

## Microbiology - Gram stain

A Lead-in. *Practice the pronunciation of the following words:*

pneumonia – pneumococcus – meningitis – bronchitis – bacteria – bacteriuria – pyogenic – fungus – fungi – sputum – urine – epithelial – identify – identification – preparation – gangrene – causative – agent – microbes – microbial – antimicrobial – fusobacteria – spirochetes – diagnosis – diagnostic

B *Read the text and decide if the statements below are true (T) or false (F).*

The Gram stain procedure was originally developed by the Danish pharmacist Hans Christian Gram to differentiate **pneumococci** from *Klebsiella pneumoniae*. The Gram stain is particularly useful in the diagnosis of bacterial **meningitis**, bacterial pneumonia, **bacteriuria**, gonorrhoea, and **pyogenic** infections of the brain, lung, abdomen, pelvis, and wounds.

Statistically about one third of all patients admitted to general hospitals have, or develop, infections, a large proportion of which are caused by bacteria and **fungi**. The Gram-stained smear of a specimen often provides valuable results that cannot be obtained from culture of the specimen alone. The Gram-stained smear is also useful in judging the adequacy of the specimen obtained. In **sputum** and **urine** specimens, for example, a poorly collected or contaminated specimen can be recognised by the presence of many **epithelial** cells in the smear.

Information obtained from the Gram-stained **preparation** rarely permits definitive **identification** of organisms, but usually narrows the possibilities in diseases such as gas **gangrene**, pneumonia or meningitis, which have a variety of **causative** agents. Early diagnostic information obtained from Gram-stained smears often allows the physician to prescribe narrow-spectrum **antimicrobial** therapy, thereby reducing the risk of toxicity or superinfection.

Moreover, in certain infections, such as Vincent's angina (associated with **fusobacteria** and **spirochetes**), the organisms cannot be identified by the culture techniques employed in most **diagnostic** microbiology laboratories, and the Gram-stained smear together with the clinical findings form the basis for diagnosis.

1 *H. C. Gram developed the staining procedure because he had problems with pneumonia.*

2 *More than half of the patients in hospitals get an infection of some type.*

3 *Epithelial cells in the smear mean that the sample is of bad quality.*

4 *Thanks to the data from Gram-stain smear, we can identify a disease precisely.*

5 *In certain infections, the Gram-stain smear is the only basis for diagnosis.*

### Preparing a smear - video

*Listening*

*A What are the steps to follow?*

- 1 rinse with water
- 2 rinse with water
- 3 rinse with water
- 4 immediately rinse with water
- 5 dry the slide
- 6 decolourise with alcohol
- 7 put the Gram's iodine on (for 10 sec)
- 8 put safranin on (for 30 sec)
- 9 fix the smear
- 10 flood with crystal violet (for 30 sec)

*B Answer these questions:*

- 1 Why is Gram-stain called differential?
- 2 How long does it take to have a result?
- 3 What type of bacteria are resistant to penicillin?
- 4 Which of the stains is called mordant? What happens if you forget to use it?
- 5 For how long do you put alcohol on the stain?
- 6 What kind of the counter-stain is used here?
- 7 What do you do before you put the stain under the microscope?

## Grammar point – Relative Clauses

**92.4** Are these sentences right or wrong? Correct them where necessary.

- 1 I don't like stories who have unhappy endings. stories that have
- 2 What was the name of the person who phoned? OK
- 3 Where's the nearest shop who sells bread? \_\_\_\_\_
- 4 The driver which caused the accident was fined £500. \_\_\_\_\_
- 5 Do you know the person that took these pictures? \_\_\_\_\_
- 6 We live in a world what is changing all the time. \_\_\_\_\_
- 7 Dan said some things about me that were not true. \_\_\_\_\_
- 8 What was the name of the horse it won the race? \_\_\_\_\_

**94.3** Complete each sentence using **who/whom/whose/where**.

- 1 What's the name of the man whose car you borrowed?
- 2 A cemetery is a place \_\_\_\_\_ people are buried.
- 3 A pacifist is a person \_\_\_\_\_ believes that all wars are wrong.
- 4 An orphan is a child \_\_\_\_\_ parents are dead.
- 5 What was the name of the person to \_\_\_\_\_ you spoke on the phone
- 6 The place \_\_\_\_\_ we spent our holidays was really beautiful.
- 7 This school is only for children \_\_\_\_\_ first language is not English.
- 8 The woman with \_\_\_\_\_ he fell in love left him after a month.

*Complete the respective relative pronouns:*

1. The man .....has just entered is Mr. Cox.
2. The lady ..... you met there is an undergraduate.
3. The magazine ..... you were showing me is published in Germany.
4. The Blacks ..... live next door have five children.
5. The town of Plzeň ..... name is often translated as Pilsen into English is famous for its beer.
6. My teacher for ..... I am waiting lives very near.
7. Oxford University ..... colleges I've heard so much about is famous all over the world.
8. This is the first thing .....we have to do.
9. You may have anything ..... you wish.
10. The essay ..... Mr Burns ran yesterday went all wrong.