點對照

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1. Mayo clinic genetic risk stratification for multiple myeloma (mSMART)
   梅奧診所多發性骨髓瘤遺傳風險分層 (mSMART)
2. Trisomies , t(11;14) and t(6;14).
   三體性 , t(11;14) 和 t(6;14)。
3. Standard Risk
   標準風險
4. ● Used only in active Multiple Myeloma
   ● 僅用於活動性多發性骨髓瘤
5. ● It was designed for physicians external to Mayo.
   ● 它是為梅奧以外的醫生設計的。
6. ● And helps to classify the most common genetic features that can occur in myeloma cells.
   ● 並有助於對骨髓瘤細胞中最常見的遺傳特徵進行分類。
7. ● Last updated in 2018 .
   ● 上次更新於 2018年 。

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逐頁中英對照

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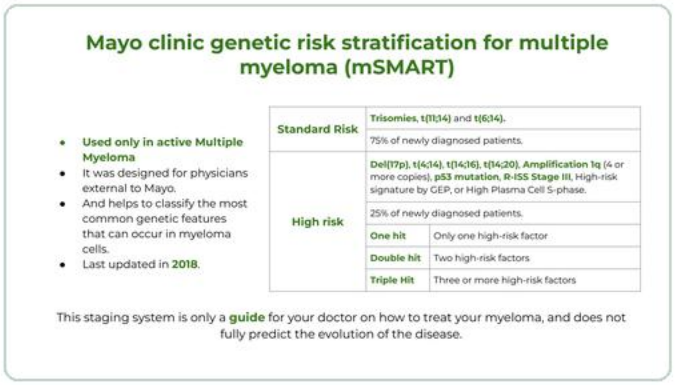

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8 High risk
高風險

9 75% of newly diagnosed patients.
75%的新診斷患者。

10 Del(17p) , t(4;14) , t(14;16) , t(14;20) , Amplification 1q (4 or more copies), p53 mutation , R-ISS Stage III , High-risk signature by GEP, or High Plasma Cell S-phase.
德爾(17p) , t(4;14) , t(14;16) , t(14;20) , 擴增1q （4份或以上） ， p53突變 , R-ISS 第三階段 ，GEP 或高漿細胞 S 期的高風險簽名。

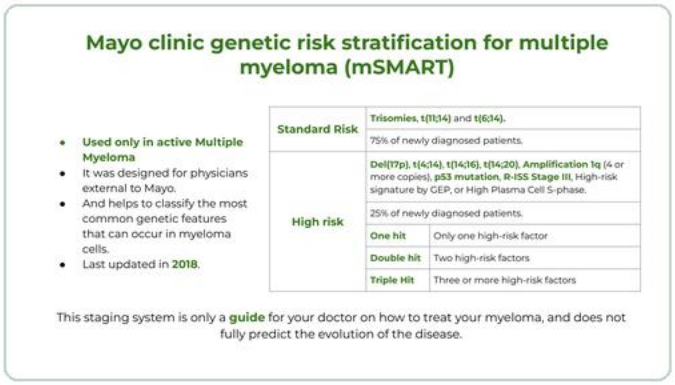
11 25% of newly diagnosed patients.
25%的新診斷患者。

12 One hit Only one high-risk factor
一擊 只有一個高危險因子

13 Double hit Two high-risk factors
連擊 兩個高危險因子

逐頁中英對照

第 25 頁（3/3）/ Page 25



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14 Triple Hit Three or more high-risk factors
三連擊 三個或以上高風險因素

15 This staging system is only a guide for your doctor on how to treat your myeloma, and does not fully predict the evolution of the disease.
這個分期系統只是一個 指導 向您的醫生介紹如何治療您的骨髓瘤，並且不能完全預測疾病的演變。

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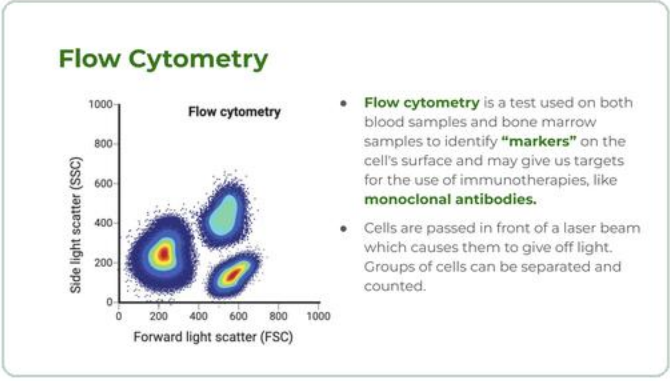
逐頁中英對照

第 26 頁（1/2） / Page 26



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1. Flow Cytometry
   流式細胞儀
2. ● Flow cytometry is a test used on both
   ● 流式細胞儀 是兩者都使用的測試
3. blood samples and bone marrow
   血液樣本和骨髓
4. samples to identify “markers” on the
   樣品來鑑定 “標記” 在
5. cell's surface and may give us targets
   細胞表面並可能為我們提供目標
6. for the use of immunotherapies, like
   用於免疫療法，例如
7. monoclonal antibodies.
   單株抗體。

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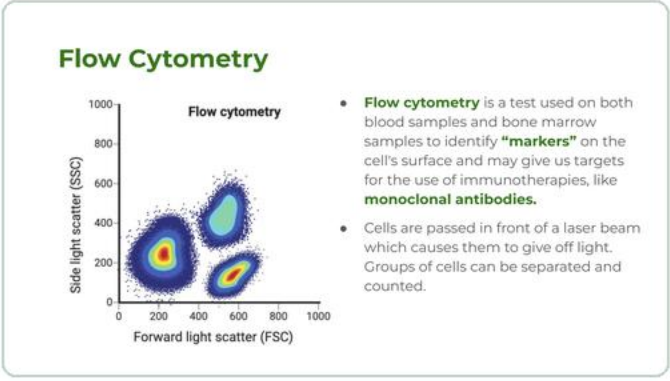
第 26 頁（2/2）/ Page 26



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8 ● Cells are passed in front of a laser beam
● 細胞在雷射光束前通過

9 which causes them to give off light.
這使得它們發光。

10 Groups of cells can be separated and
可以將細胞組分開並

11 counted.
算了。

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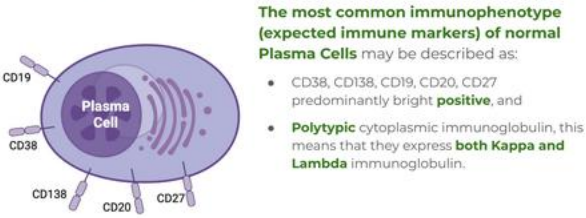

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中英重點對照

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1. Flow Cytometry in a normal plasma cell
   正常漿細胞中的流式細胞儀
2. The most common immunophenotype
   最常見的免疫表型
3. (expected immune markers) of normal
   （預期免疫標記）正常
4. Plasma Cells may be described as:
   漿細胞 可以描述為：
5. ● CD38, CD138, CD19, CD20, CD27
   ● CD38、CD138、CD19、CD20、CD27
6. predominantly bright positive , and
   主要明亮 積極的 ， 和
7. ● Polytypic cytoplasmic immunoglobulin, this
   ● 多型性 細胞質免疫球蛋白，這個

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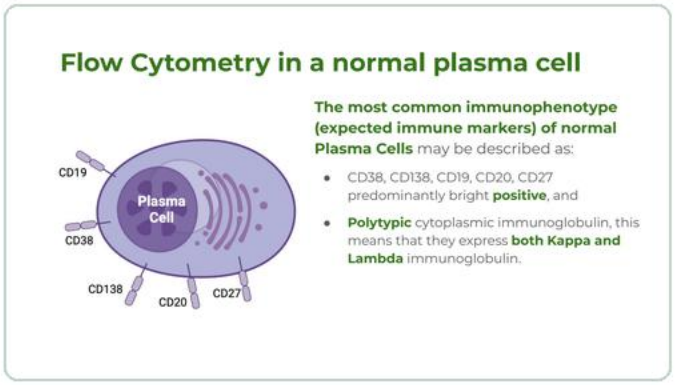

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8 means that they express both Kappa and
意味著他們表達 河童和

9 Lambda immunoglobulin.
拉姆達 免疫球蛋白。

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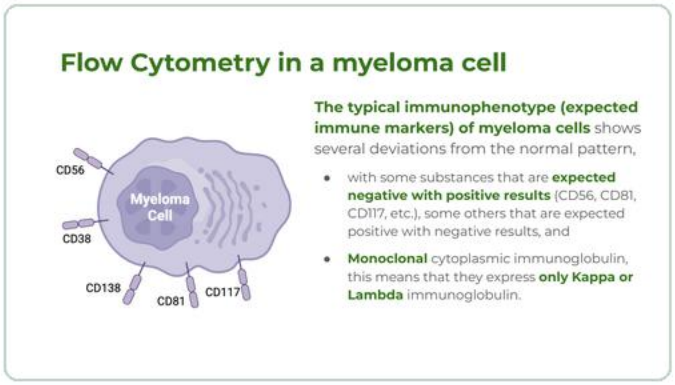

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1 Flow Cytometry in a myeloma cell
骨髓瘤細胞的流式細胞儀

2 The typical immunophenotype (expected
典型的免疫表型（預期

3 immune markers) of myeloma cells shows
骨髓瘤細胞的免疫標記物 節目

4 several deviations from the normal pattern,
與正常模式的一些偏差，

5 ● with some substances that are expected
● 與某些物質 預期的

6 negative with positive results (CD56, CD81,
陰性結果呈陽性（CD56、CD81、

7 CD117, etc.), some others that are expected
CD117等），其他一些預計的

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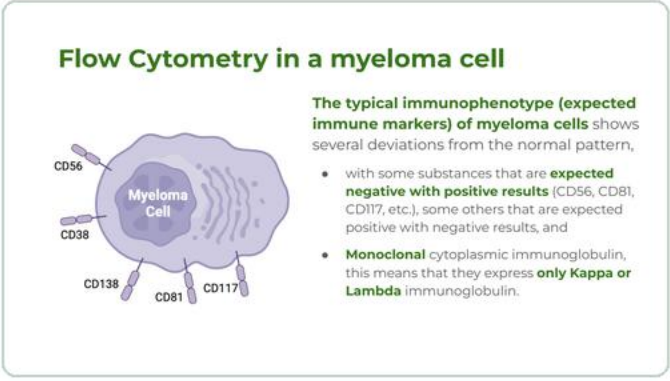
逐頁中英對照

第 28 頁（2/2）/ Page 28



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8 positive with negative results, and
陽性結果為陰性，且

9 ● Monoclonal cytoplasmic immunoglobulin,
● 單複製 細胞質免疫球蛋白，

10 this means that they express only Kappa or
這意味著他們表達 只有河童或

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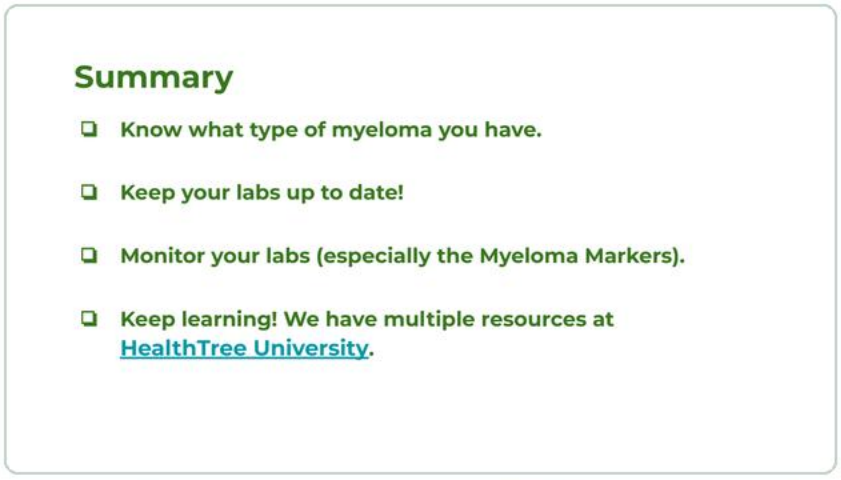

Summary

- Know what type of myeloma you have.
- Keep your labs up to date!
- Monitor your labs (especially the Myeloma Markers).
- Keep learning! We have multiple resources at HealthTree University.

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1. Summary
   概括

2. □ Know what type of myeloma you have. □ Keep your labs up to date!
   □ 了解您患有哪種類型的骨髓瘤。 □ 讓您的實驗室保持最新狀態！

3. □ Monitor your labs (especially the Myeloma Markers).
   □ 監控您的實驗室（尤其是骨髓瘤標記物）。

4. □ Keep learning! We have multiple resources at HealthTree University .
   □ 保持學習！我們擁有多種資源 健康樹大學 。

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逐頁中英對照

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中英重點對照

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1. Thank you!
   謝謝你！

2. If you need assistance, contact our team at:
   如果您需要協助，請透過以下方式聯絡我們的團隊：

3. support@healthtree.org
   support@healthtree.org

4. +1 800-709-1113
   +1 800-709-1113

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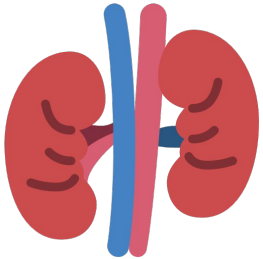
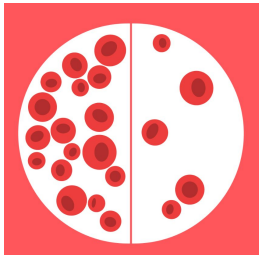
HealthTree Cure Hub
FOR MULTIPLE MYELOMA

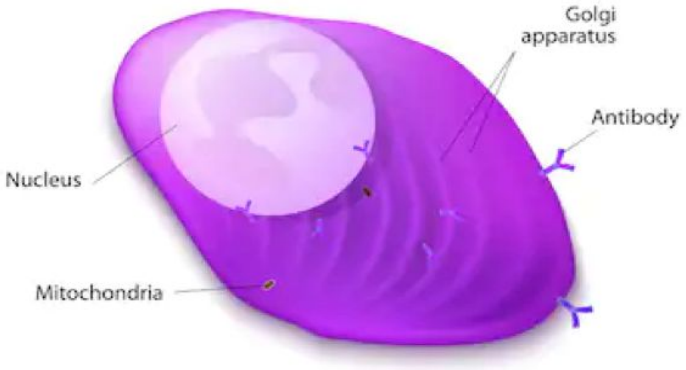
Understanding your Myeloma Labs

By monitoring your labs you can prevent end organ damage and significant disease.

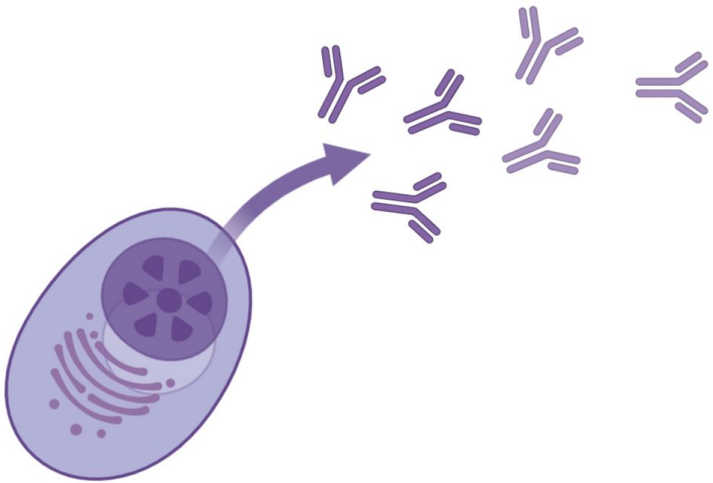




Multiple Myeloma is a type of cancer of plasma cells



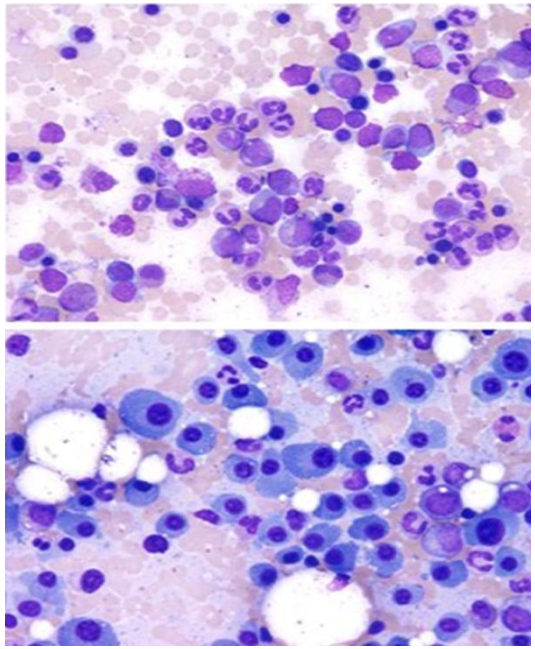
Plasma cells produce proteins called immunoglobulins



- Immunoglobulins are **proteins that attach to foreign substances** entering the body,
  - **Helping fight infections**
- There are many different types and they are specialized for different things.

Multiple Myeloma and Monoclonal Proteins

- Myeloma, secretes abnormal immunoglobulins of only one type that cannot properly fight infections.
- They are called **Monoclonal Proteins**
  - Also called M-protein, M-spike, and other names.
- **Crowding out** the other antibodies and other components of the immune system.
  - Making too much of one type reduces the ability to create a wide spectrum of immunoglobulins to fight infections.
- As Myeloma cells grow, they start **Crowding out the other Blood cells** in the bone marrow.



Top: Normal Bone Marrow;
Bottom: Multiple Myeloma Bone Marrow

MGUS is a precursor of Myeloma

Diagnosed with the following

Serum monoclonal protein **<3 g/dL**
Clonal bone marrow plasma cells **<10%**
Absence of end-organ damage such as hypercalcemia, renal insufficiency, anemia, and bone lesions (**CRAB**) that can be attributed to the plasma cell proliferative disorder

Smoldering Myeloma is another precursor closer to Myeloma

Diagnosed with the following

Serum monoclonal protein **≥3 g/dL**, or urinary monoclonal protein **≥500 mg per 24 h**
Clonal bone marrow plasma cells **10-60%**
Absence of end-organ damage such as hypercalcemia, renal insufficiency, anemia, and bone lesions (**CRAB**) that can be attributed to the plasma cell proliferative disorder, **or amyloidosis**

Multiple Myeloma

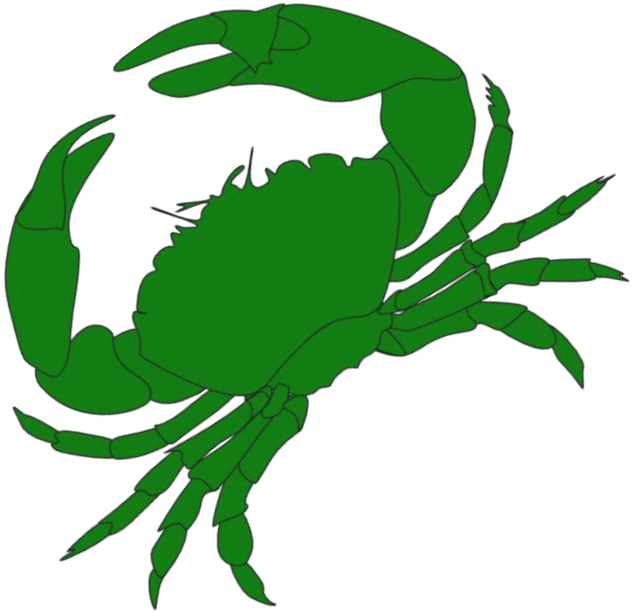
Diagnosed with ≥10% plasma cells, and

Presence of end-organ damage such as hypercalcemia, renal insufficiency, anemia, or bone lesions (**CRAB**) that can be attributed to the plasma cell proliferative disorder

Or any of the following:

- **≥60% plasma cells in the bone marrow**
- **Free light chain (FLC) ratio ≥100 (with involved FLC level ≥100 mg/L)**
- **Extramedullary disease**
- **More than one focal lesion on MRI ≥ 5mm**

CRAB



- **Calcium:** serum calcium >11 mg/dL
- **Renal insufficiency:** creatinine clearance (eGFR) <40 mL per minute or serum creatinine >2 mg/dL
- **Anemia:** hemoglobin value <10 g/dL
- **Bone lesions:** one or more osteolytic lesions on skeletal radiography, computed tomography (CT), or positron emission tomography-CT (PET-CT)

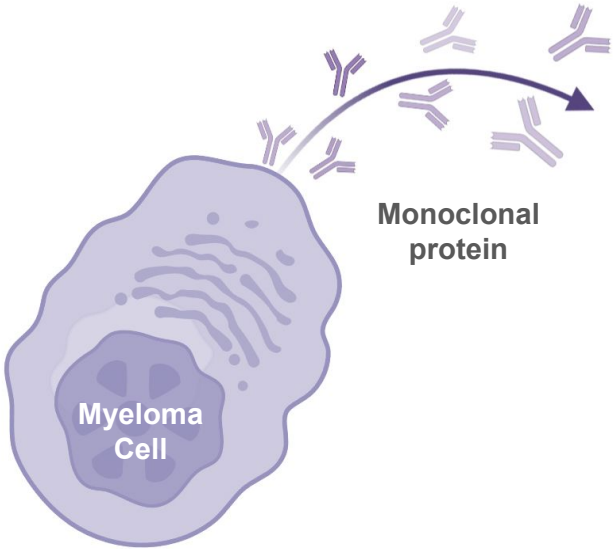
R-ISS Myeloma Staging

- **Measured only at the time of diagnosis of active Multiple Myeloma**
- The experts already knew that **high levels of Beta 2 microglobulin** and **low albumin** levels were indicators of higher risk myeloma. This staging system was updated as myeloma researchers learned more about **high-risk genetic features** and high levels of **LDH**.
- The Revised International Staging System was last updated in **2015**.

Stage I	• Serum albumin ≥3.5 g/dL, • Serum beta-2-microglobulin <3.5 mg/L, • No high-risk cytogenetics, and • Normal serum lactate dehydrogenase level
Stage II	• Not fitting Stage I or III
Stage III	• Serum beta-2-microglobulin >5.5 mg/L, and • High-risk cytogenetics [**t(4;14), t(14;16), or del(17p)**] or elevated serum lactate dehydrogenase level

This staging system is only a **guide** for your doctor on how to treat your myeloma, and does not fully predict the evolution of the disease.

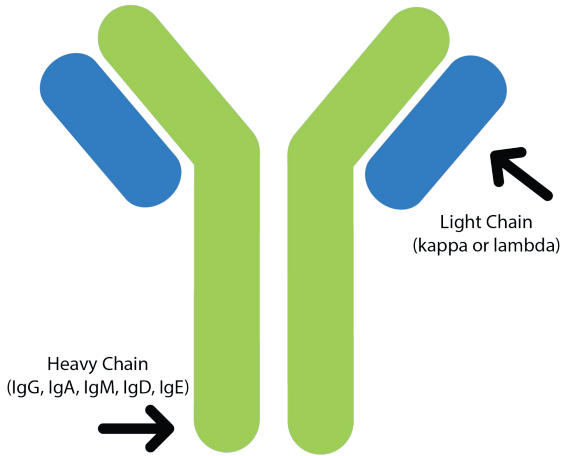
M-Spike Tests



- **Serum/Urine Protein Electrophoresis** (SPEP/UPEP) are tests used to find and quantify abnormal proteins.
    - The abnormal protein produced by the Myeloma, is known by several different names, including **Monoclonal Immunoglobulin, M protein, M spike, paraprotein, and others**.
- **Immunofixation** shows the exact type of the antibody that is abnormal.
- **A normal result** = 0 g/dL or negative.

When treated with a monoclonal antibody, like Darzalex, this antibody will be shown in the electrophoresis and Immunofixation studies as a little M spike.

Free Light Chains



- This test measures the free light chains, **Kappa and Lambda**
- It is important to know your **myeloma subtype** in order to monitor the relevant light chain.

- **Kappa reference values:** 3.3 to 19.4 mg/L
- **Lambda reference values:** 5.71 to 26.3 mg/L

Reference values may vary from lab to lab

About 25% of myeloma patients will have NEGATIVE SPEP (no M-Spike), but will have a POSITIVE light chain.

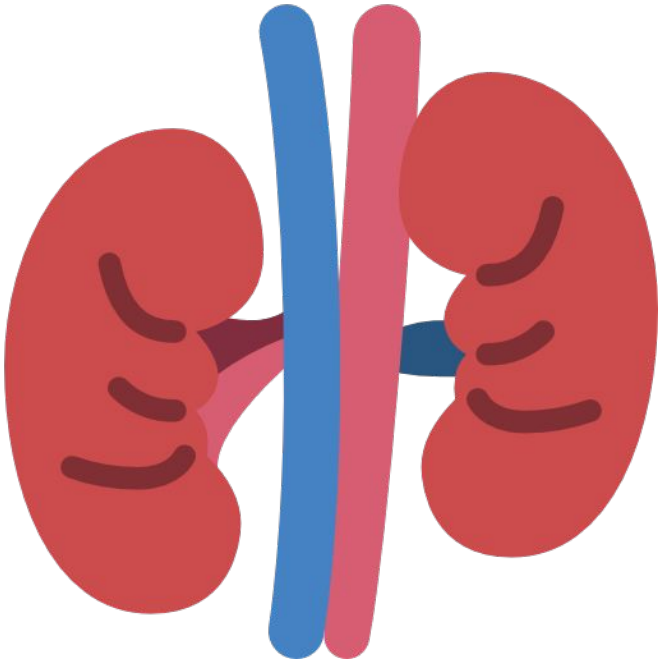
Free Light Chains in the blood can help detect an early progression or relapse.

Light Chain Ratio (in Multiple myeloma)

- **The Ratio** is the balance between the kappa and lambda light chains.
- **With a normal creatinine** (< 2 mg / dL): reference values are 0.26 – 1.65.
- **With a elevated creatinine** (≥ 2 mg / dL): reference values are 0.37 – 3.1.

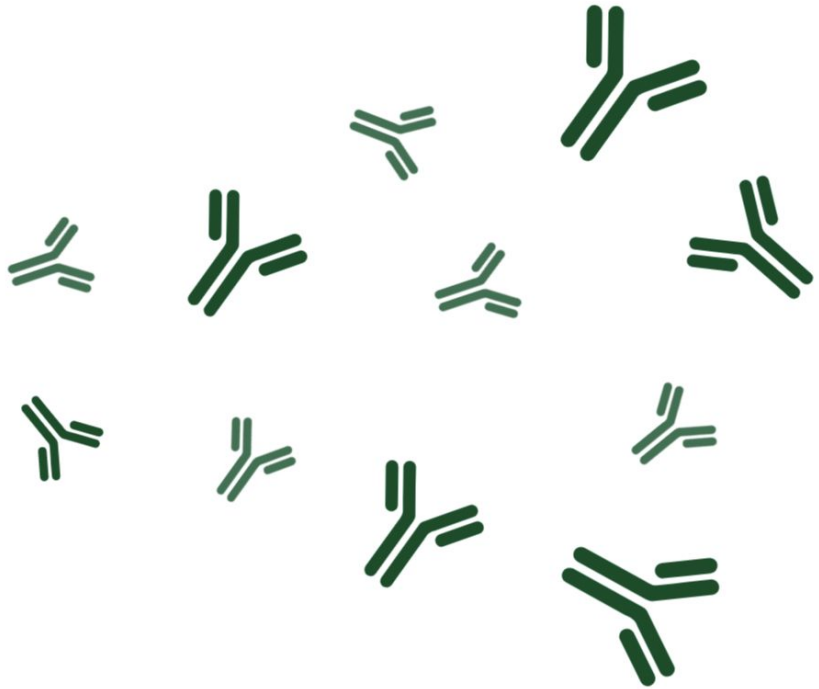
Reference values may vary from lab to lab

Light Chain Ratio (in Multiple myeloma)



- If Kappa/Lambda Ratio is **above 8** or **less than 0.125** it is considered a significant **abnormality** that needs to be investigated.
- People who have **kidney problems** often have **higher levels** of light chains at baseline.

Immunoglobulins (Heavy chains)



Immunoglobulin A		
	68 - 378	mg/dl
Immunoglobulin G		
	768 - 1632	mg/dl
Immunoglobulin M		
	60 - 263	mg/dl
Immunoglobulin D		
	< or = 10	mg/dl
Immunoglobulin E		
	< or = 214	mg/dl

Reference values may vary from lab to lab

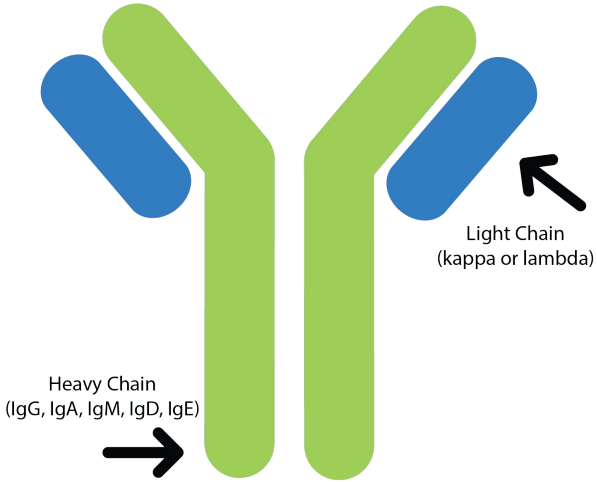
The myeloma subtype

Defined by the M-Spike immunofixation, and the highest results in the free light chain and immunoglobulins testing, composed like this:

Heavy chain (if any) + Light chain + Phase

Examples:

- IgG Kappa MGUS
- Kappa light chain only Smoldering Myeloma
- IgA Lambda Multiple Myeloma



Complete Blood Count

Because multiple myeloma crowds out bone marrow, it can cause several kinds of blood deficiencies such as :

Anemia, a shortage of red blood cells shown on the **Hemoglobin**,

Thrombocytopenia, a shortage of blood **Platelets**,

Leukopenia, a shortage of **White Blood Cells** (leukocytes),

- Neutropenia, a shortage of **Neutrophils**, and
- Lymphopenia, a shortage of **Lymphocytes**.

White Blood Cell count (WBC)		Hemoglobin (HGB)	
3.2 - 10.6	k/ul	12.1 - 15.9	g/dl
Platelets		**Lymphocyte Absolute Count**	
150 - 440	k/ul	0.8 - 3.1	k/ul
Absolute Neutrophils Count (ANC)			
1.3 - 7	k/ul		

Reference values may vary from lab to lab

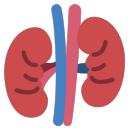
Comprehensive Metabolic Panel

Chemistry panels are run regularly during and after treatment to check your body's normal functions.

Albumin. One of the most abundant proteins in humans. Diminished by the monoclonal proteins.

High **Calcium**. Caused by bone destruction done by MM,

- It may result in severe constipation and loss of appetite, weakness, drowsiness, and confusion.

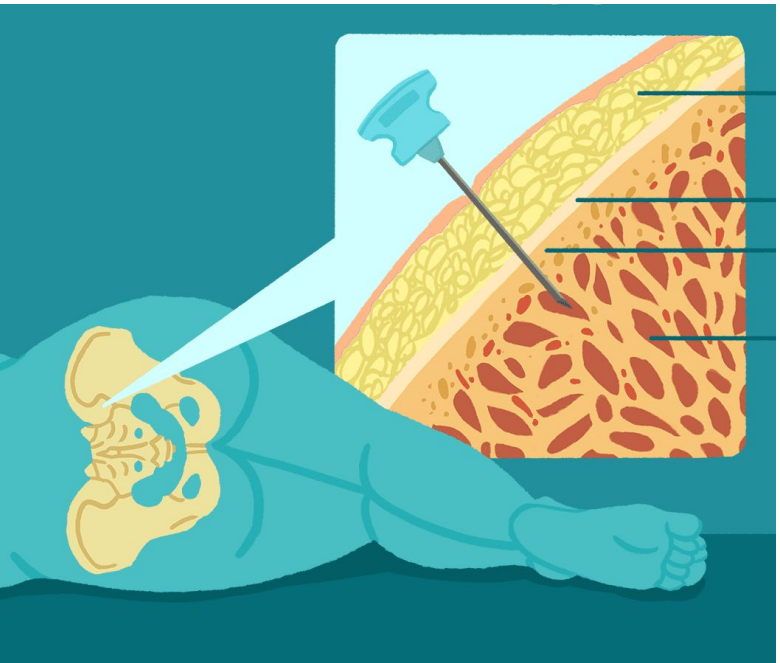


Elevated **Serum Creatinine** or Low **eGFR** may indicate poor hydration or possible kidney damage.

Reference values may vary from lab to lab

Albumin		Calcium	
3.5 - 4.7	g/dl	8.4 - 10.2	mg/dl
Creatinine (Serum/Blood)		eGFR (Estimated glomerular filtration rate) / Creatinine Clearance	
0.52 - 1.08	mg/dl	>60	ml/min
Glucose			
64 - 128	mg/dl		

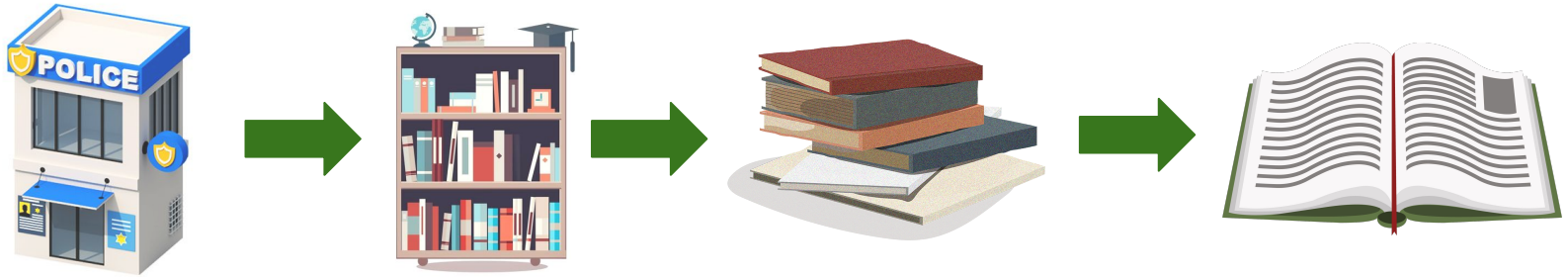
Plasma Cell Percentage



- The percentage in the bone marrow core biopsy will be a major determinant of the classification of the type of disorder.
  - **Normal** = <5%
  - **MGUS** = <10% + Absence of end-organ damage
  - **Smoldering myeloma** = 10-60% + Absence of end-organ damage
  - **Multiple myeloma** = >10% + Evidence of end-organ damage, or ≥60%
- Stains may be performed to highlight the different cell types present (IHC or **Immunohistochemistry**).
  - **CD138** is an antibody stain that marks plasma cells and aids in enumeration.

Bone marrow genetics tests

Plasma cell | **Nucleus** | **Chromosomes** | **DNA**



Flow cytometry MRD (FC or NGS)

FISH/Cytogenetics

NGS/Microarray(SNP)

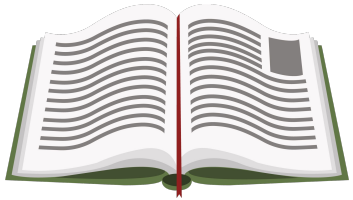
- A Plasma cell is like a police department,
- it will have a nucleus/bookshelf with all the rulebooks/chromosomes of how the department should behave, we have 46 chromosomes in each cell, and
- the rules written inside them are the DNA.

Bone marrow genetics tests

Chromosomes

FISH/Cytogenetics

DNA



NGS/Microarray(SNP)

- A **Myeloma cell** is a police department that is not working well.
- The **rulebooks or rules may have mistakes** or mutations,
  - there may be rules or parts of books missing duplicated, or with other kinds of aberrant changes.
- These **mutations** may vary from cell to cell and from person to person, and might change over time.
- And they may **help or hinder** the progression of the myeloma.

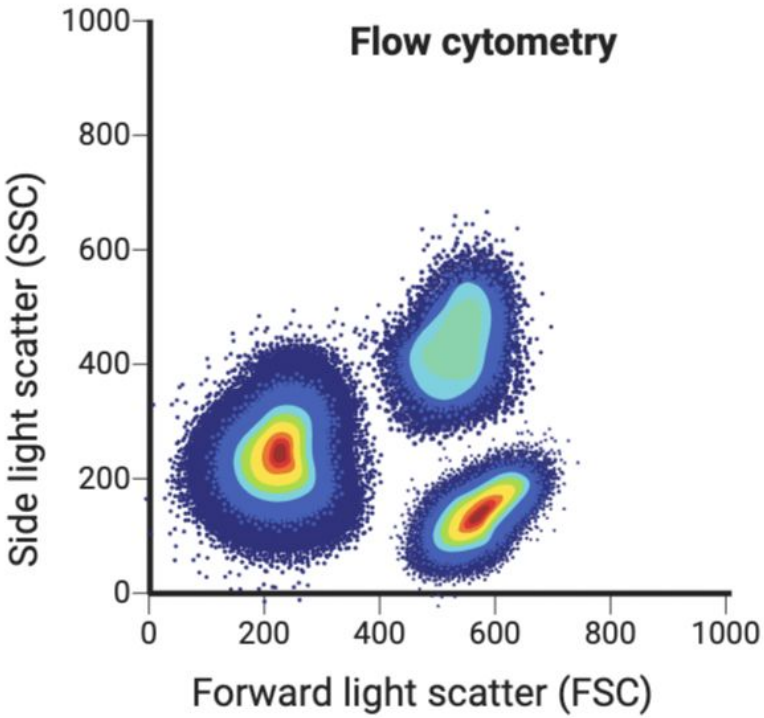
Mayo clinic genetic risk stratification for multiple myeloma (mSMART)

- **Used only in active Multiple Myeloma**
- It was designed for physicians external to Mayo.
- And helps to classify the most common genetic features that can occur in myeloma cells.
- Last updated in **2018**.

Standard Risk	**Trisomies**, **t(11;14)** and **t(6;14).**	
	75% of newly diagnosed patients.	
High risk	**Del(17p)**, **t(4;14)**, **t(14;16)**, **t(14;20)**, **Amplification 1q** (4 or more copies), **p53 mutation**, **R-ISS Stage III**, High-risk signature by GEP, or High Plasma Cell S-phase.	
	25% of newly diagnosed patients.	
	One hit	Only one high-risk factor
	Double hit	Two high-risk factors
	Triple Hit	Three or more high-risk factors

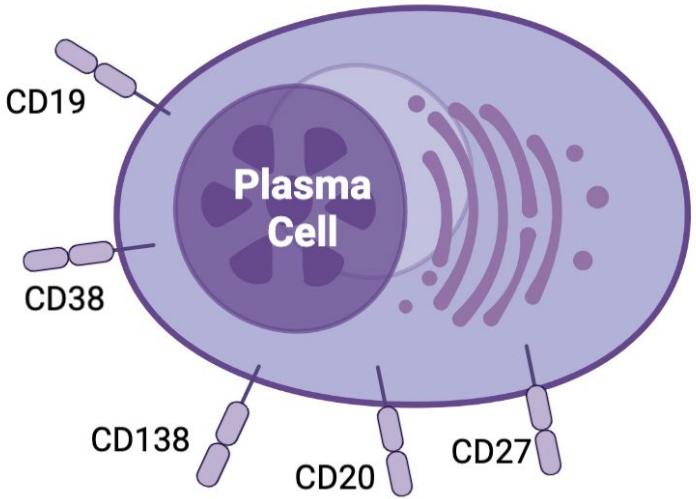
This staging system is only a **guide** for your doctor on how to treat your myeloma, and does not fully predict the evolution of the disease.

Flow Cytometry



- **Flow cytometry** is a test used on both blood samples and bone marrow samples to identify **“markers”** on the cell's surface and may give us targets for the use of immunotherapies, like **monoclonal antibodies.**
- Cells are passed in front of a laser beam which causes them to give off light. Groups of cells can be separated and counted.

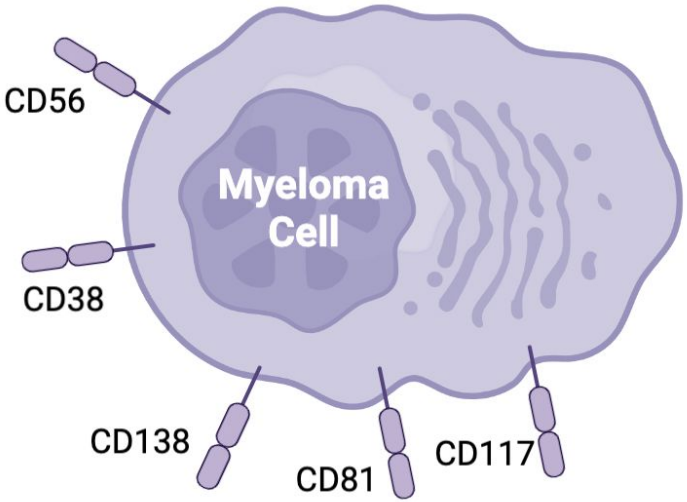
Flow Cytometry in a normal plasma cell



The most common immunophenotype (expected immune markers) of normal Plasma Cells may be described as:

- CD38, CD138, CD19, CD20, CD27 predominantly bright **positive**, and
- **Polytypic** cytoplasmic immunoglobulin, this means that they express **both Kappa and Lambda** immunoglobulin.

Flow Cytometry in a myeloma cell



The typical immunophenotype (expected immune markers) of myeloma cells shows several deviations from the normal pattern,

- with some substances that are **expected negative with positive results** (CD56, CD81, CD117, etc.), some others that are expected positive with negative results, and
- **Monoclonal** cytoplasmic immunoglobulin, this means that they express **only Kappa or Lambda** immunoglobulin.

Summary

- ❑ Know what type of myeloma you have.
- ❑ Keep your labs up to date!
- ❑ Monitor your labs (especially the Myeloma Markers).
- ❑ Keep learning! We have multiple resources at HealthTree University.

Thank you!

If you need assistance, contact our team at:

support@healthtree.org

+1 800-709-1113

HealthTree Cure Hub
FOR MULTIPLE MYELOMA

AI 輔助翻譯與醫療參考提醒

認識檢驗數據：簡明版中英對照

閱讀後再次提醒

本 PDF 由 AI 協助翻譯、整理與重排，目的是協助病友與家屬對照英文原文，理解多發性骨髓瘤相關檢驗資訊。

本資料僅供一般資訊參考，不能取代醫師診斷、治療建議、用藥調整或個別化醫療判斷。

不同醫院、不同實驗室的檢驗方法與參考區間可能不同；若檢驗數值偏高、偏低或有疑問，請以您的主治醫師說明為準。

感謝您閱讀。本資料適合帶著問題與醫療團隊討論；請勿只依據本 PDF 自行判斷病情或調整治療。

資料來源：Simplified Version of Understanding Your Labs；本頁為繁體中文 AI 輔助翻譯與閱讀版重排。

網站：https://healthtreetw.org/posts/know-04/