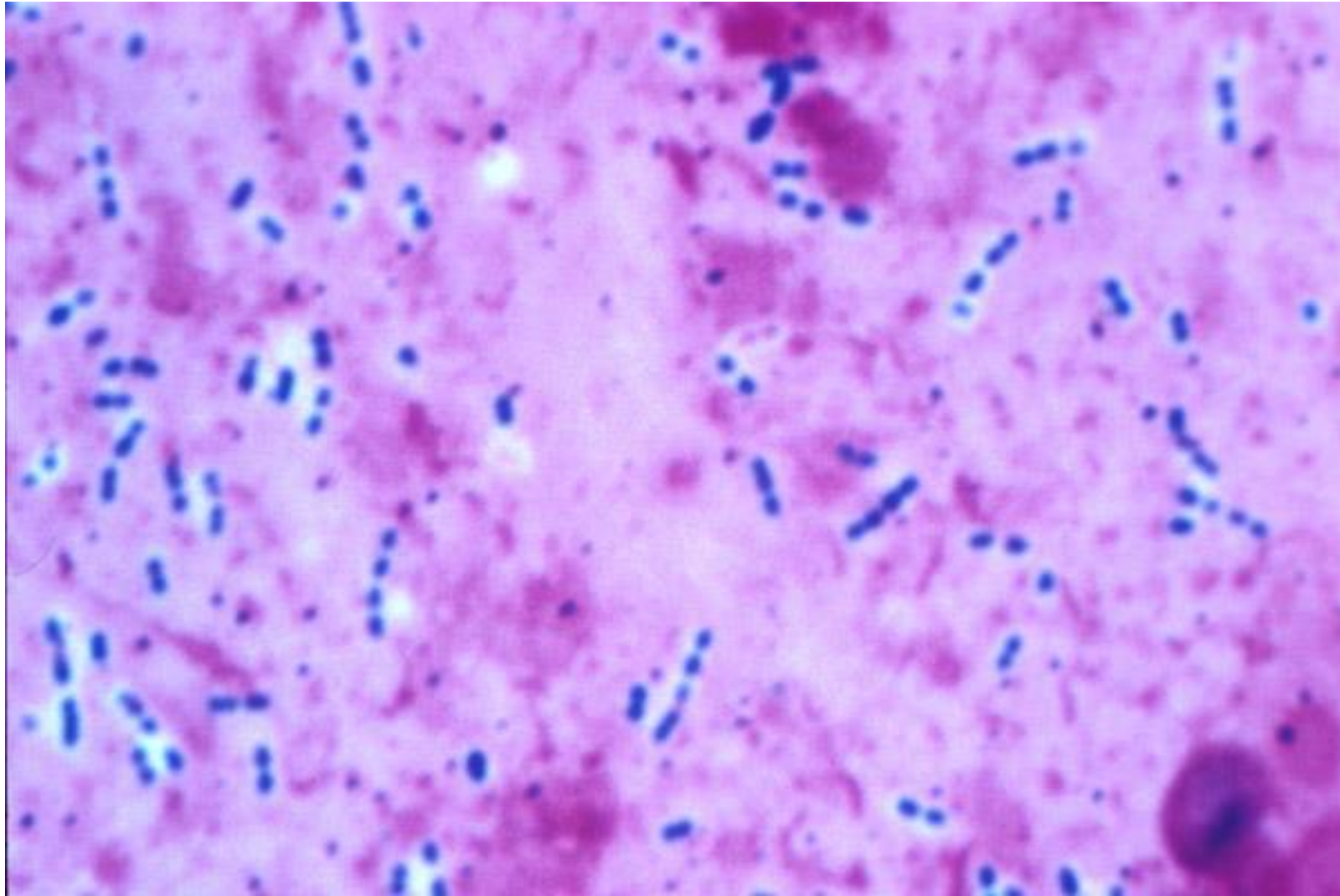


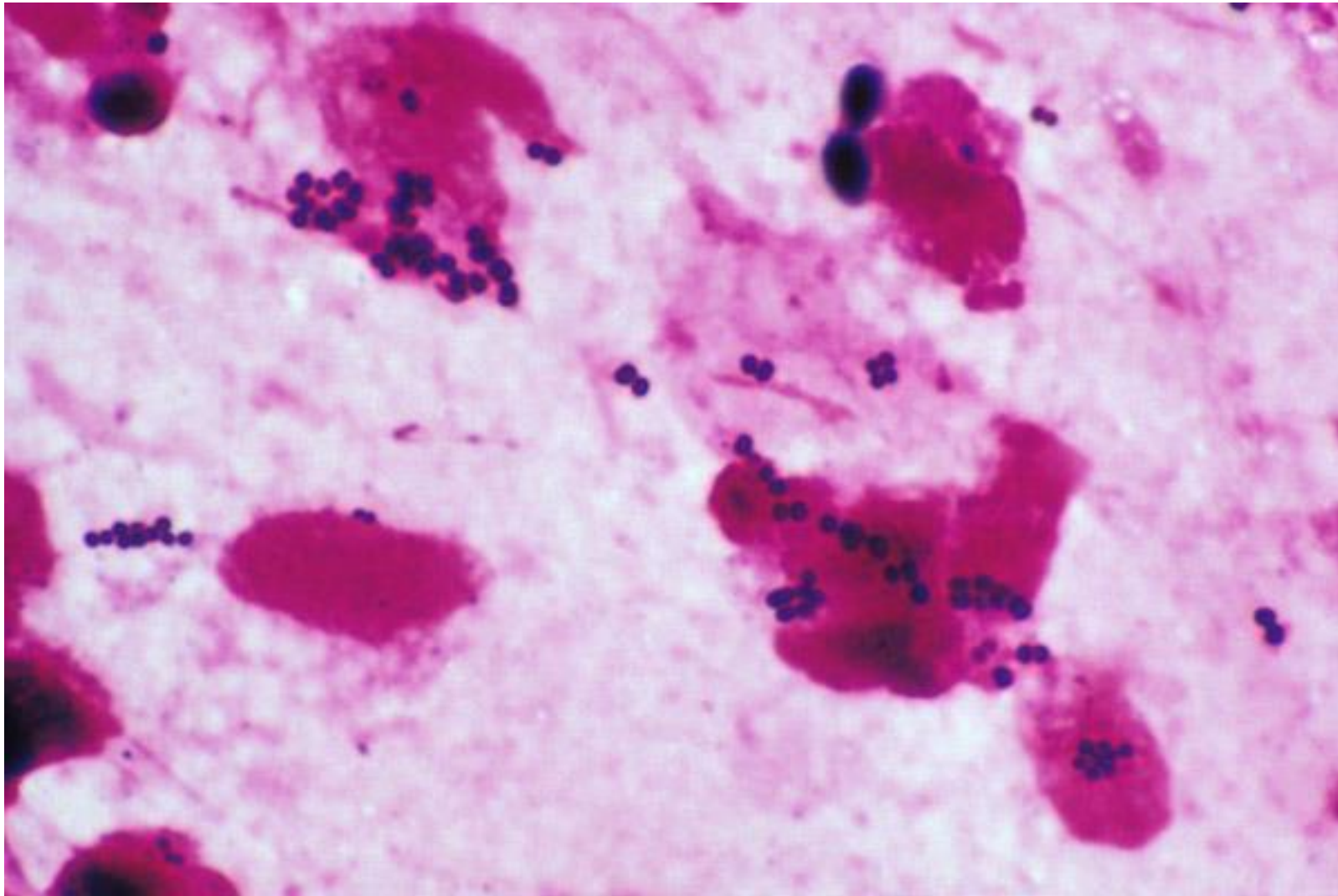
# Bacteria seen in sputum preparations

Gram stain is a cheap and quick traditional technique to identify pathogens in smears of sputum, exudates, liquid material and effusion. The importance of Gram stain in the diagnosis of pneumonia should be emphasized. In case of acute and thus possibly fulminant pneumonia, the clinicians must not wait the result of microbial culture of the sputum, requiring for two days. They can get information on the causative pathogens within minutes. Of note that *Mycobacterium tuberculosis* and *Legionella pneumophila* are not recognized with Gram stain.

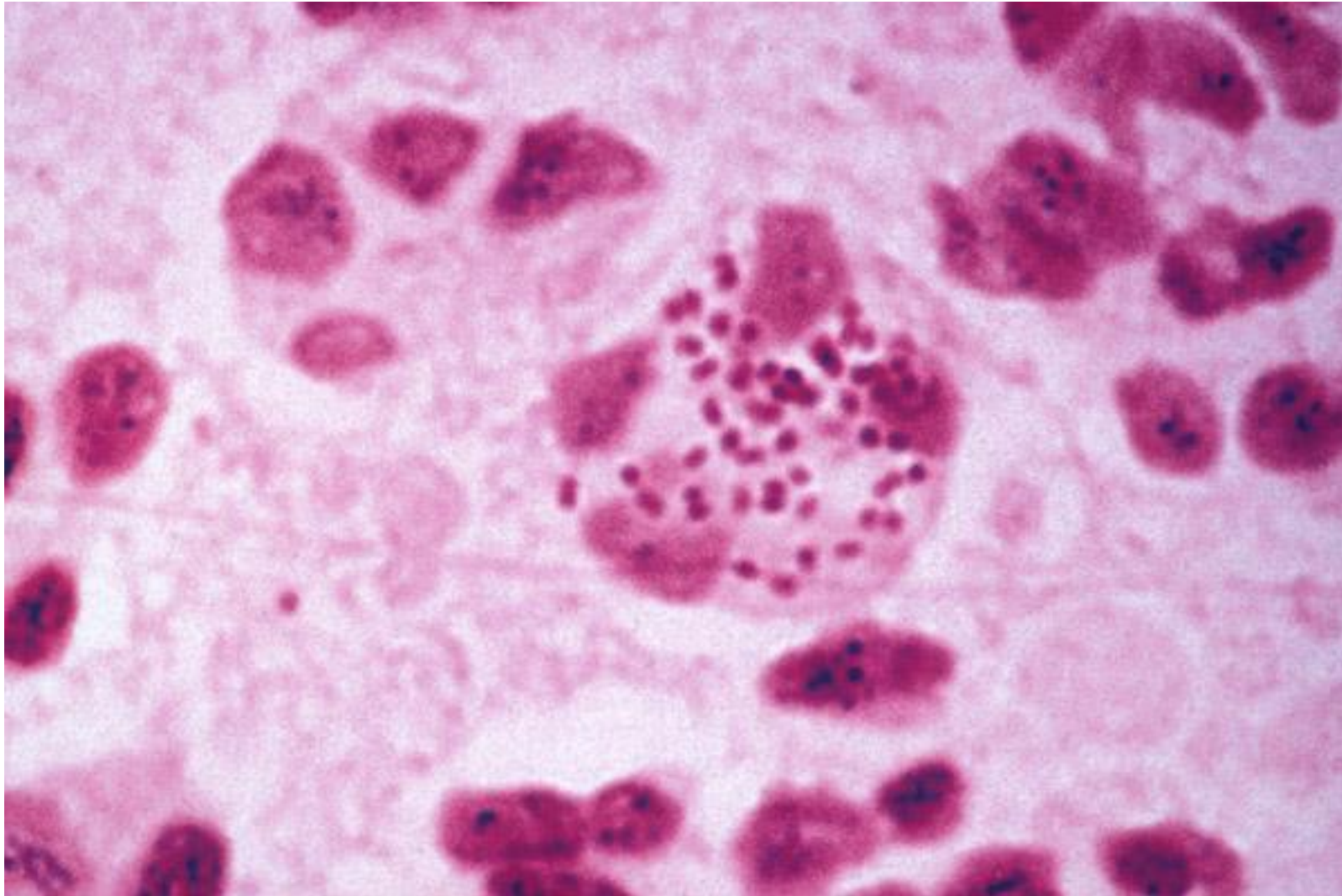
Ref.: Tsutsumi Y. Pathology of Infectious Disease. 2003.  
<https://pathos223.com/en/case/case071.htm>



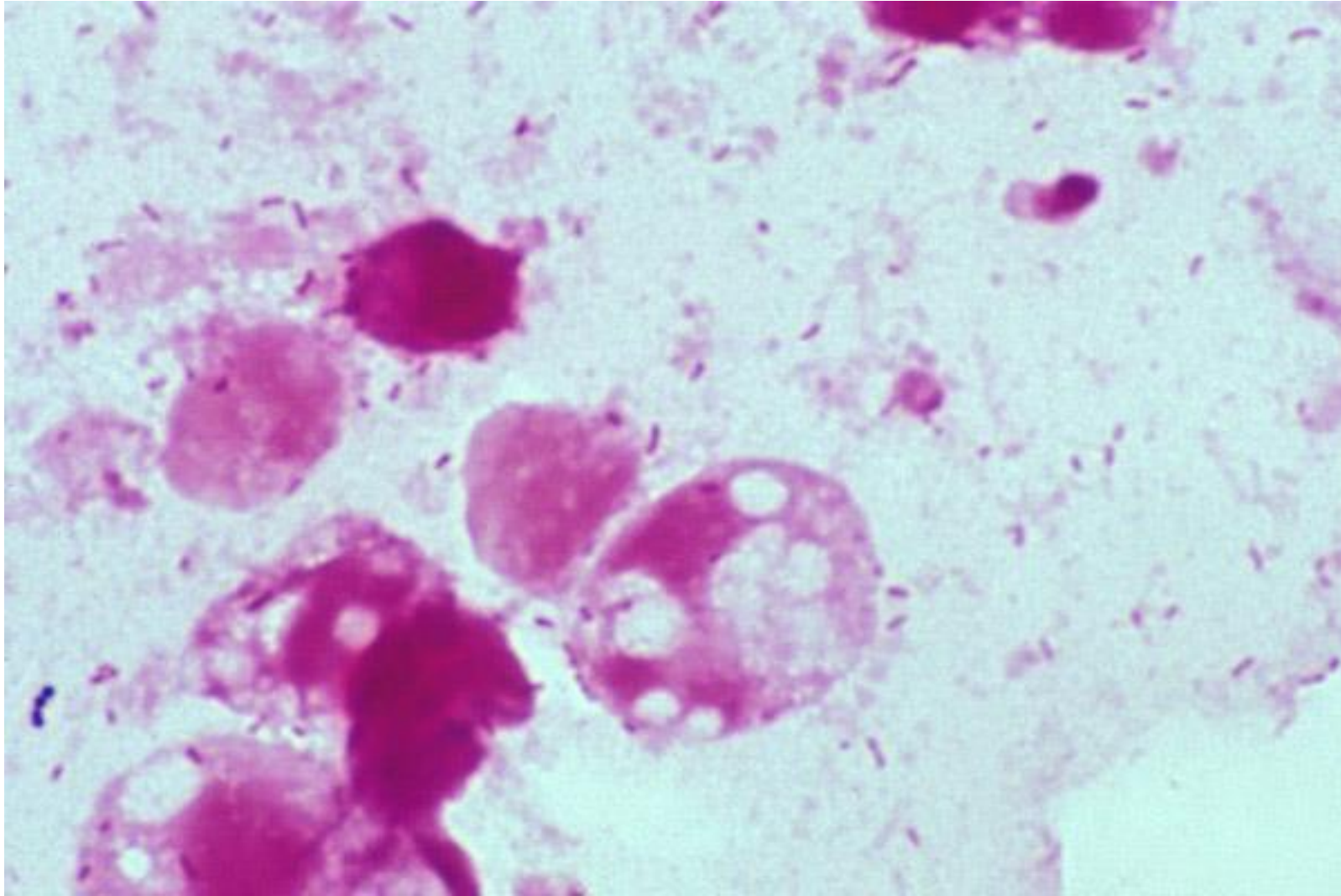
*Streptococcus pneumoniae* (Gram). Gram-positive diplococci with capsule (halo) formation, located outside neutrophils.



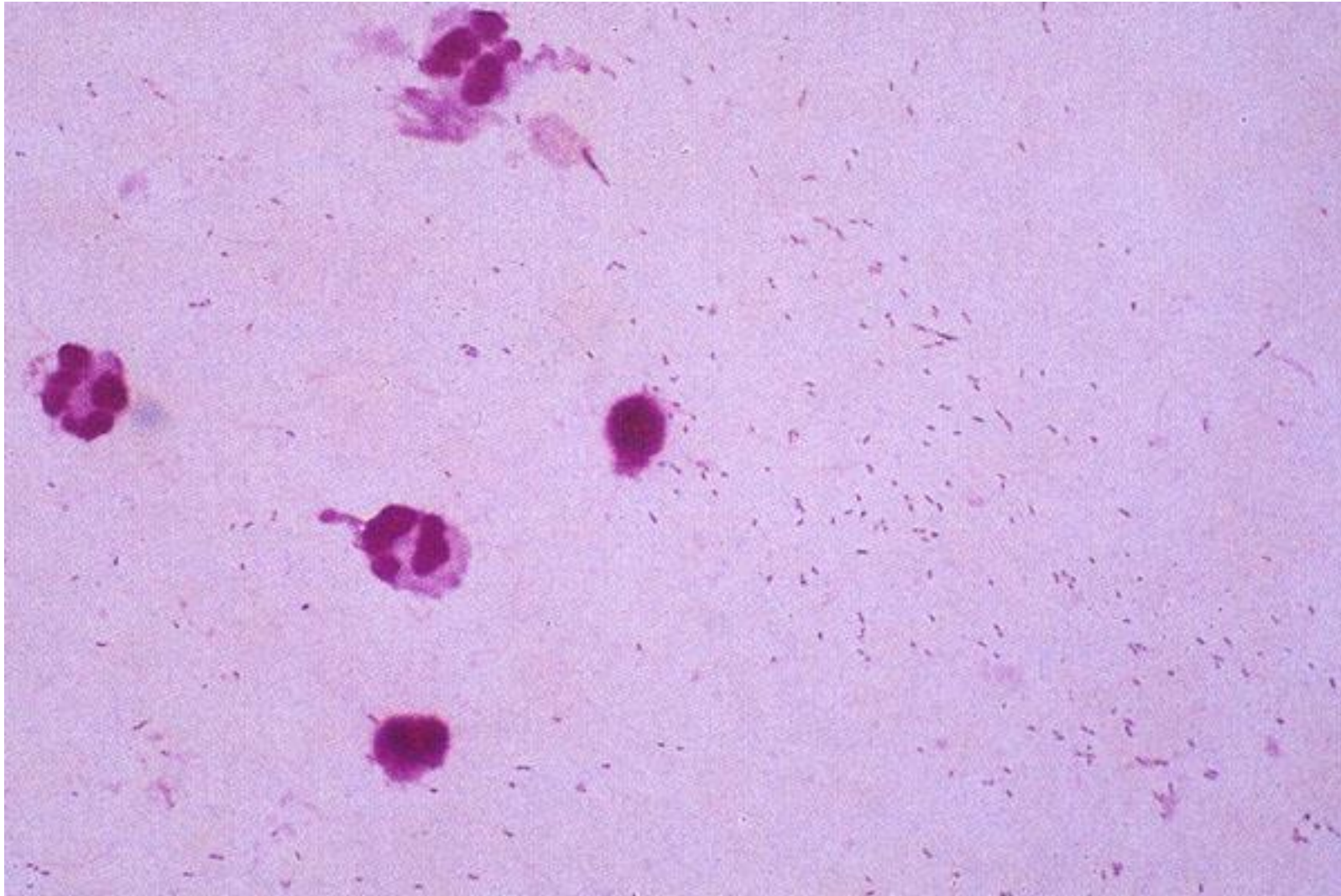
Methicillin-resistant *Staphylococcus aureus* (MRSA) (Gram). Irregularly clustered Gram-positive cocci in and outside neutrophils. MRSA is cytologically indistinguishable from Methicillin-sensitive *Staphylococcus aureus* (MSSA).



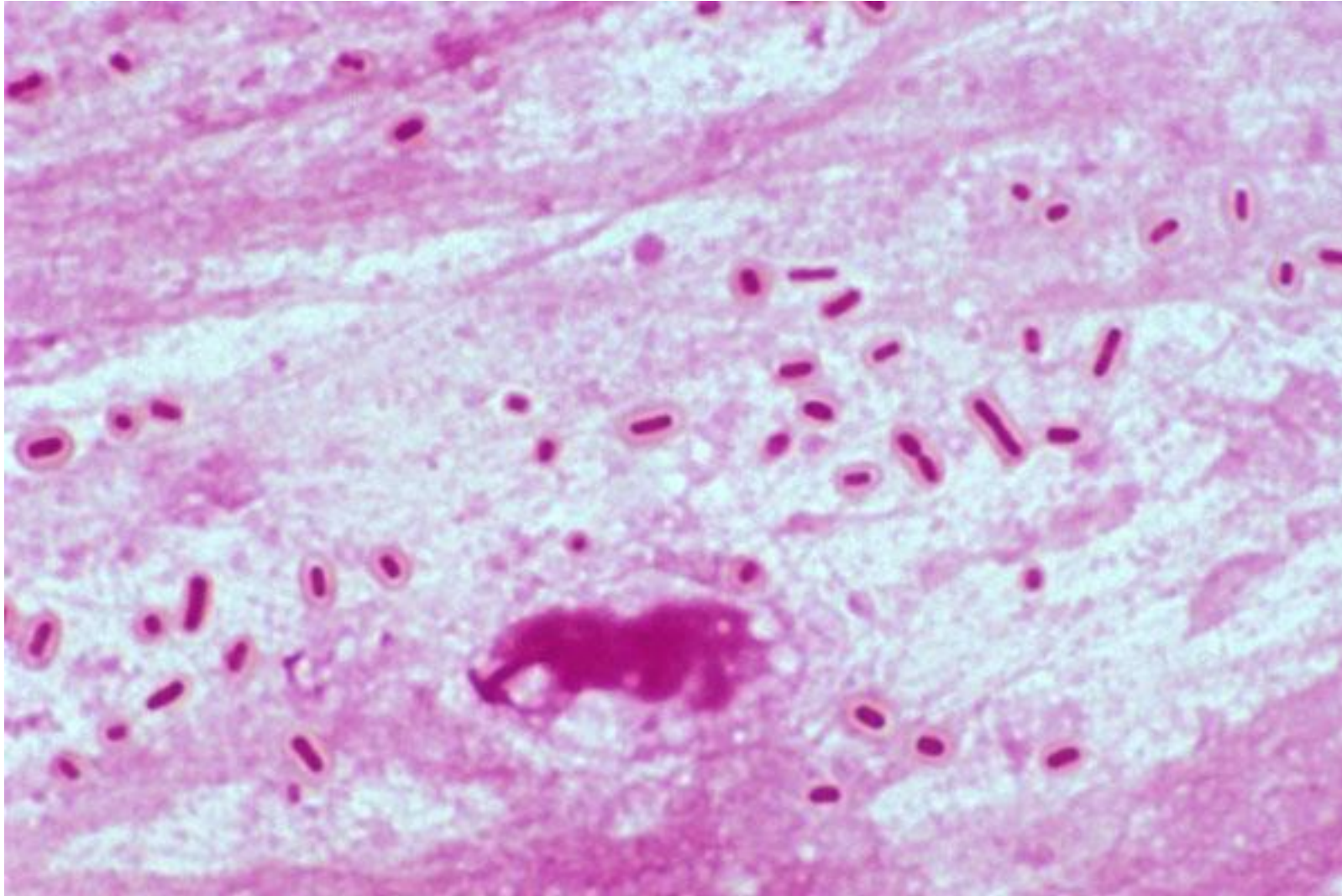
*Branhamella (Moraxella) catarrhalis* (Gram). Gram-negative diplococci phagocytized by neutrophils.



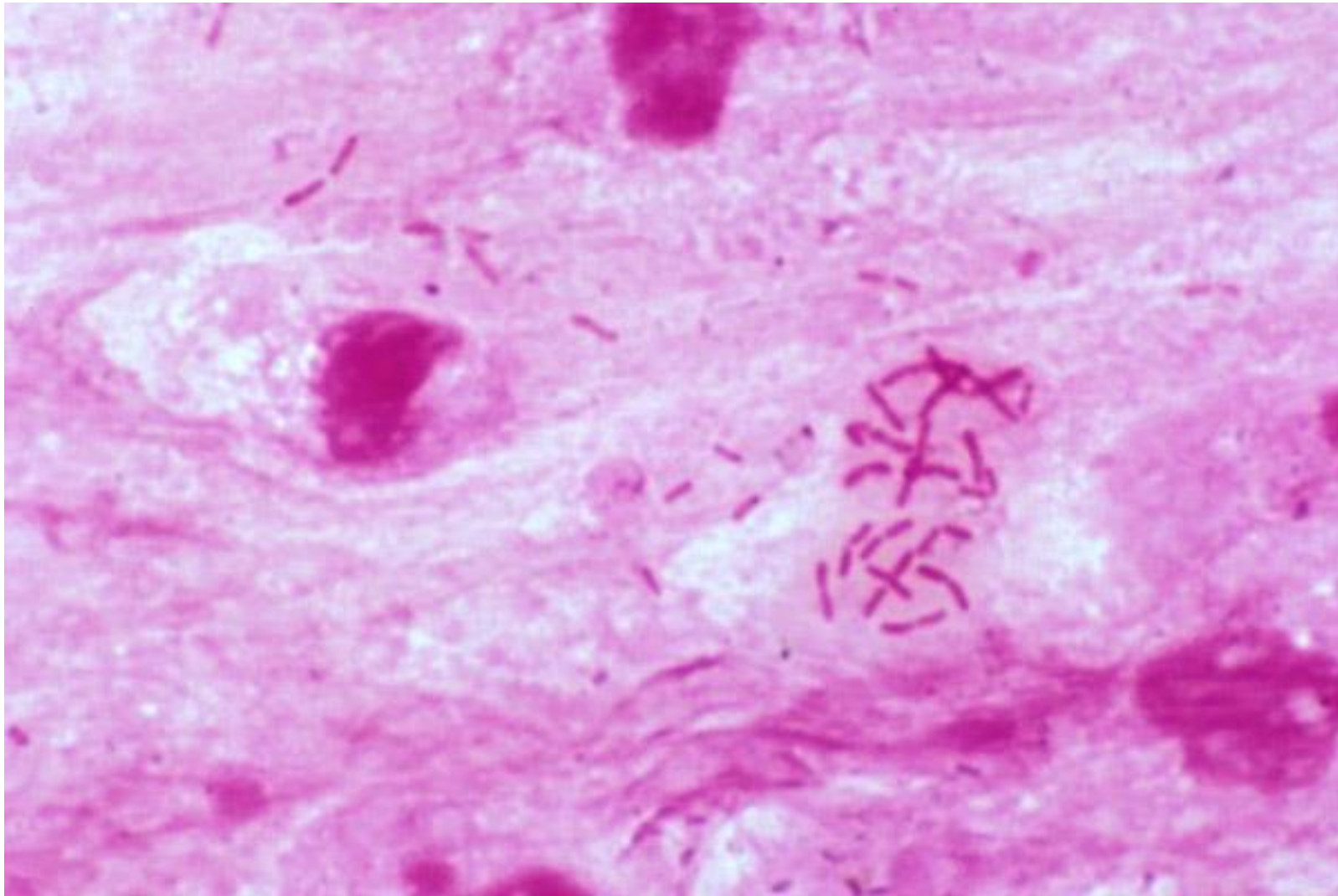
*Haemophilus influenzae* (Gram). Small-sized, Gram-negative short rods mainly seen outside neutrophils.



*Bordetella pertussis* (Gram). Small-sized, Gram-negative short rods mainly seen outside neutrophils, resembling *Haemophilus influenzae*.

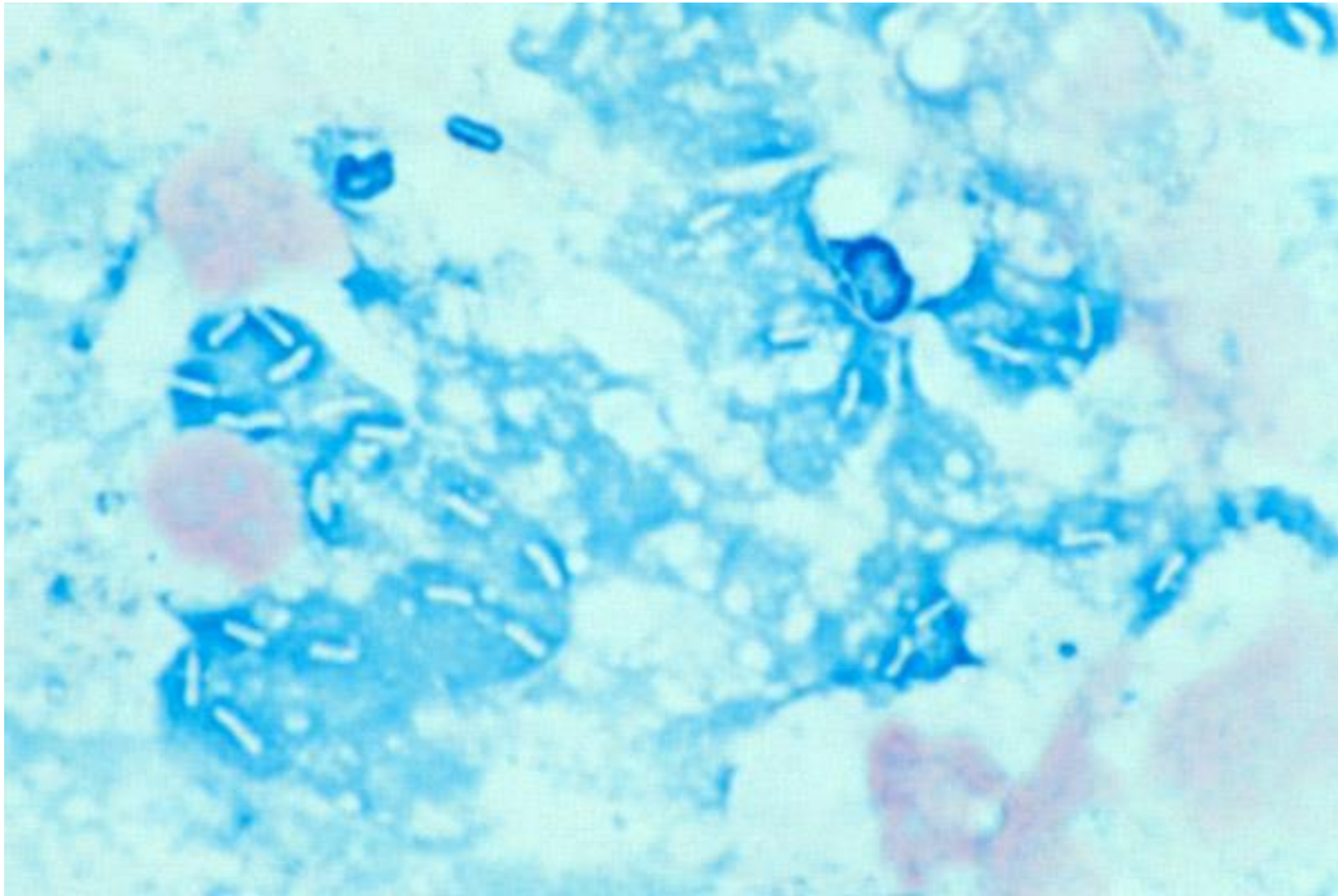


*Klebsiella pneumoniae* (Gram). Large-sized, Gram-negative rods with capsule formation.

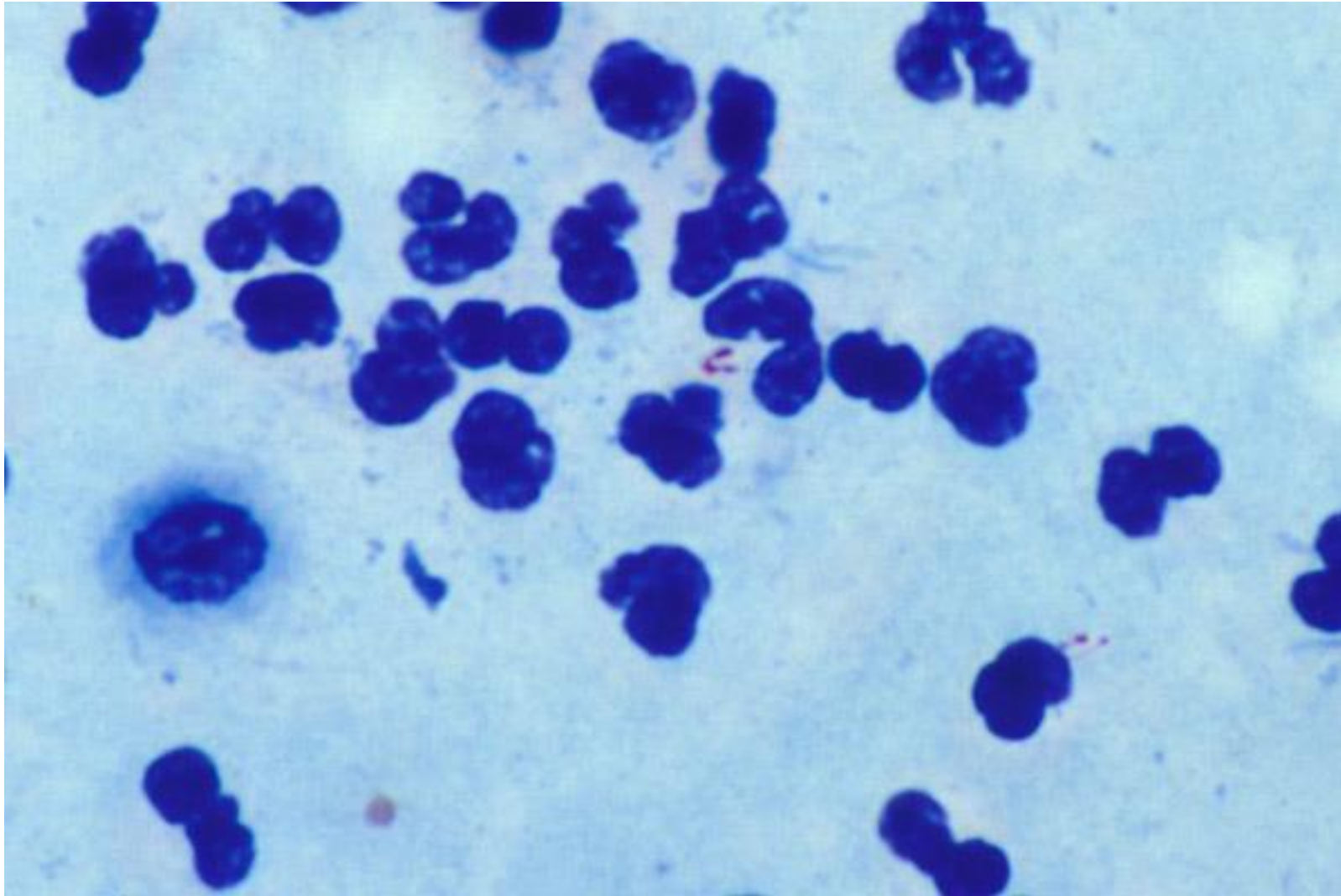


*Pseudomonas aeruginosa* (mucoid type, Gram). Gram-negative rods floating within mucoid matrices.

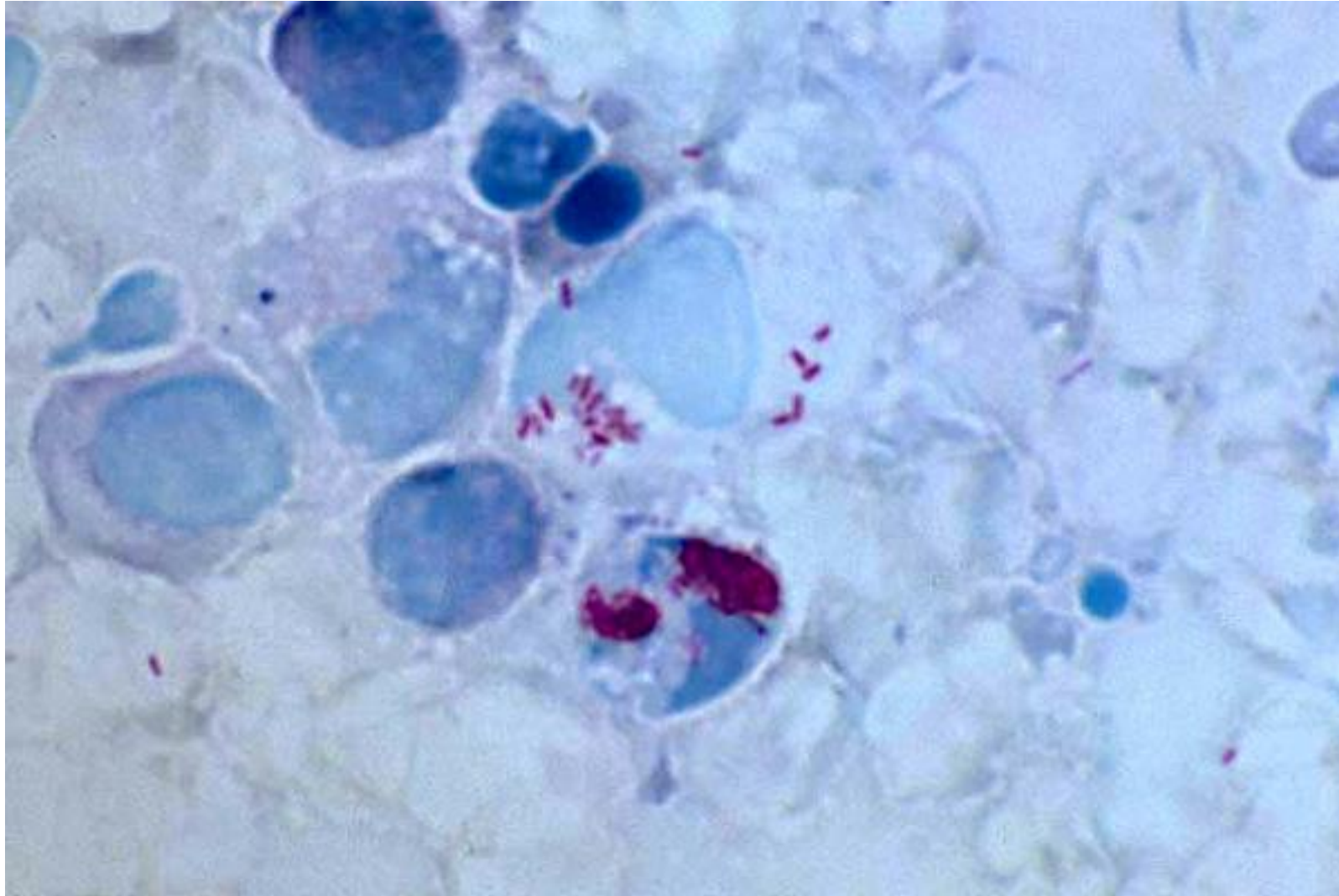




*Pseudomonas aeruginosa* (mucoid type, colloidal iron). The mucoid matrix of *P. aeruginosa* is positively stained with colloidal iron.



*Mycobacterium tuberculosis* (Ziehl-Neelsen). A few large-sized rods stained red by carbol fuchsin solution are phagocytized by macrophages. *M. tuberculosis* is not recognized with Gram stain.



*Legionella pneumophila* (Gimenez). Red-stained rods are seen in the cytoplasm of macrophages. Gimenez stain is not specific for Legionella, and a variety of microbes such as *H. pylori* and rickettsia, are identified with this stain. *L. pneumophila* is not recognized with Gram stain.