

Aber leider ist keine dieser Methoden zurzeit in die Praxis umgesetzt worden.

Gashydrate sind die einzige unentwickelte Quelle des Erdgases, die eine gute Konkurrenz zum traditionellen Gas bilden kann. Sie verfügen über die bedeutenden potentiellen Gasressourcen, die die Menschheit mit dem hochwertigen Brennstoff gewährleisten können. Die Gasmengen in gashydratischen Vorkommen sind enorm, was die Situation auf dem Gasmarkt verbessern kann. Russland zugunsten als einem der größten Gasexporteure der Welt.

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ADVANTAGES AND DISADVANTAGES OF USING ANTIBIOTICS

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It's hard to imagine a world before the development of what many consider to be miracle drugs. However, only about 80 years ago antibiotics weren't available. The discovery of penicillin in 1928 by Alexander Fleming was one of the greatest scientific achievements of the 20th century. Some common illnesses, such as strep throat, are now easily treated with antibiotics, but in the past, they often led to serious complications. Antibiotics serve an important role in keeping the public health.

However, through the years, bacteria have developed *resistance* to certain types of antibiotics, and researchers have found that taking antibiotics for non-bacterial infections such as viruses is ineffective. In fact, taking antibiotics every time you get sick can actually harm your body instead of helping you get well. There are both pros and cons of antibiotics, and it can be helpful to know some of these when deciding whether to take antibiotics for an illness. Following are several of the most prominent advantages of taking antibiotics:

- *can treat many infections*: antibiotics can treat a wide variety of infections such as strep throat, tonsillitis, and sinusitis;
- *easy to administer*: most antibiotics are easy to administer since you can take them orally or via injection;
- *few side effects*: many antibiotics have few side effects, which makes them the perfect option when you feel extremely sick;
- *cost-effective*: most types of older antibiotics—especially those with generic alternatives—are often very affordable on any budget, even if you lack health insurance.

While there are many benefits of antibiotics, there are also several disadvantages, such as:

- *allergic reactions*: depending on your drug allergies, you may be extremely allergic to some types of antibiotics, such as those containing sulfa. Unfortunately, sulfa is present in many common antibiotics, so it may be more difficult to find a suitable medication for your illness;

- *potential side effects*: while many antibiotics have few side effects, some can trigger nasty problems such as digestion issues, discomfort, nausea, diarrhea, and sensitivity to light;

- *drug-resistant bacteria*: if you do not take the full dose of an antibiotic, it only kills some of the bacteria in your system and can make the rest antibiotic-resistant, which means antibiotics may not work as well for you in the future.

Unfortunately, antibiotic resistance, or the increased ability of bacteria to survive in the presence of antibiotics, has become *a major public health threat*.

Antibiotic resistance occurs when bacteria change in some way that reduces the effectiveness of drugs, chemicals or other agents designed to cure or prevent the infection. Thus the bacteria survive and continue to multiply causing more harm. Widespread use of antibiotics promotes the spread of antibiotic resistance. Bacterial susceptibility to antibacterial agents is achieved by determining the minimum inhibitory concentration that inhibits the growth of bacteria [1]. Resistance is defined as bacteria that are not inhibited by usually achievable systemic concentration of an agent with normal dosage schedule or fall in the minimum inhibitory concentration ranges. Likewise the multiple drug resistance is defined as the resistance to two or more drugs or drug classes [2].

Antibiotics are given to human for treatment and prophylaxis of infectious diseases, 80% to 90% of antibiotics are used in outpatients and the remainder in hospitals. Antibiotics appear to be used not only in excess but also inappropriately and this accounts for 20% to 50 % of all antibiotics used [3-4].

Nowadays, about 70 % of the bacteria that cause infections are resistant to at least one of the antibiotic agents most commonly used for treatment. Some organisms are resistant to all approved antibiotics and can only be treated with experimental and potentially toxic drugs. An alarming increase in resistance of bacteria that cause community acquired infections has also been documented, especially the Staphylococci and Pneumococci (*Streptococcus pneumoniae*), which are prevalent causes of disease and mortality. In a recent study, 25% of bacterial pneumonia cases were shown to be resistant to Penicillin, and an additional 25% of cases were resistant to more than one antibiotic [5].

Antibiotic usage resistance rates vary from one country to another [6-7]. It is observed that countries with the highest per capita antibiotic consumption have the highest resistance rates. It is not only the amount of antibiotic used that select for resistance, but the number of individuals receiving the drug and the population density also matters [3]. Giving 1000 doses of an antibiotic to one individual will have considerably less ecological effect on resistance emergence than giving those same 1000 doses to 1000 individuals [8]. A study by Levy suggests that combination of antibiotic use and population density correlates more strongly with the prevalence of antibiotic resistance in a population than use of the antibiotic alone [9].

Measures to control the spread of antibiotic-resistant diseases include prescribing the drugs only when necessary, prescribing the correct antibiotic for the disease being treated, and making sure the patient understands the importance of taking *all* of the

prescribed medication. Research in newer types and combinations of drugs is ongoing, as is research in the development of vaccines to prevent bacterial infections.

The issue of antibiotic misuse is of *global concern* because of the spreading and developing resistance of most common bacteria to most inexpensive generic antibiotics. Antibiotic resistance now has been universally identified as public health priority and necessary plan of action to combat resistance should be developed. Improving the quality, not just the quantity of medication will require public and professional education towards rational use of antibiotics. Better diagnostic tests, promotion and evaluation of medical and veterinary practice guidelines, restriction of antibiotic use as growth promoters in food and animals, development of novel antibiotics are some of steps required.

Above all, patients, providers and health care leaders must make a serious commitment to change the dynamics of outpatient prescribing. If we want to prove the prediction of an impending post-antibiotic era wrong, the time has come to drastically improve our antibiotic prescribing practices and to strengthen research to identify cost-effective strategies for controlling resistance. If this could be achieved, the care of an individual patient at large can be substantially improved.

REFERENCES

1. Bari SB, Mahajan B.M., Surana S.J. Resistance to antibiotic: A challenge in chemotherapy. Indian Journal of Pharmaceutical Education and Research 2008; 42 (1): 3-11.
2. Roger F.G, Greenwood D, Norbby S.R., Whitley R.J. Antibiotic and Chemotherapy, The problem of resistance, 8th ed. Churchill Livingstone; 2003. p. 25-47.
3. Cizman M. The use and resistance of antimicrobials in the community. Int J Antimicrob Agents 2003; 21: 297-307.
4. Wise R, Hart T, Cars O. Antimicrobial resistance is a major threat to public health. BMJ 1998; 317: 609-610.
5. Bacterial Resistance to antibiotics, 2008 Kenneth Todar University of Wisconsin-Madison Department of Bacteriology. URL: <http://www.textbookofbacteriology.net/resantimicrobial.html>. Recalled data: 27.03.2015.
6. Sorensen T.L, Monnet D. Control of antibiotic use in the community: The Danish experience. Infect Control Hosp Epidemiol 2000; 21: 387-389.
7. Bremon R.A, Ruiz Tovar M, Gorricho P.B, Diaz de Torres P, Rodriguez R. Non - hospital consumption of antibiotics in Spain: 1987-1997. J Antimicrob Chemother 2000; 45: 395- 400.
8. Leegaard T.M, Bevanger L, Jureen R. Antibiotic sensitivity still prevails in Norwegian blood culture isolates. Int J Antimicrob Agents 2001; 18: 99-106.
9. Levy S.B. Antibiotic resistance: Consequences of inaction. Clin Infect Dis 2001; 33: 124-129.