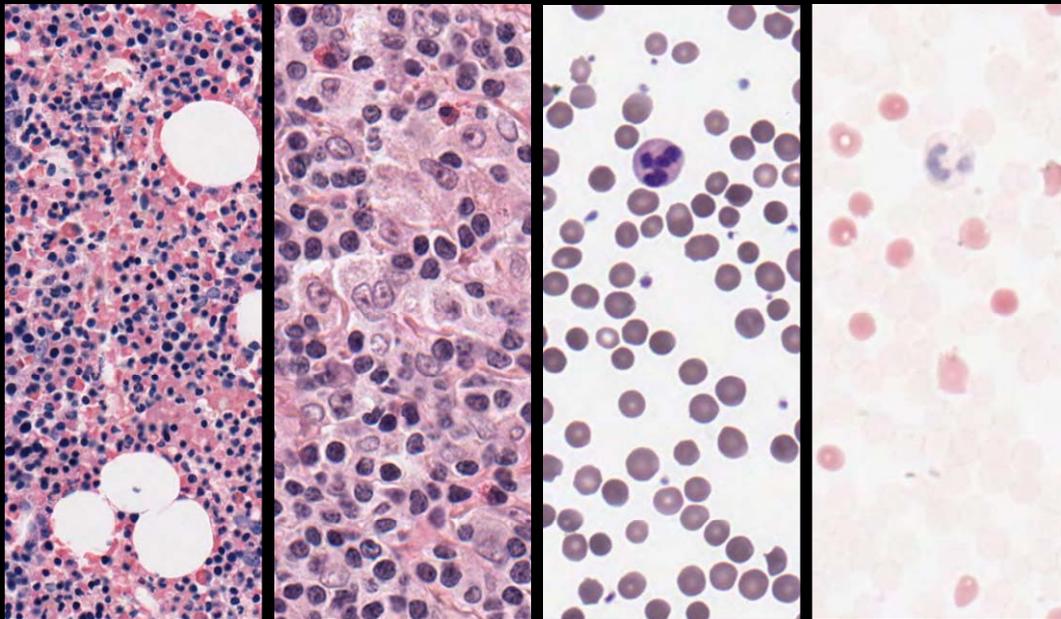




# Teaching Cases in **Hematology:** A Virtual Slide Atlas



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2009



**pathology**  
laboratory medicine  
UNIVERSITY OF BRITISH COLUMBIA



Welcome to the Hematopathology Case-Based Atlas.

The Atlas is a collection of classic hematology cases, representing both adult and pediatric conditions. Each case in the Atlas consists of a concise patient history, corresponding CBC findings and other pertinent laboratory data, as well as digitized slide(s) of peripheral blood smears, bone marrow aspirates/biopsies, lymph node biopsies, and/or other relevant histological tissues. The slides are annotated to highlight important diagnostic features, although we encourage you to review the slides with the annotations turned "off" (which is our default setting) just as if you were reviewing these slides in the clinical laboratory.

For each case, please first review the case history and CBC findings, and then view the slides. The "Instructions for Viewing Slides", on the next pages, explain how to look at the digital slides, and how to access the slide annotations. After you have made your own morphological diagnosis for each case, you will be able to review the correct diagnosis and a brief description of each disorder.

The majority of the cases are from the teaching files of the BC Children's Hospital Division of Hematopathology. We would like to thank our patients and our colleagues for making these cases available to us. In particular, we would like to extend our sincere gratitude to Dr. Bonnie Massing, an expert hematopathologist and a great teacher.

If you have any questions or comments about this Atlas, please let us know at [jford@cw.bc.ca](mailto:jford@cw.bc.ca)

Jason Ford  
Sophia Wong  
Summer 2009

## Instructions for Viewing Slides

The slides are best viewed with Aperio's **ImageScope** software, which is available as a free download from [www.aperio.com](http://www.aperio.com). You may also review the slides using the web-based viewer, but the annotations are not available in this mode.

**Note:** If a logon screen pops up use:

**Username:** dhplc

**Password:** hardwick

### To View Slides:

You can click on the link to open the web-based slide viewer (under the No Annotations heading). *To then view the slide in ImageScope, click on "View in ImageScope". This link is found on the top right corner of the web-based viewer. However this link does not have annotations.*

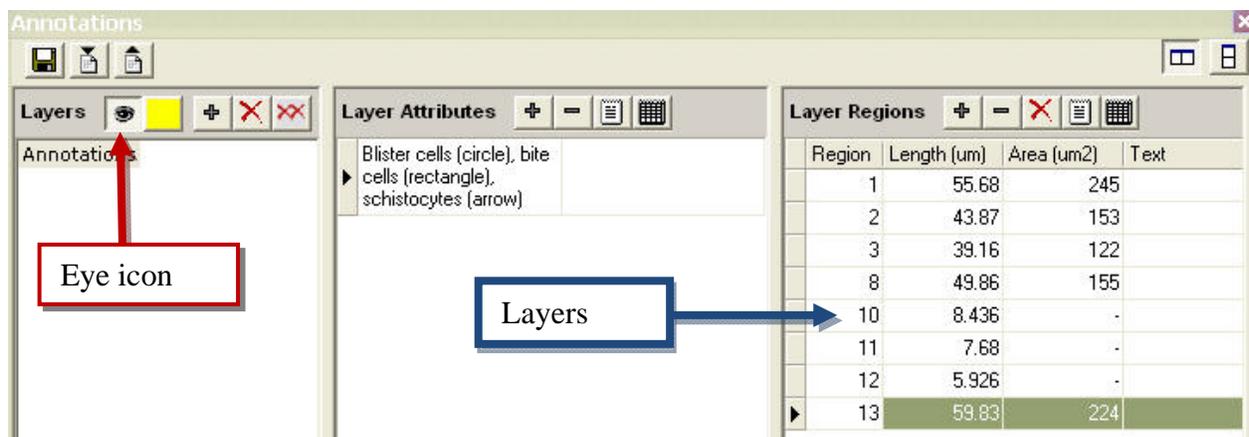
### To View Annotations in ImageScope:

To view the annotations you need ImageScope, and then you can click on the link(s) under "Annotated Slides."

1. When the slide opens there are no annotations marked at all. This is a great place to start viewing the slide.
2. If you are having trouble locating abnormalities, you can go to "View" and click on "Annotations," or find this icon on the toolbar and click on it:



3. A box should open up that looks similar to the following:



- A. **Layers** lets you go to areas of interest without any markings present. Click on any region to go to that part of the slide. It will automatically zoom to an appropriate magnification.
- B. Once you click on the **eye icon** the marking will show up in all views. The **layer attributes** lets you know what is marked.



## Hemepath Case 1: 5-Year-Old Boy

### HISTORY

A 5-year-old boy presents with exquisitely painful fingers and toes. The family emigrated from West Africa 6 months ago.

### CBC

Hgb (g/L)	Low
MCV	N
Reticulocyte Count	High
WBC	N
Plt	N

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## Hemepath Case 2: 3-Year-Old Girl

### HISTORY

A 3-year-old girl, who had an upper respiratory tract infection 2 weeks ago, is noted to have purple, pinpoint hemorrhages in her buccal mucosa and several bruises on her legs. She has experienced 4 episodes of nosebleeds in the last week.

On physical exam, the spleen and liver are both non-palpable. No lymphadenopathy is noted.

### CBC

Hgb (g/L)	N
MCV	N
WBC	N
Plt	Low

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## Hemepath Case 3: 5-Year-Old Boy

### HISTORY

A 5-year-old Caucasian boy is brought in by his mother, who notes that her son has appeared quite pale in the last week. He is constantly tired and takes several naps a day, and complains that he can no longer play tag with his friends because he “can’t breathe” when he runs.

Physical exam reveals a diffuse petechial rash and several large bruises over his trunk and extremities. A liver edge is palpated 2.5 cm below the costal margin. The spleen is also palpable.

### CBC

Hgb (g/L)	Low
MCV	N
Reticulocyte Count	Low
WBC	High
Plt	Low

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## Hemepath Case 4: 11-Year-Old Boy

### HISTORY

An 11-year-old boy visits his family physician because of a sprained ankle. The physician, noting the boy to be thin and pale, conducts a full physical exam. The patient's spleen is grossly enlarged (palpable 8 cm below the costal margin) and firm, but non-tender. Lymph nodes are non-palpable.

Upon further questioning, the boy admits that he has felt weak for the past few months, and needs much more sleep than before. He also remarks that his gums frequently bleed when he brushes his teeth.

### CBC

Hgb (g/L)	Low
MCV	N
WBC	High
Plt	High

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## Hemepath Case 5: 67-Year-Old Male

### HISTORY

A 67-year-old man presents with a diffuse scaly erythematous rash throughout his entire body, including his palms and soles. The rash is extremely itchy. He has had several red, scaly patches on his left buttock and his right axilla for the past 5 years, which were pruritic at times. The patient assumed these skin lesions to be related to eczema, and thus never sought medical attention.

On physical exam, multiple large, hard, non-mobile lymph nodes are palpated in the cervical, axillary, and groin regions. The patient is noted to be shivering during the entire exam.

### CBC

Hgb (g/L)	N
MCV	N
WBC	High
Plt	N

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## Hemepath Case 6: 15-Year-Old Girl

### HISTORY

A 15-year-old girl visits her family physician for an annual physical exam and a CBC is ordered.

The girl returns for a follow-up because of the CBC results (see below). Upon focused questioning, the patient notes that her menses have always been heavy (8-9 days per cycle). She also remembers bleeding profusely when a tooth was extracted at the dentist's office. The girl says that this amount of bleeding from dental visits is common in her family – both her mom and her uncle have similar complaints.

### CBC

Hgb (g/L)	N
MCV	N
WBC	N
Plt	Low

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## Hemepath Case 7: 7-Year-Old Boy

### HISTORY

A 7-year-old boy presents with a large abdominal mass and a 4-day history of fatigue and weakness. Past medical history is unremarkable.

Physical exam reveals a large, non-tender mass in the lower abdomen, hepatosplenomegaly, and multiple swollen, non-tender lymph nodes in the submandibular and cervical regions. Peripheral blood and bone marrow are studied.

### CBC

Hgb (g/L)	Low
MCV	N
Reticulocyte Count	Low
WBC	High
Plt	Low

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## Hemepath Case 8: 3-Year-Old Girl

### HISTORY

A 3-year-old girl is brought in by her mother, having become increasingly drowsy and lethargic over the past week. The child has experienced chills, a mild cough, and a high fever of 40°C that has waxed and waned for the entire week. She also refuses to eat, and has vomited twice. The symptoms began approximately 2 weeks after the family returned from a vacation to Nepal. On the last day of their trip, their son pointed out that there was a hole in their mosquito net.

### CBC

Hgb (g/L)	Low
MCV	N
Reticulocyte Count	High
WBC	Low
Plt	Low

### View Slides

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## Hemepath Case 9: 4-Year-Old Boy

### HISTORY

A 4-year-old boy is brought in by his father. The child has eaten clay from the playground on several occasions and demands “only ice” during dinners. As well, the boy is still unable to speak in sentences and expresses no interest when his parents read simple story books to him. There has been no blood observed in the stools or urine, and the boy has not had any episodes of vomiting. A dietary history reveals that the entire family is lacto-vegetarian and the child has never consumed any meat; additionally, the boy loves cow’s milk and drinks up to 6 large glasses per day.

On physical examination, the child appears pale and is noted to use his accessory muscles for respiration, even at rest. His tongue is red, shiny, and smooth, and the corners of his mouth are red and macerated. His fingernails are curved upwards, resembling a spoon. On cardiac exam, the boy’s HR is 140 bpm and auscultation reveals a systolic ejection murmur at the upper left sternal border.

### CBC

Hgb (g/L)	Low
MCV	Low
RDW	High
Reticulocyte Count	Low
WBC	N
Plt	High

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## Hemepath Case 10: 2-Month-Old Girl

### HISTORY

A 2-month-old girl is brought in by her mother. The baby has been lethargic, irritable, and has not gained adequate weight. There is no history of illnesses or any episodes of fever, diarrhea, or vomiting. The girl was the product of a healthy pregnancy and full-term home delivery; however, an atrial septal defect was diagnosed at birth.

On physical exam, the patient appears pale and listless. She is noted to have wide-spaced eyes, a short, upturned nose, and a thick upper lip. Both thumbs are subluxed.

### CBC

Hgb (g/L)	Low
MCV	High
Reticulocyte Count	Markedly reduced
WBC	N
Plt	N

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## Hemepath Case 11: 5-Year-Old Boy

### HISTORY

A 5-year-old boy presents with dark urine after walking home from kindergarten with his mother on a cold, snowy day. The child experienced diarrhea and vomiting 3 weeks ago, and was diagnosed with a GI viral infection. Since then, he has complained of feeling "full all the time", and experiences occasional abdominal discomfort. His mother also notices that he rarely plays with his siblings, but instead, takes naps on the couch. The child has always been very energetic in the past.

Physical exam reveals a pale-looking boy with an enlarged spleen palpable 3-4 cm below the left costal margin.

### CBC

Hgb (g/L)	Low
MCV	N
Reticulocyte Count	High
WBC	N
Plt	N

### OTHER LABORATORY FINDINGS

Urine dipstick for blood	(+)
LDH	High
Direct Coombs Test	(+) complement only
Biphasic Donath-Landsteiner Test	(+)

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## Hemepath Case 12: Newborn Male

### HISTORY

A newborn male, of African descent on his father's side (mother is Caucasian), is severely jaundiced. The pregnancy and delivery were unremarkable. Family history reveals that the father has G6PD deficiency and hereditary elliptocytosis.

The baby is now 2-day-old with a very high bilirubin level.

### CBC

Hgb (g/L)	Low
MCV	Low
RDW	High
Reticulocyte Count	High
WBC	N
Plt	N

### View Slides

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## Hemepath Case 13: 4-Month-Old Girl

### HISTORY

A 4-month-old baby girl of Mediterranean descent is brought in by her father as she appears pale and has not been gaining weight. The child also has a “lump” in her upper left abdomen.

On physical examination, the girl is noted to be lethargic. Her skin is pale and her sclera has a tinge of yellow. The zygomatic bones are disproportionately larger than the rest of her facial bones. The spleen is palpable 5 cm below the left costal margin.

### CBC

Hgb (g/L)	Low
MCV	Low
RBC count	High
Reticulocyte Count	High
WBC	N
Plt	N

### OTHER LABORATORY FINDINGS

HbA <sub>2</sub>	Increased
HbF	Increased

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## Hemepath Case 14: 7-Year-Old Girl

### HISTORY

A 7-year-old girl presents with an upper respiratory tract infection. Her mother is concerned that the girl's eyes have turned "yellow". This has happened before several times, and always occurred when the girl was sick with a viral infection. The mother also comments that her child is paler than the rest of the family members, and tires easily when playing outdoors. Birth history is unremarkable except for neonatal jaundice that lasted for 1 week. Family history reveals that the family migrated from Norway 5 years ago, and the father had a splenectomy in his 20s.

Splenomegaly is noted on physical examination.

### CBC

Hgb (g/L)	Low
MCV	N
MCHC	High
Reticulocyte Count	High
RDW	High
WBC	N
Plt	N

### OTHER LABORATORY FINDINGS

Osmotic Fragility Test	Increased fragility
Flow for Eosin-5-maleimide	Reduced fluorescence

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## Hemepath Case 15: 22-Year-Old Male

### HISTORY

A 22-year-old African-Canadian male presents with a 3-day history of extreme fatigue and weakness, and “cola”-colored urine. His girlfriend comments that his skin and eyes have also become increasingly yellow.

The patient has always been in good health, apart from severe acne for which he started taking sulfacetamide 5 or 6 days ago. He remarks that his brother had similar symptoms while preparing for a trip to Haiti.

### CBC

Hgb (g/L)	Low
MCV	N
Reticulocyte Count	High
WBC	N
Plt	N

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## Hemepath Case 16: 7-Month-Old Boy

### HISTORY

A 7-month-old baby boy of Italian ancestry is brought in by his mother as he is not gaining adequate weight. Also, he is not rolling over on his own yet, and does not seem able to support his own head very well.

On physical exam, both liver and spleen are noted to be enlarged. Cardiac exam reveals moderate pedal edema and a systolic ejection murmur.

### CBC

Hgb (g/L)	Low
MCV	High
Reticulocyte Count	N
WBC	N
Plt	N

### OTHER LABORATORY FINDINGS

Serum Fe	High
Serum Ferritin	High
Serum Bilirubin	Mild increase
Ham's Test	(+)
Sucrose Lysis Test	(-)

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## Hemepath Case 17: 5-Year-Old Boy

### HISTORY

A 5-year-old Chinese-Canadian boy presents with recurring abdominal pain localized to the right upper quadrant. The discomfort is not associated with meals. Past medical history is unremarkable except that the boy's skin and sclera have "always" been slightly jaundiced.

Physical exam reveals a mildly jaundiced boy in no apparent distress. On abdominal exam, an enlarged, firm, non-tender spleen is palpated 7 cm below the left costal margin. A positive Murphy's sign is also elicited.

### CBC

Hgb (g/L)	Low
MCV	N
Reticulocyte Count	Very high
WBC	N
Plt	N

### OTHER LABORATORY FINDINGS

Osmotic Fragility Test	N
Coombs Test	(-)

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## Hemepath Case 18: 13-Year-Old Girl

### HISTORY

A 13-year-old girl presents with jaundice, marked hepatosplenomegaly, and prominent frontal bossing. Both parents are immigrants from Thailand.

### CBC

Hgb (g/L)	Low
MCV	Low
Reticulocyte Count	High
WBC	N
Plt	N

### OTHER LABORATORY FINDINGS

Bilirubin	High
Serum Fe	N
Serum Ferritin	N

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## Hemepath Case 19: 63-Year-Old Female

### HISTORY

A 63-year-old female presents with fatigue and “reduced energy” for two weeks. She complains of being out of breath from taking a stroll in the park, and notices that her heart races when she watches TV.

On physical exam, the patient appears pale and has a fever of 38.5°C. Her gingivae are swollen and hemorrhagic, and a petechial rash is noted on her left arm. Both liver and spleen are found to be enlarged.

### CBC

Hgb (g/L)	Low
MCV	N
Reticulocyte Count	Low
WBC	High
Plt	Low

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## Hemepath Case 20: 3-Year-Old Girl

### HISTORY

A 3-year-old girl who recently emigrated from Puerto Rico is brought in by her mother over concerns that the child is not gaining adequate weight. She is always tired, and sleeps through most of the day. The girl is not a picky eater and enjoys foods from all food groups. However, she is known to have tropical sprue and has only begun receiving treatment recently.

On physical examination, the girl appears tired, quite thin, and slightly jaundiced. The corners of her mouth are red and cracked, and her tongue is very red and swollen. Mild bruising is observed on her lower legs. No lymphadenopathy is noted. Findings from the neurological examination are normal.

### CBC

Hgb (g/L)	Low
MCV	High
Reticulocyte Count	Low
WBC	Low
Plt	Low

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## Hemepath Case 21: 9-Year-Old Boy

### HISTORY

A 9-year-old boy of Ashkenazi Jewish ancestry complains of pain in his left arm. There has been no history of trauma or injury.

For the past year, the patient has been taking increasingly longer naps in the afternoons as he always feels tired. He has stopped playing sports with his friends as he feels out of breath when he runs. About 8 months ago, he began having regular nosebleeds (about 1 episode per month) and acquires frequent bruises on his legs, although he doesn't remember injuring himself.

On physical examination, the patient appears pale and listless. Localized tenderness and swelling are noted on his left forearm, and he winces with pain during gentle palpation. There is no skin breakage. Additionally, several ecchymoses are noted on the anterior part of his shins bilaterally. The spleen is found to be severely enlarged, with the tip protruding into the pelvic cavity.

### CBC

Hgb (g/L)	Low
MCV	N
Reticulocyte Count	N
WBC	Low
Plt	Low

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## Hemepath Case 22: 1-Year-Old Boy

### HISTORY

A 1-year-old boy is brought in by his mother. He has not gained adequate weight and is noticeably shorter than the other children of his age. He also does not respond when his name is called, and still has not spoken his first words. Over the past few months, she has noticed a “hump” in his lower back which has gradually increased in size. She also remarks that his facial features seem to be changing and he no longer resembles his parents. The boy was born with an umbilical hernia and has had chronic rhinitis “his entire life”. He also had an ear infection 3 months ago.

On physical examination, the boy is noted to have a prominent forehead, large eyes with marked corneal clouding, a flattened nasal bridge, and a large tongue. He is unresponsive to both auditory and visual stimuli. The rest of the exam reveals hepatosplenomegaly and mild deformation of the lower spine and pelvis.

### CBC

Hgb (g/L)	N
MCV	N
WBC	N
Plt	Low

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## Hemepath Case 23: 52-Year-Old Male

### HISTORY

A 52-year-old male presents with a gradual onset of fatigue and abdominal discomfort. He has lost 3 kg in the past month and complains of drenching night sweats, approximately 1-2 episodes per week. He has a persistent mild fever and gets sick very easily, although he was previously in good health. Whenever he eats, he feels full after only a few bites.

Physical examination reveals a pale, tired man with mild tachycardia. Massive enlargement of the spleen, with the tip palpable in the pelvis, is noted. The liver is firm and palpated 7 cm below the right costal margin. No lymphadenopathy is found.

### CBC

Hgb (g/L)	Mildly low
MCV	N
Reticulocyte Count	Low
WBC	N

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## Hemepath Case 24: 33-Year-Old Female

### HISTORY

A 33-year-old female pregnant with her first child (26 weeks 2 days gestation) notices decreased movements from her fetus over the past few days. This morning, her uterus felt slightly tender. The fetal heart strip shows a sinusoidal pattern. A Kleihauer test is performed.

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## Hemepath Case 25: 60-Year-Old Male

### HISTORY

A 60-year-old male complains of frequent episodes of headache and dizziness that are gradually worsening in severity. Three months prior he stopped playing golf with his friends as he became increasingly dyspneic from walking, and his vision often became blurred.

On physical examination, the patient's body appears quite erythematous, and his face is noted to be red and swollen. Fundoscopy reveals plethora of the retinal veins. His spleen is firm, non-tender, and palpable 6 cm below the left costal margin. Several bruises are observed on his lower legs.

### CBC

Hgb (g/L)	High
RBC	High
MCV	Low
WBC	High
Plt	High

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## Hemepath Case 26: 3-Year-Old Boy

### HISTORY

A 3-year-old boy is brought in by his mother. He started complaining about pain in his left hip a week ago, and developed a limp over the past few days. This morning, he can no longer walk and is having difficulty standing. The mother also notices a bruise around his left eye although there is no history of trauma.

On physical examination, the child appears ill and thin. A hard mass is palpated in his abdomen.

### CBC

Hgb (g/L)	Low
MCV	N
Reticulocyte Count	Low
WBC	Low
Plt	Low

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## Hemepath Case 27: 55-Year-Old Female

### HISTORY

A 55-year-old female from Japan presents with a 1-week history of papules and nodules. The lesions began on her trunk and quickly spread throughout the entire body. The patient also complains of fatigue, constipation, and increased urinary frequency for the past several months. Physical examination reveals cervical, axillary, and inguinal lymphadenopathy, as well as hepatosplenomegaly.

### CBC

Hgb (g/L)	N
MCV	N
WBC	High
Plt	N

### OTHER LABORATORY FINDINGS

LDH	High
Serum Ca	High

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## Hemepath Case 28: Newborn Male

### HISTORY

A newborn male with a congenital heart defect undergoes a successful surgical repair. Several hours later, the patient is found to have a post-operative pleural effusion. The effusion is tapped.

The baby's CBC is normal.

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## Hemepath Case 29: 13-Year-Old Male

### HISTORY

A 13-year-old male presents with a 1-month history of right-sided cervical lymphadenopathy, as well as test results suggestive of hepatitis. The node is aspirated, and "Hodgkin-like cells" are identified. The node is subsequently excised.

### CBC

Hgb (g/L)	N
MCV	N
WBC	High
Plt	N

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## Hemepath Case 30: 23-Year-Old Female

### HISTORY

A 23-year-old female presents with a 1-week history of fatigue, headache, and muscle pain. She also complains of anorexia and intermittent episodes of nausea and vomiting. Past medical history is unremarkable.

On physical examination, a single firm, painful and mobile lymph node is palpated in the posterior cervical region.

### CBC

Hgb (g/L)	N
MCV	N
WBC	N
Plt	N

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## Hemepath Case 31: 19-Year-Old Male

### HISTORY

A 19-year-old male, an exchange student from Africa, presents with multiple bilateral painless and mobile enlarged cervical lymph nodes. He reports a fever for the past week and weight loss of 2 pounds during this time.

### CBC

Hgb (g/L)	Low
MCV	N
WBC	High
Plt	N

### OTHER LABORATORY FINDINGS

ESR	High
γ-Globulin	High, non-clonal

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## Hemepath Case 32: 17-Year-Old Male

### HISTORY

A 17-year-old male presents with recurrent fever and chills, as well as weight loss of 2 kg, over the past 3 weeks. Four days ago, he started complaining of pain in his left wrist. He was previously in good health, with no significant past medical history or family medical history.

Physical examination reveals an ill-appearing adolescent male with a swollen left wrist, tender to palpation. Several red, warm, pruritic nodules are observed on his right thigh. Axillary and inguinal lymphadenopathy are also noted. Radiologic imaging of his left wrist shows a 3 cm osteolytic lesion in the ulnar head.

### CBC

Hgb (g/L)	Low
MCV	N
Reticulocyte Count	Low
WBC	Low
Plt	Low

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## Hemepath Case 33: 65-Year-Old Female

### HISTORY

A 65-year-old female visits her family physician. She is concerned as her fingers turn purple and become painful when she goes out for her morning jog. This is especially severe during the winter months. She also notices that she tires easily, and can no longer run as far as she used to. Her urine is sometimes tea-colored after one of these episodes.

Physical examination reveals a pale-looking female in no apparent distress. She is slightly tachycardic. Her hands and earlobes are cold to the touch, and her spleen is slightly enlarged.

### CBC

Hgb (g/L)	Low
MCV	N
Reticulocyte Count	High
WBC	N
Plt	N

### OTHER LABORATORY FINDINGS

LDH	High
Bilirubin	High

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## Hemepath Case 34: 21-Year-Old Male

### HISTORY

A 21-year-old male presents with a 1-week history of intermittent chest pain and shortness of breath. Several times in the past week, he has woken up in the middle of the night drenched in sweat. He has not weighed himself recently, but notices that his favorite jeans seem loose compared to before.

On examination, the patient appears weak and pale. A petechial rash is noted on his trunk. Several large, non-tender, mobile lymph nodes are palpated in the axillary region. There is a slight reduction in breath sounds in all lung fields on respiratory examination. Cardiovascular examination yields no significant findings except for mild tachycardia. The spleen is noted to be firm and 7 cm below the left costal margin.

Chest x-ray reveals a mediastinal mass of 7 cm causing partial obstruction of the trachea.

### CBC

Hgb (g/L)	Low
MCV	N
Reticulocyte Count	Low
WBC	Low
Plt	Low

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## Hemepath Case 35: 38-Year-Old Female

### HISTORY

A 38-year-old female complains of a persistent dry cough of 3-month duration with intermittent dyspnea. Four days ago she started noticing pain in her right lower leg. She has felt increasingly feverish and tired over the past few weeks. Past medical history is unremarkable.

On physical examination, the patient is noted to have a low-grade fever. The right leg is slightly tender to palpation and multiple red, painful nodules are present on the anterior aspects of both legs. Auscultation of the chest reveals coarse breath sounds bilaterally.

Imaging reveals bilateral hilar lymphadenopathy, diffuse reticular infiltrates, and multiple nodules in both lung fields. Several nodular lesions are also observed on the x-ray of the right tibia. Because of the CBC results, a bone marrow biopsy is performed.

### CBC

Hgb (g/L)	Low
MCV	N
WBC	Low
Plt	Borderline low

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## Hemepath Case 36: 25-Year-Old Female

### HISTORY

A 25-year-old female visits her family physician for an annual check-up. She is in good health and reports no illnesses. Physical examination yields no significant findings. A routine CBC is performed.

### CBC

Hgb (g/L)	N
MCV	N
WBC	N
Plt	Severely low

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## Hemepath Case 37: 70-Year-Old Female

### HISTORY

A 70-year-old female with a history of breast cancer presents with lethargy, and lymphadenopathy of the axillary and supraclavicular regions.

### CBC

Hgb (g/L)	Low
MCV	N
WBC	Low
Plt	N

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## Hemepath Case 38: 2-Year-Old Girl

### HISTORY

A 2-year-old girl is brought in by her father. Two weeks ago, the child had a runny nose and an unproductive cough, along with a low-grade fever. They visited the local clinic and were diagnosed with a cold. The father bought some over-the-counter cold medications but these did not seem to improve the girl's symptoms.

Approximately a week ago, the girl began experiencing 15-20 intense bouts of coughing per day, with each episode lasting a few minutes. The father remarks that the child's face turns bright red from coughing so hard.

### CBC

Hgb (g/L)	N
MCV	N
WBC	High
Plt	High

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## Hemepath Case 39: 62-Year-Old Female

### HISTORY

A 62-year-old female presents with chronic fatigue and an increased susceptibility to infections. She has lost 10 pounds in the past month and experiences drenching night sweats several times per week. Physical examination reveals large, rubbery lymph nodes in the submandibular, cervical, and inguinal areas, as well as hepatosplenomegaly.

### CBC

Hgb (g/L)	Low
MCV	N
Reticulocyte Count	Low
WBC	Very high
Plt	Low

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## Hemepath Case 40: 11-Year-Old Male

### HISTORY

An 11-year-old male is brought in by his father. The boy has experienced intermittent abdominal discomfort and nausea for the past week. Yesterday, the family was at the swimming pool when the father noticed a mass protruding from the boy's abdomen.

Physical examination reveals a pale, tired-looking boy in no apparent distress. Pinpoint hemorrhages are noted on his arms. A firm abdominal mass of 15 cm is palpated in the epigastric region. Fluid wave and shifting dullness are both present.

### CBC

Hgb (g/L)	Low
MCV	N
Reticulocyte Count	Low
WBC	High
Plt	Low

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## Hemepath Case 41: 33-Year-Old Male

### HISTORY

A 33-year-old male who is HIV-positive presents with extreme fatigue and fever. His partner notices that he is becoming increasingly pale. The patient also complains of recurrent nosebleeds every 2-3 days, and remarks that his gums often bleed when he brushes his teeth. He then shows you a petechial rash on his upper and lower extremities.

### CBC

Hgb (g/L)	Low
MCV	N
Reticulocyte Count	Low
WBC	Low
Plt	Low

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## Hemepath Case 42: 13-Year-Old Boy

### HISTORY

A 13-year-old boy presents with a history of “easy bruising”. You complete a full history, and learn that there is blood in the patient’s urine from time to time; additionally, the boy has been previously diagnosed with sensorineural deafness. The patient’s mother and grandfather have similar problems.

### CBC

Hgb (g/L)	N
MCV	N
WBC	N
Plt	Low

### View Slides

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## Hemepath Case 43: 25-Year-Old Female

### HISTORY

A 25-year-old female receives a chest x-ray after being in an automobile accident. Imaging reveals no organ damage or bone fractures from the collision; however, enlargement of the mediastinum is noted. Subsequent CT of the chest shows a well-circumscribed mediastinal mass with no evidence of infiltration.

The patient is in good health and reports no symptoms. She has an unremarkable past medical history.

### CBC

Hgb (g/L)	N
MCV	N
WBC	N
Plt	N

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## Hemepath Case 44: 17-Year-Old Male

### HISTORY

A 17-year-old male visits his family physician. He has lost 10 lbs in the past 2 months, and has experienced cyclic episodes of fever: 1-2 weeks of fever alternating with afebrile periods. For the past few weeks, he has woken up in the middle of the night with drenching night sweat, sometimes so severe that he has had to change his pajamas. During the day, his entire body would feel incredibly itchy. The patient had mononucleosis 1 year prior, but is otherwise in good health.

Physical examination reveals palpable cervical lymph nodes that are non-tender and rubbery in consistency. Splenomegaly is also noted. There are multiple scratch marks and excoriations throughout the patient's body.

### CBC

Hgb (g/L)	Low
MCV	N
WBC	N
Plt	Low

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## Hemepath Case 45: 26-Year-Old Male

### HISTORY

A 26-year-old male exchange student from Central Africa presents with testicular pain and cloudy urine. On physical examination, the patient is noted to be feverish. The right scrotum and epididymis are enlarged and tender to palpation. The spermatic cord is thickened. Painful inguinal lymphadenopathy and mild edema of the lower limbs are also noted.

### CBC

Hgb (g/L)	Low
MCV	N
WBC	Mild increase. Differential shows mild eosinophilia
Plt	N

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## Hemepath Case 46: 21-Year-Old Female

### HISTORY

A 21-year-old female presents with red, 2-3 cm, non-pruritic targetoid lesions and bullae on her trunk. Her buccal mucosa and lips are red and swollen, and especially painful when she eats. Her conjunctivae are also inflamed. A few days prior, she had a sore throat and experienced chills and fatigue, and thought she had the flu.

One week ago, she began taking Septra for a urinary tract infection. Past medical history is noncontributory. There is no history of allergies, either environmental or drug-related.

### CBC

Hgb (g/L)	N
MCV	N
WBC	High
Plt	N

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## Hemepath Case 47: Newborn Female

### HISTORY

A female newborn presents with severe jaundice and hepatosplenomegaly. She is tachycardic and tachypneic, and has marked peripheral edema.

### CBC

Hgb (g/L)	Low
MCV	N
Reticulocyte Count	High
WBC	N
Plt	N

### OTHER LABORATORY FINDINGS

Serum Bilirubin (Unconjugated) High

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## Hemepath Case 48: Newborn Female

### HISTORY

A female newborn, the product of an uneventful pregnancy, presents with physical features consistent with trisomy 21, and is confirmed to have Down syndrome via karyotype analysis. Upon further examination, the baby is noted to be slightly hypoxic, with mild peripheral edema as well as hepatomegaly. A routine CBC is performed.

### CBC

Hgb (g/L)	Low
MCV	N
WBC	High
Plt	High

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## Hemepath Case 49: 9-Year-Old Boy

### HISTORY

A 9-year-old boy is brought in by his mother. The child has been complaining of double vision and severe headaches since yesterday. He was diagnosed with acute lymphoblastic leukemia 3 years ago, but has almost completed his maintenance therapy without incident.

Right abducens nerve palsy and nuchal rigidity are demonstrated on physical examination. A lumbar puncture, CBC, and bone marrow aspirate and biopsy are quickly ordered. The peripheral blood smear and marrow findings are normal, showing no evidence of leukemia or any other lesion. The CSF is shown in the digitized slide below.

### CBC

Hgb (g/L)	N
MCV	N
WBC	N
Plt	N

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## Hemepath Case 50: 22-Year-Old Woman

### HISTORY

A 22-year-old woman has a routine CBC as part of an annual physician's visit. She feels well, and has no complaints. Her past medical history is notable only for an automobile accident she had as a toddler: at that time she was hospitalized for several weeks, but she has no memory of the accident itself.

### CBC

Hgb (g/L)	N
MCV	N
Reticulocyte Count	N
WBC	N
Plt	N

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## Hemepath Case 51: 3-Year-Old Boy

### HISTORY

A 3-year-old boy is brought in by his mother. He has experienced recurrent seizures and has a limp when he walks. The child has had frequent respiratory tract infections and skin rashes ever since he was born. He burns quickly in the sun, and bleeds easily with mild injuries. He is delayed developmentally. The child's parents are first cousins.

On physical examination, the child is noted to have hypopigmented skin patches throughout his body, and pale, almost silvery, hair. He is very sensitive to light from the ophthalmoscope; fundoscopy reveals pale retinae. Neurological examination shows reduced sensation in his left foot. The boy walks with an abnormal gait, and seems to have trouble coordinating his movement.

### CBC

Hgb (g/L)	Low
MCV	N
WBC	Low
Plt	N

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## Hemepath Case 52: 38-Year-Old Male

### HISTORY

A 38-year-old male of Hispanic origin presents with a 3-day history of severe epistaxis. There is no history of trauma and no family history of bleeding disorders. He is not taking any medications or recreational drugs. The patient also complains of general malaise, chills, and drenching night sweats. He had gingival bleeding 2 weeks ago, which stopped after 10 days. On examination, the patient is noted to be feverish.

### CBC

Hgb (g/L)	Low
MCV	N
Reticulocyte Count	Low
WBC	Low
Plt	Low

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## Hemepath Case 53: 4-Year-Old Girl

### HISTORY

A 4-year-old girl presents with oliguria, hematuria, and increasing irritability. The child has a 1-week history of crampy abdominal pain, vomiting, and bloody diarrhea which were just beginning to clear up when these new symptoms appeared. The child first became sick after drinking unpasteurized apple juice.

On physical examination, the girl appears pale and restless. She is feverish and mildly hypertensive. Her ankles are slightly swollen, and a petechial rash is noted on her legs and arms.

### CBC

Hgb (g/L)	Low
MCV	N
Reticulocyte Count	High
WBC	High with left shift
Plt	Low

### OTHER LABORATORY FINDINGS

BUN	High
Serum Creatinine	High
Urinalysis	Cellular casts with dysmorphic RBCs

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