

"Antimicrobial Resistance (AMR): One of the Leading Cause of Major Health Issues."

Antimicrobial resistance (AMR) is a serious threat and no longer a prediction for the future. It is happening right now in every region of the world and has the potential to affect anyone of any age in any part of the country.

What is AMR?

AMR occurs when microorganisms like Bacteria, Virus, Fungi and Parasites change over time and no longer respond to medicines making infections harder to treat and increasing the risk of disease spread, severe illness and death.

Causes of AMR -

- Misuse and overuse of antimicrobials
- Lack of sanitation
- Inadequate infection prevention
- Incomplete treatment
- Lack of new antibiotics being developed.

Consequences of AMR -

- Greater number of AMR death, routine treatment becomes riskier to perform,
- Economic loss.

How to avoid/prevent AMR-

- Only use antibiotics when prescribed by a certified health professional.
- Always follow your health workers advice while using antibiotics.
- Never share your leftover antibiotics.
- Prevent infection by regularly washing hands, avoid close contact with sick people, prepare food hygienically, practicing safer sex and keeping vaccination up to date.
- Follow the World Health Organization (WHO) five keys to safer food (1. Keep Clean, 2. Separate Raw and Cooked Food, 3. Cook Thoroughly, 4. Keep Food at Safe Temperature and 5. Use safe Water and Raw Material).
- Choose food that has been produced without the use of antibiotics growth promotion and disease prevention in healthy animals (Milk, Meat, Vegetables, etc).

There are Indian organizations who have come forward to help in preventing AMR. The Indian Council of Medical Research (ICMR) launched the program on 'Antimicrobial

Stewardship, Prevention of Infection and Control (ASPIC) in 2012)', Indian Initiative for Management of Antibiotic Resistance (IIMAR in 2008). The European Union's (EU) ban on preventive mass medication in animals using antibiotics or many other drugs.

Besides all of these individually we all have to become responsible for prevention of AMR.



MS. SAKSHI PINGLE
(STUDENT- M.Sc. MICROBIOLOGY, SPPU)

प्रतिजैविक प्रतिकार - येणारे भावी जागतिक आरोग्य संकट !

आपण सर्वांनी कधी तरी अँटिबायोटिक्स म्हणजेच जैव प्रतिरोधी औषधे घेतलीच असणार, अनेकदा आपण आजारी असताना डॉक्टर्स आपल्याला अँटिबायोटिक लिहून देतात. पण तुम्हाला माहीत आहे का की ही औषधे मुळात आपल्या शरीरावर नाही तर आपल्या शरीरात असणाऱ्या रोगास कारणीभूत असलेल्या बॅक्टेरिया म्हणजेच जिवाणू आणि इतर रोगकारक सूक्ष्मजीवांवर परिणाम करतात. हल्ली सोयीस्कररित्या लोक अनेक मेडिकल स्टोअर्स मधून आपल्या मनाने अँटिबायोटिक्स विकत घेतात ते ही डॉक्टरांचा सल्ला न घेता!

पण इथेच एक खुप मोठा धोका आहे तो म्हणजे 'अँटिबायोटिक रेझिस्टन्स' अर्थात प्रतिजैविक प्रतिकार. वैद्यकीय भाषेत औषधांचा परिणाम न होण्याच्या या स्थितीला 'अँटि-मायक्रोबियल रेझिस्टन्स (AMR)' असे म्हटलं जातं. प्रतिजैविकांचा अयोग्य व अतिवापरामुळे जीवाणू (बॅक्टेरिया, व्हायरस, बुरशी आणि इतर परजीवी सूक्ष्मजीव काळानुरूप स्वतःच्या रचनेमध्ये बदल किंवा सुधारणा करून अनेक प्रतिजैविकांना निष्क्रिय करतात. ज्यामुळे पुढे प्रचलित असलेले अनेक अँटिबायोटिक औषधे निकामी होतात, अश्या जीवाणूंना 'सुपरबग्स' म्हणतात.

विषाणूचा संसर्ग नियंत्रणात आणणे व थांबवणे हा यक्ष श्रम सर्व आरोग्य यंत्रणेसमोर उभा राहतो. अँटिबायोटिक प्रतिरोधक जिवाणूमुळे होणारे संसर्ग जसे की ट्युबरक्युलोसिस, गोनोरिया, न्युमोनिया सारख्या आजारांचा उपचारांमध्ये आलेल्या अडथळ्यामुळे मृत्यु वाढ झालेली आहे आणि अशा आजारांचे संक्रमण देखील सहज पसरते. जागतिक आरोग्य संघटनेने (World Health Organization (WHO) देखिल 'AMR' हे जागतिक आरोग्य संकट होऊ शकते असा सर्व देशांना इशारा दिला आहे. अँटिबायोटिक (प्रतिजैविक) औषधांच्या परिणामांबाबत आतापर्यंत झालेल्या सर्वात मोठ्या अभ्यासानुसार 2019 मध्ये जगभरात 12 लाखांपेक्षा जास्त लोकांचा मृत्यू अशा जैवविरोधी प्रतिरोधी असलेल्या जीवाणूमुळे झाला आहे. त्यामुळेच सर्वसामान्य लोकांना या बाबत दक्ष करण्यासाठी आणि त्यांना अँटिबायोटिक्सचे आणि त्याचे फायदे - तोटे कळण्यासाठी 18 ते 24 नोव्हेंबर हा आठवडा 'प्रतिजैविक प्रतिकार जागृती सप्ताह' म्हणून साजरा केला जातो.

अँटिबायोटिक्स बाबत घेण्याची काळजी आणि खबरदारी:

- १) कोणताही साधा लहान - सहान आजार असला तरी डॉक्टरांच्या किंवा मेडिकल प्रोफेशन असलेल्या व्यक्तींच्या सल्ल्यानुसारच अँटिबायोटिक्स घ्यावेत.
- २) दिलेल्या अँटिबायोटिक्स औषधांच्या मात्रा आणि वेळा डॉक्टरच्या सल्ल्यानुसारच घ्याव्यात.
- ३) अँटिबायोटिक्स औषधांचा कोर्स पूर्ण करावा व बरे वाटत असेल तरी मध्येच सोडून देऊ नये.
- ४) अँटिबायोटिक्स चे अतिसेवन किंवा एक्सपायर झालेले औषधे घेऊ नये.
- ५) कोणत्याही अँटिबायोटिक औषधाच्या वापरापूर्वी त्यांचे फायदे आणि नुकसान वैद्यकीय तज्ज्ञांकडून विचारून घ्यावे.
- ६) आपली अँटिबायोटिक औषधे आपल्या परिवारातील व्यक्तींना त्यांच्या आजारपणात देऊ नयेत.



MR. SOURABH BHUJBAL



MS. MRUNAL THORAT



MS. SHREYA JADHAV

(STUDENTS- M.Sc. MICROBIOLOGY, SPPU)

Antimicrobial Resistance (AMR): Time is Running Out, Need an Urgent Actions Plans!

Microbes are something we are very familiar with due to the recent pandemic situation. Like the Covid-19 virus, there are numerous other deadly microbes which can cause life-threatening diseases, post infection. To treat these diseases, a large number of drugs, called antimicrobial drugs, are developed which are catered towards different groups of pathogens like bacteria (Gram + and Gram -), viruses, fungi etc.

Antimicrobial resistance occurs when the pathogen to which the drug is targeted towards, changes over time and doesn't respond anymore, leading to increased spreading and severity of the disease and consequent difficulties in treatment. The emergence of drug-resistant microbes globally who are capable of developing methods that confer them resistance against the same or different antimicrobial groups have become a matter of serious concern, especially due to the rapid spread of infections caused by pan- and multi-drug resistant pathogens (superbugs). They are completely resistant to all the available antimicrobial drugs. One such resistant pathogen group is Carbapenem-resistant gram-negative bacteria. Ineffectiveness in treating even the most common bacterial infections, such as UTI, sepsis, STIs etc. by common drugs have led to prolonged period of infections and even high mortality rates due to insufficient means.

AMR can occur due to genetic changes in the microbes, increase or misuse in the administration of antimicrobial drugs, irregular consumption as opposed to that prescribed by physicians and lack of sanitation, hygienic practices. Resistant organisms can spread from person to person via water, soil, air etc. Increased investment and funding for the research and development of new antimicrobial drugs, vaccines, diagnostic tools are the need of the hour. Proper sanitation and public awareness is also crucial in overcoming this global problem.



MS. Nabarima Chowdhury
(STUDENT- M.Sc. MICROBIOLOGY, SPPU)

Antimicrobial Resistance in Agriculture and Livestock Farming

World Antimicrobial Awareness Week (WAAW) an Initiative by WHO is being observed annually from 18-24th November. This initiative aims to increase awareness and understating among laymen about the increasing antimicrobial resistance in common pathogens. For this year, the motto of the WAAW is "Preventing Antimicrobial Resistance Together." With respect to this motto, the present article provides information about antimicrobial resistance in the agriculture and livestock sectors.

Antimicrobials are chemical substances that are administered in controlled amounts to inhibit or slow the growth of microorganisms. These are mostly natural chemical compounds produced by various microorganisms as part of their survival strategies, and they contain genes that encode resistance to the compounds they produce. These antimicrobials have greatly revolutionized medicine and are critical in the treatment of a wide range of microbial infections in humans, both internal and external. Apart from their major human applications, these are widely used in agriculture and livestock farming. However, excessive antimicrobial use fastens the development of antimicrobial resistance, reducing treatment efficacy and jeopardizing the future of human and animal medical interventions. Because of the overuse of antimicrobials, the twentieth century has seen a significant increase in the emergence of microbes that have been observed to modify their genes more quickly and efficiently in order to survive the presence of antimicrobials, assisting them in developing resistance against various antibiotic groups, particularly broad-spectrum antibiotics. Even new generation antimicrobials are reported to be ineffective against such microbes, posing a significant challenge for researchers and necessitating the development of new methods to combat this ever-increasing problem. The development of new strategies to slow or provide an alternative solution to the emerging problem of multiple drug resistance is thus critical. As stated above antimicrobials are widely used in agriculture, livestock, poultry, fisheries, and veterinary medicine. They are most commonly used in agriculture to prevent and cure various crop diseases, whereas, in livestock and animal husbandry, they are most commonly used as growth promoters(colistin) and to prevent/cure infections. There are at least 30 different antimicrobials that are commonly used in agriculture and livestock, the most common of which are macrolides, penicillins, and tetracyclines. Micro-organisms are now adapting to the presence of these antimicrobials and developing resistance against these commonly used antimicrobial resistance is a problem for both animals and, more importantly, humans because resistant bacteria can be transmitted between animals, humans, and the environment. In farming, animals treated with antibiotics can become potential sources of antimicrobial resistance. Resistant bacteria and antibiotic residues from these animals can be transmitted to humans via animal manure spread as fertilizer across the land. This animal manure can be absorbed by food crops, causing resistant bacteria and antibiotic residues to be passed on to humans through food. Excess animal urine and manure can also introduce large amounts of bacteria and antibiotic residues into the soil and water bodies. This leads to transfer and accumulation antimicrobial resistant genes to enter the aquatic gene pool which might further

enhance the antimicrobial resistance issue. Direct contact with animals can also spread resistant bacteria to humans. Transfer of such drug resistant bacteria into humans from different sources can cause a great threat to the individual's life. Hence there is a necessity to curb this ever-increasing drug resistance amongst the microbes. According to international reports, antimicrobial resistance is a global health emergency that, if not addressed, will have serious health consequences as well as negative economic consequences. In response to antimicrobial resistance concerns, international frameworks such as the WHO's 'Global Action Plan' have been developed to address the crisis. In summary, these reports recognize that combating imprudent antimicrobial use globally requires a holistic multidisciplinary approach across countries and organization.



Yaseera Bhombal
Ph.D. student, MICROBIOLOGY, SPPU

विद्यापीठातील सूक्ष्मजीवशास्त्र विभागातर्फे प्रतिजैविक जागरूकता सप्ताह

सावित्रीबाई फुले पुणे विद्यापीठाच्या सूक्ष्मजीवशास्त्र विभागात १८ ते २४ नोव्हेंबर २०२२ दरम्यान 'जागतिक प्रतिजैविक जागरूकता सप्ताहानिमित्त विविध कार्यक्रमाचे आयोजन केले आहे.

जगात प्रतिजैविक प्रतिकाराबाबत जागृती निर्माण करण्यासाठी जागतिक प्रतिजैविक जनजागृती सप्ताह पाळण्यात येतो. या सप्ताहाच्या निमित्ताने प्रतिजैविकांच्या आवश्यक वापराबाबत जनजागृती केली जाते. या क्षेत्रात काम करणाऱ्या सर्व संशोधक, आरोग्य क्षेत्रातील अधिकारी व कर्मचारी, औषध निर्माते, सामान्य नागरिक यांच्या मध्ये याबाबत जनजागृती करण्यात येते.

याचाच एक भाग म्हणून विद्यापीठात या विषयावरील विविध स्पर्धा, प्रश्नमंजुषा आणि तज्ज्ञ व्यक्तींचे मार्गदर्शन आदी कार्यक्रमाचे आयोजन केले आहे. या निमित्ताने विद्यार्थ्यांना त्यांचे या विषयातील ज्ञान विस्तारण्याची संधी मिळेल. विद्यापीठातील सर्व विद्यार्थी, प्राध्यापक, संलग्न महाविद्यालयातील विद्यार्थी यांना या कार्यक्रमांमध्ये सहभागी होता येणार आहे. याबाबतची सविस्तर माहिती विद्यापीठाच्या संकेतस्थळावर प्रसिद्ध करण्यात आली असल्याचे सूक्ष्मजीवशास्त्रच्या विभाग प्रमुख डॉ. करिश्मा परदेसी व या कार्यक्रमाच्या समन्वयक डॉ. सुरेखा सातपुते यांनी सांगितले.



Dr. Surekha K. Satpute
Assistant Professor & Coordinator
Department of Microbiology,
Savitribai Phule Pune University,
Pune- 411007, Maharashtra



Dr. Karishma Pardesi
HEAD,
Department of Microbiology,
Savitribai Phule Pune University,
Pune- 411007, Maharashtra