

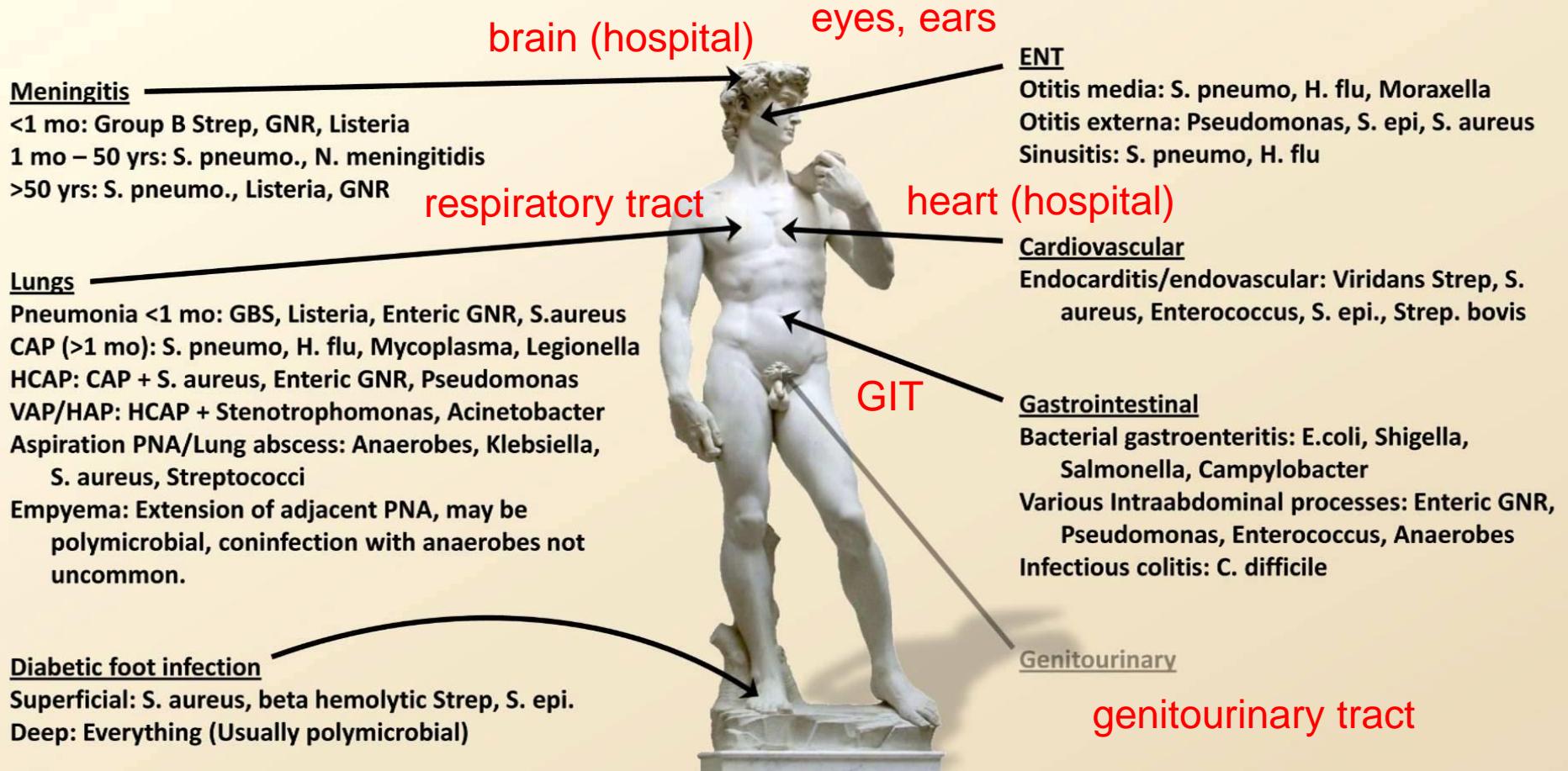


Antibiotic treatment



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Infectious Diseases and Common Etiologic Bacteria



most common - respiratory tract infections

When to give ATB ?



Antibiotics are ordered to:

- irritating **cough**
- high **fever**
- increased **erythrocyte sedimentation rate**
- increased **number of leukocytes** in the blood count
- asymptomatic **bacteriuria**
- finding pathogenic **microbe** in a **swab of the throat**



When to give ATB ?

IMPORTANT:

In the **general public** but also among health care professionals, exists the **impression** that:

if the patient **doesn't receive antibiotics**, he is not, especially when acute disease with unpleasant symptoms, **well-treated**.



Inflammatory airway disease

- 
- ATB prescribing for **respiratory tract infections** is **75%** (from the whole administration)!

X

- Respiratory tract infections are caused by about 200 **viruses** and only about 5 bacteria.

Do patients really need ATB?

- Acute rhinitis
- Inflammation of the nasopharynx
- Substantial proportion of **acute bronchitis** (especially in children)
- Catarrhal inflammation of middle ear
- Facial sinuses

**Caused by
respiratory
viruses**

- **Evidence-based medicine?**

Bacteria vs. Virus



BACTERIA

Strep throat
Tuberculosis
Whooping cough
UTI

Antibiotics?
YES



BOTH

Bronchitis
Ear infection
Sinus infection

Antibiotics?
MAYBE



VIRUS

Common cold
Flu
Sore throat

Antibiotics?
NO



Illness	Usual Cause		Antibiotic Needed
	Viruses	Bacteria	
Cold/Runny Nose	✓		NO
Bronchitis/Chest Cold (in otherwise healthy children and adults)	✓		NO
Whooping Cough		✓	Yes
Flu	✓		NO
Strep Throat		✓	Yes
Sore Throat (except strep)	✓		NO
Fluid in the Middle Ear (otitis media with effusion)	✓		NO
Urinary Tract Infection		✓	Yes

COMMON INFECTIOUS DISEASES

SYMPTOM	DISEASE	REMEDY
Cold, cough, body ache, mild fever	Viral disease, lasts 3-5 days, maybe longer in adults	Home remedies; no antibiotics
Sore throat, ear pain, mild fever	Viral throat infection	Home remedies; no antibiotics
Sudden vomiting, diarrhoea, mild fever	Acute gastroenteritis lasts 1-2 days	Home remedies; no antibiotics
Fever, body ache, joint pain	Viral disease (dengue, chikungunya, other)	Fluids and fever control; no antibiotics
Fever, vomiting, dark urine	Hepatitis	Fluids; no antibiotics
High fever (3-5 days), severe chills	Possibly malaria, typhoid, sepsis	Consult doctor; misdiagnosis common
High fever, chills, chest pain, cough	Pneumonia	Consult doctor
High fever, severe headache, vomiting	Alert!	Emergency consultation
Fever (more than 2 weeks), weight loss	Many possible causes	Consult doctor

ANTIBIOTIC RESISTANCE

WHAT YOU CAN DO



Antibiotic resistance happens when bacteria change and become resistant to the antibiotics used to treat the infections they cause.



- 1 Only use antibiotics when **prescribed** by a certified health professional
- 2 Always take the **full prescription**, even if you feel better
- 3 **Never use left over** antibiotics
- 4 **Never share** antibiotics with others
- 5 **Prevent infections** by regularly washing your hands, avoiding contact with sick people and keeping your vaccinations up to date

www.who.int/drugresistance

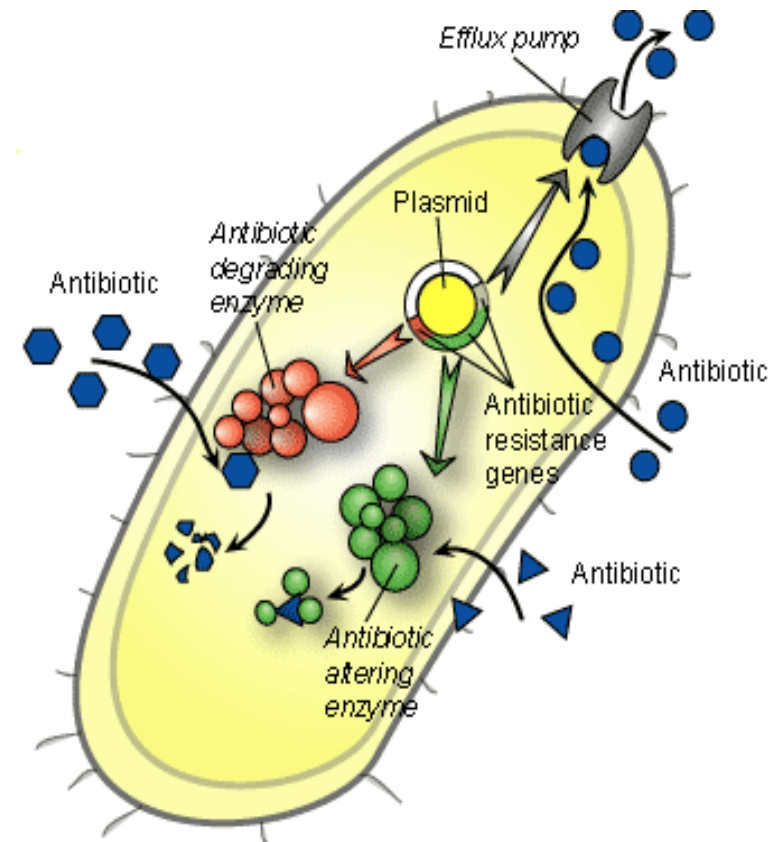
[#AntibioticResistance](https://twitter.com/AntibioticResistance)



World Health
Organization

Mechanisms of Antibiotic Resistance

- Enzymatic destruction of drug
- Prevention of penetration of drug
- Alteration of antibiotic or target site
- Rapid ejection of the drug



CAUSES OF ANTIBIOTIC RESISTANCE



Antibiotic resistance happens when bacteria change and become resistant to the antibiotics used to treat the infections they cause.



Over-prescribing
of antibiotics



Patients not finishing
their treatment



Over-use of antibiotics in
livestock and fish farming



Poor infection control
in hospitals and clinics



Lack of hygiene and poor
sanitation



Lack of new antibiotics
being developed

www.who.int/drugresistance

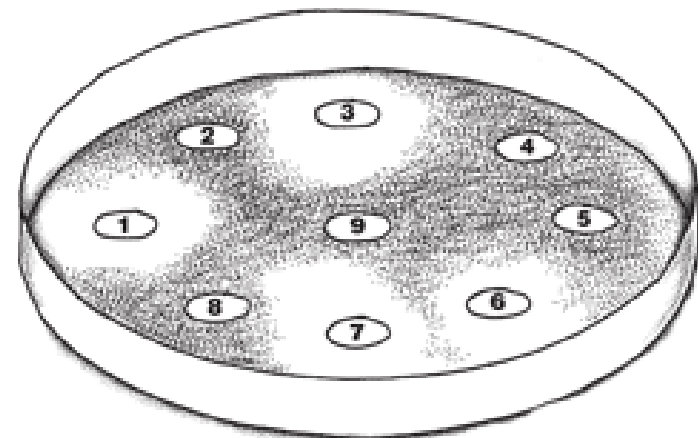
#AntibioticResistance



When to administer ATB - bacterial infections

Diagnostic methods:

- C reactive protein (CRP) levels
- Higher sedimentation of Erys
 - ♂ 2–5 mm/hod
 - ♀ 3–8 mm/hod
- Leukocytosis
- Bacterial cultivation + sensitivity determination



With antibacterials 1, 3, 6 & 7, the bacteria show a sensitivity to an antibiotic. The bacteria are resistant to medications 2, 4, 5, 8 & 9.



When to give ATB – bacterial infections

- Determination of C reactive protein (CRP):
- **high values** are associated with **bacterial infection, > 50mg/l**
- **low concentrations** indicate a **viral etiology** of infection **<10 mg l**
- ✓ Test is done by the pediatrician or GP at the office
- ✓ Costs around 100 CZE (paid by health insurance)
- ❖ **What would be the use in PHARMACY?**

CRP test



	<p>méně než 10 mg/l</p> <p>– normální fyziologická koncentrace CRP</p>
	<p>10 až 30 mg/l</p> <p>– zvýšená hladina CRP obvykle odpovídá mírné bakteriální infekci</p>
	<p>více než 30 mg/l</p> <p>výrazně zvýšená koncentrace CRP potvrdila bakteriální infekci – doporučujeme obrátit se na lékaře k posouzení zdravotního stavu testované osoby a rozhodnutí o potenciálním nasazení antibiotik.</p>
<p>rychlý výsledek</p>	

Division of symptoms and findings of streptococcal and viral tonsillitis



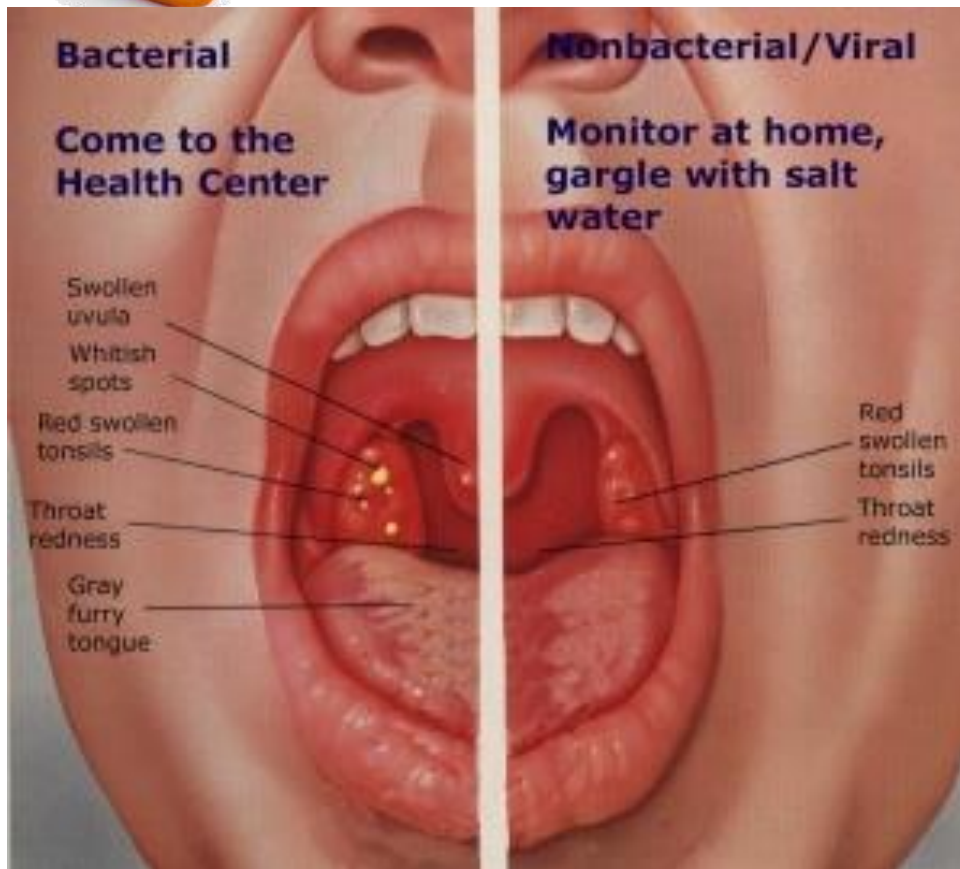
Streptococcal infection

- Complicated process
- Fever over 38 ° C
- Shivers
- Magnitude of sore throat and swallowing
- Hypersalivation
- **Painful enlargement of cervical nodes**

Viral infection

- Uncomplicated process, coupled with signs in the surrounding regions due to high communication skills (sinusitis, otitis, pharyngitis ...)
- Runny nose
- Sneezing
- Cough
- Headache

Division of symptoms and findings of streptococcal and viral tonsillitis





Communication with patient

- Why do patients want ATB for common cold?
- **How would you explain to the patient that ATB cannot be dispensed without prescription?**
- **Which ATB are OTC?**

Do not underestimate the communication part of dispensing!



Dispensing minimum

1) Always warn the patient that he is receiving antibiotics

2) Frequency of use

- On the right time at the right dose
- Not 3 times a day, but every 8 hours, etc.
- Or give **specific times** (8.00 and 20.00)
- Always **write on the box!**
- **If you miss the dose, take as soon as you remember** (never take double dose)



Dispensing minimum

3. The time during which patients are taking antibiotics (how long?)

- ✓ Up to using the **package, 7 days or until further control** at the doctor, etc. (do not stop halfway)
- ✓ Draw attention to the **durability of diluted antibiotic syrups**, and their **proper storage**
- ✓ If the antibiotics **did not start to with within 48 hours**, **NO decreasing of the symptoms**, patient should contact the doctor



- **If condition does not improve, or even worsened after completing the course of treatment, consult your doctor immediately!**





Dispensing minimum

4. Connection with food

- ✓ **Before eating, after eating**, "in case of abdominal pain eat something small with ATB" ...
- ✓ The possible **interactions** with certain **foods, minerals (bivalent cations), alcohol** (eg, metronidazole, tetracycline antibiotics).



Dispensing minimum

5. Warn about possible side effects

- ✓ Only those **side effects** that **may occur** in the individual.
Do not name all!
- ✓ Possible **photosensitivity?**
- ✓ Draw attention to possible **allergization**, and how to proceed with its occurrence
- ✓ **depletion of bacterial mikroflora**
 - ✓ **Broad-spectrum antibiotics** for prolonged use or when used in high-risk patient groups -- recommend the way of protection and **regeneration of the intestinal mikroflora**

Side effects of ATB



- Nausea
- Vomiting
- Constipation x **Diarrhoea** bacterial µflora
- Headache
- Allergic reactions (beta-lactames)
 - rash, itchness, brethlessness



Dispensing minimum

6. Warn about possible interactions with other drugs

- ✓ Need for individualization. (eg, a young woman - contraception, seniors - statins)

7. Regime measures

- ✓ Plenty of fluids, bed rest, plenty of sleep, vit. C, probiotics support immune ...

8. Make sure, if the patient understood everything correctly

Once more inform patient that:

- **Do not share** antibiotics with others or **leave them** for us in next similar episode
- **Similar symptoms** do not mean the same disease





Probiotics, etc.



- **Probiotics:** contain **bacterial strains** (*Lactobacilus*, *Bifidobacterium*, *Streptococcus*, *Enterococcus*, or *Sacharomyces*) **which re-colonize the intestinal wall.**
- Usually combination of strains
- Positive effect on specific and non-specific immunity

Probiotic use at ATB therapy

- Effects on the prevention and treatment of gastrointestinal complications
- To be administered in parallel with ATB
- Usually higher doses than in prevention (3x daily, 3rd day, not at the same time)
- **Sacharomyces boulardii** especially for long-term antibiotic therapy (*predominantly colonizes only when using Sacharomyces*)



Lacidofil 45 cps

authorized drug (store in refridgerator)



Choice of probiotic

- According to a given **resistance to specific antibiotic** (see in SPC antibiotics).
- Sufficient dose (10^8 – 10^{10} microorganisms)
- Read PIL, at the end of expiration – lower doses, alive microorganisms!!)



Choice of probiotic

Various dosage forms

- **for children:** sachets, capsules, soluble tablets
- **for adults**



Antibiotic Spectrum of Activity

TABLE 20.2

The Spectrum of Activity of Antibiotics and Other Antimicrobial Drugs

Prokaryotes				Eukaryotes			Viruses
Mycobacteria*	Gram-Negative Bacteria	Gram-Positive Bacteria	Chlamydias, Rickettsias†	Fungi	Protozoa	Helminths	
		← Penicillin →		← Ketoconazole →		← Niclosamide → (tapeworms)	
	← Streptomycin →				← Mefloquine → (malaria)		
						← Praziquantel → (flukes)	
			← Tetracycline →				← Acyclovir →
← Isoniazid →							

*Growth of these bacteria frequently occurs within macrophages or tissue structures.
 †Obligately intracellular bacteria.

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- no antibiotic is effective against all microbes !!
- there are microbes resistant for most of ATB groups



Mechanisms of Antimicrobial Action

- Cell wall formation
- Protein synthesis
- DNA replication
- RNA synthesis
- Synthesis of essential metabolites

- Bacteriostatic x bactericide



Thank you for our attention