

## Anaplasmosis

Anaplasmosis is a disease caused by a rickettsial organism known as *Anaplasma phagocytophilum*. *Anaplasma* is a gram-negative organism that infects blood cells. It is transmitted through a number of species of ticks, particularly the *Ixodes* species. The natural reservoirs of *Anaplasma* are deer and mice. Patients may present with flu-like symptoms with fever. A petechial rash is rare in these patients, which differentiates this disease from ehrlichiosis or Lyme disease. Blood smear will reveal granulocytes with cytoplasmic morulae. Other diagnostic features include IgG antibodies and pancytopenia. Treatment options include doxycycline and rifampin.



PLAY PICMONIC

### Characteristics

#### Ixodes Tick

##### [X-tick](#)

*Anaplasma* is a zoonotic gram-negative organism transmitted by ticks in the regions of the upper midwest and the northeastern US. *Ixodes scapularis* and *Ixodes pacificus* are the most common vectors responsible for the transmission. *Ixodes scapularis* can also transmit *Borrelia burgdorferi* and *Babesia*.

#### Deer and Mice Reservoirs

##### [Deer-mouse](#)

The main reservoirs of *Anaplasma phagocytophilum* are mice and deer; however, a broad range of wild and domestic mammals have been identified as reservoirs.

### Clinical Features

#### Flu-Like Symptoms

##### [Flu-like symptoms](#)

Flu-like symptoms such as myalgias, fatigue, rhinorrhea, cough, nausea are common in patients with anaplasmosis.

#### Fever

##### [Fever-beaver](#)

Inflammation and immune response induce the release of inflammatory mediators (e.g., IL-10, TNF- $\alpha$ ), resulting in fever and flu-like symptoms.

#### Rash is Rare

##### [Dermatologist Examining Rare-steak Rash](#)

Maculopapular or petechial rash is rare in patients with anaplasmosis. The presence of a rash might indicate a coinfection with Lyme disease, or another tickborne disease.

### Diagnosis

#### Granulocytes with Cytoplasmic Morulae

##### [Granny-granulocyte with More Cakes](#)

Peripheral smear of these patients reveals granulocytes with morulae in the cytoplasm.

#### Antibody Testing

##### [Ant-tie-body with Test-Tubes](#)

Indirect immunofluorescence antibody (IFA) assay for immunoglobulin G (IgG) directed against *A. phagocytophilum* antigen is the preferred diagnostic test for anaplasmosis.

## **Pancytopenia**

[Pan-side-toe-peanut](#)

Pancytopenia (deficiency of all three cellular components of the blood) is a common manifestation of anaplasmosis. Leukopenia (deficiency of white blood cells) and thrombocytopenia (deficiency of platelets) are particularly common. The exact mechanism behind the pancytopenia is unknown, but immune reactions and direct cell invasion (e.g., erythrocytic invasion) are possible mechanisms.

## **Management**

### **Doxycycline**

[Dachshund-cycling](#)

Doxycycline inhibits bacterial protein synthesis by binding to the 30S ribosomal subunit. Doxycycline is the drug of choice for anaplasmosis.

### **Rifampin**

[Ref amp](#)

Rifampin is a bactericidal antibiotic that works by inhibiting RNA polymerase. It is an alternative to doxycycline in patients with anaplasmosis, particularly in children under the age of 8 and in pregnant women. It is important to note that even in these subpopulations, doxycycline is still the preferred antibiotic due to the prevalence of data showing its efficacy and safety.