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Article

Educational Video Improves Knowledge about Outpatients' Usage of Antibiotics in Two Public Hospitals in Indonesia

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Abstract: The inappropriate use or misuse of antibiotics, particularly by outpatients, increases antibiotic resistance. A lack of public knowledge about "Responsible use of antibiotics" and "How to obtain antibiotics" is a major cause of this. This study aimed to assess the effectiveness of an educational video about antibiotics and antibiotic use to increase outpatients' knowledge shown in two public hospitals in East Java, Indonesia. A quasi-experimental research setting was used with a one-group pre-test—post-test design, carried out from November 2018 to January 2019. The study population consisted of outpatients to whom antibiotics were prescribed. Participants were selected using a purposive sampling technique; 98 outpatients at MZ General Hospital in the S regency and 96 at SG General Hospital in the L regency were included. A questionnaire was used to measure the respondents' knowledge, and consisted of five domains, i.e., the definition of infections and antibiotics, obtaining the antibiotics, directions for use, storage instructions, and antibiotic resistance. The knowledge test score was the total score of the Guttman scale (a dichotomous "yes" or "no" answer). To determine the significance of the difference in knowledge before and after providing the educational video and in the knowledge score between hospitals, the (paired) Student's *t*-test was applied. The educational videos significantly improved outpatients' knowledge, which increased by 41% in MZ General Hospital, and by 42% in SG General Hospital. It was concluded that an educational video provides a useful method to improve the knowledge of the outpatients regarding antibiotics.

Keywords: information media; video; patient's knowledge; antibiotics use; antibiotic resistance

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1. Introduction

WHO reported that microbial resistance to antibiotics is a global health problem [1]. It is stated in their *WHO report on surveillance of antibiotic consumption* that the incidence of antibiotic resistance has increased rapidly in Asia, with the highest incidence in Southeast Asia [2,3]. Overprescribing [4], and the use of monotherapy broad-spectrum antibiotics [5,6] are the main causes of antibiotic resistance [7,8]. The reasons for antibiotic overprescribing and the use of monotherapy broad-spectrum antibiotics are the massive antibiotics revenue [9,10], the lack of supervision in antibiotic distribution by the regulatory authorities [11], physician-related factors, and patient-related factors [12]. Basic health research (Riset Kesehatan Dasar) from the Ministry of Health of the Republic of Indonesia [13]

reported that 35.2% of Indonesians keep drugs on hand for self-medication, not only antibiotics but all medicines, and that 86.1% of the population store antibiotics that were obtained without a prescription [14,15].

Various measures need to be taken to prevent the development of antibiotic resistance and to reduce the spread of it [16]. One important aspect is to educate the public on how to use antibiotics correctly, and to convince them not to buy antibiotics without a prescription [17]. The most important patient-related factor is the lack of knowledge about antibiotics and their responsible use [18]. The Indonesian people perceive that antibiotics are "super drugs" for any possible disease, and that they can cure minor ailments caused by viruses, such as flu, colds, and fever [18,19].

Therefore, it is necessary to increase the patients' knowledge by providing reliable information and education about antibiotics and their use [17,20]. In addition, it is not only important to consider the required content of the information that should be delivered to the patients, but also the information media used for conveying the message [21]. Various types of information media exist, including visual, auditory, and visual–auditory media [22]. A scoping review methodology reported positive results from video-based educational interventions (animated presentations, professionals in practice, and patient narratives); the effect differences between printed material and verbal education were statistically significant. Animated video formats offered advantages because elements are relatively easy to add or remove, content can be modified easily and they are flexible enough to accommodate clinical practices. Patients also tend to be more receptive to animated videos. In several studies, animated videos consistently showed improvement in short-term outcomes such as the knowledge and comprehension of the information provided by the healthcare team [23]. A video used to teach patients/parents about the appropriate use of antibiotics was shown to be more effective than a pamphlet. It increased knowledge and improved behavior [24,25]. It also showed longer-term knowledge retention, the post-intervention survey scores remaining high [26,27]. Recent studies carried out in Indonesia showed that watching an informative video positively influenced a patient's or caregiver's knowledge and perception of antibiotic use [18,28].

1.1. Aim of the Study

This study aimed to assess the effect of providing information in the form of an animated video containing information about antibiotics, to improve outpatients' knowledge.

1.2. The Impact on Practice

Antibiotics should only be taken when prescribed by a physician. However, there is no strict regulation preventing patients from buying antibiotics without a prescription in pharmacies in Indonesia. The assumed benefits of antibiotics may cause a patient to purchase them for every symptom, even for minor ailments. The patients' understanding of how to use antibiotics responsibly and how to obtain antibiotics correctly is still very poor in Indonesia. Self-medication behavior in this respect is dangerous and may pose a serious threat to the development of microbial resistance to antibiotics. This study shows that an educational video increases the patients' knowledge about the responsible use of antibiotics, and about procedures for obtaining antibiotics correctly. This increase in knowledge may help to reduce the risk of antibiotic resistance development.

2. Results

The study on the effect of the educational video was carried out to improve patients' knowledge on the responsible use of antibiotics and procedures for obtaining antibiotics. The characteristics of the respondents from MZ General Hospital and SG General Hospital are provided in Table 1. The number of females visiting the two hospitals was higher than that of males (52% in MZ General Hospital and 74% in SG General Hospital). The age distribution of the outpatients in the range of 18–45 years was 97% for MZ General Hospital, and 59% for SG General Hospital.

Table 1. Respondents' demographic characteristics.

Characteristic	MZ General Hospital (n = 98)	SG General Hospital (n = 96)
	n (%)	n (%)
Gender		
Male	47 (48.0)	25 (26.0)
Female	51 (52.0)	71 (74.0)
Age (years old)		
18–25	12 (12.2)	8 (8.3)
26–35	36 (36.7)	12 (12.5)
36–45	47 (48.0)	37 (38.5)
46–60	3 (3.1)	38 (39.6)
>60	0 (0)	1 (1.0)

Table 2 shows that the total score of patients' knowledge about antibiotics before the intervention (pre-test) was 58.8 in MZ General Hospital and 62.6 in SG General Hospital, while after the intervention the score was 82.7 at MZ General Hospital and 88.8 at SG General Hospital. Knowledge improvement was significant ($p < 0.05$) in both hospitals.

Among the five domains, there were two showing a significant improvement after intervention: "Obtaining the Antibiotics" (MZ: from 44.9 to 77.6; SG: from 53.1 to 95.8; $p < 0.05$) and the "Directions for Use" (MZ: from 64.3 to 81.6; SG: from 63.9 to 91.5; $p < 0.05$) (Figure 1).

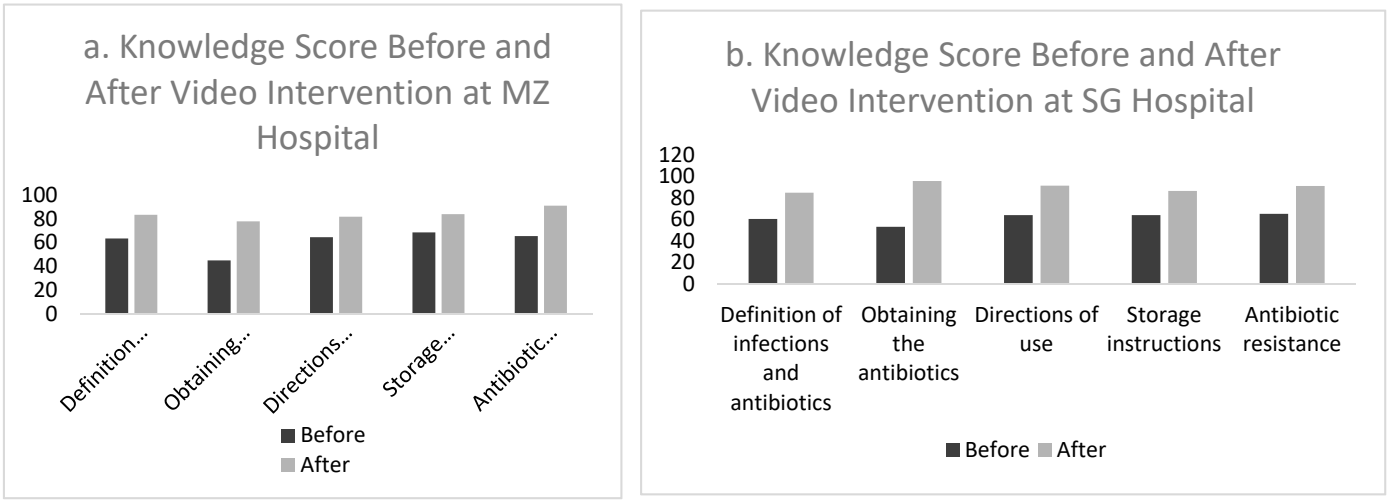

Figure 1. (**a**) Score of patient's knowledge (%) before and after video intervention at (**a**) MZ General Hospital, and (**b**), SG General Hospital.

The results of the pre-test of question Q1 showed that respondents at MZ General Hospital already had adequate knowledge that antibiotics are used for bacterial infections, with a score of 95.9. The respondents also had a good knowledge that antibiotics should be taken regularly (the pre-test score of Q10 was 73.5). On the other hand, the respondents at the SG General Hospital already knew that antibiotics would be ineffective when stored in a place exposed to sunlight, and also understood that being infected with antibiotic-resistant bacteria may result in higher costs of treatment (pre-test scores of Q14 and Q18 were 70.8).

Table 2. Knowledge score test difference between hospitals.

	Questions	MZ General Hospital			SG General Hospital			Δ *p*-Value
		Pre	Post	Δ	Pre	Post	Δ	
	Domain: Definition of Infections and Antibiotics	63.3	83.2	19.9	60.4	84.9	24.5	0.278
Q1	Antibiotics are medicines used to treat diseases caused by bacterial infections.	95.9	98.0	2.0	50.0	90.6	40.6	0.000
Q2	Antibiotics are remedies for diseases with symptoms of fever, runny nose, and sore throat.	29.6	68.4	38.8	56.3	78.1	21.9	0.049
Q3	Amoxicillin/ampicillin/ciprofloxacin/cefixime/ chloramphenicol/rifampicin/tetracycline/ erythromycin are antibiotics.	N/A	N/A	N/A	68.8	88.5	19.8	-
Q4	Constant use of hand sanitizer or soap before doing an activity can prevent infection transmission.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Q5	Wearing a face mask when suffering a cough, cold or flu, will prevent infection transmission.	N/A	N/A	N/A	66.7	82.3	15.6	-
	Domain: Obtaining the Antibiotics	44.9	77.6	32.4	53.1	95.8	42.7	0.125
Q6	Antibiotics are medicines that can be purchased without a doctor's prescription.	40.8	81.6	40.8	N/A	N/A	N/A	-
Q7	If the disease has the same symptoms as a relative or a friend has, the patient can use the antibiotics left over by the relative or friend.	59.2	78.6	19.4	53.1	95.8	42.7	0.004
Q8	Antibiotics can be purchased from supermarkets or drug stores.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Domain: Directions for Use	64.3	81.6	17.3	63.9	91.5	27.2	0.042
Q9	If the condition has improved, the amount or dose of antibiotics to be taken must remain the same until the entire course of antibiotics is complete.	35.7	73.5	37.8	67.7	100	32.3	0.474
Q10	Antibiotics must be taken every day following the schedule directed by the doctor or the pharmacist until the course of antibiotics is finished.	73.5	91.8	18.4	60.4	83.3	22.9	0.577
Q11	Failure to comply with the antibiotics' directions used as suggested by the doctor or pharmacist leads to an incomplete or no recovery from the disease.	N/A	N/A	N/A	64.6	91.7	27.1	-
Q12	Consumption of a food or beverage that the doctor or pharmacist recommends avoiding during the antibiotic course can reduce the efficacy of the drugs.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Domain: Storage Instructions	68.4	83.7	15.3	63.9	86.6	22.3	0.288
Q13	The remaining antibiotic tablet or syrup can be stored and used again if the same disease occurs.	55.1	71.4	16.3	58.3	90.6	32.3	0.056
Q14	Antibiotics will be ineffective when stored in a place exposed to sunlight.	68.4	83.7	15.3	70.8	88.5	17.7	0.770
Q15	Antibiotics can be stored in a freezer.	N/A	N/A	N/A	63.54	81.25	17.71	-
	Domain: Antibiotic Resistance	65.3	90.8	25.5	65.2	91.2	25.5	0.998
Q16	Stopping the use of antibiotics before completing the course of treatment recommended by the doctor can cause the bacteria to become resistant.	69.4	86.7	17.4	59.4	86.5	27.1	0.245
Q17	When bacteria become resistant to antibiotics, the duration of the antibiotic course will not be affected.	54.1	93.9	39.8	N/A	N/A	N/A	-
Q18	Being infected with antibiotic-resistant bacteria can result in higher costs of treatment.	N/A	N/A	N/A	70.8	93.8	22.9	-
Q19	Being infected with antibiotic-resistant bacteria can have a deadly outcome.	N/A	N/A	N/A	66.7	92.7	26.0	-
	Total	58.8	82.7	23.9	62.6	88.8	26.2	-

Δ *p*-values refer to Student's *t*-test of Δ values; Δ values represent the differences in knowledge scores of hospital respondents before and after intervention. N/A: not available.

Video intervention significantly improved the patient's knowledge that antibiotics are medicines that can be purchased without a doctor's prescription. This is obvious from the increased score of 40.8 for question Q6 at MZ General Hospital. At SG General Hospital, a significant improvement was seen in the knowledge about the fact that left-over antibiotics (e.g., from relatives) cannot be used in the case that the patient has similar symptoms (increased score of 42.7 for question Q7).

The respondents from both hospitals misunderstood the indicators for antibiotics. This incorrect knowledge is related to question Q1 and Q2, i.e., antibiotics are medicines used not only for diseases caused by bacterial infections, but also for diseases with symptoms of fever, runny nose, and sore throat. The knowledge score before the intervention was 95.9 (Q1) and 29.6 (Q2) at MZ General Hospital; 50.0 (Q1) and 56.3 (Q2) at SG General Hospital.

The paired Student's *t*-test comparing pre- and post-intervention in each hospital revealed that the difference in the knowledge score before and after the intervention was statistically significant ($p < 0.05$) (Table 2).

3. Discussion

Our study to reduce the inappropriate use of antibiotics in outpatients was performed by providing information in the form of an educational video prior to dispensing the medication to outpatients at two General Hospitals in two regencies in the East Java Province of Indonesia, followed by evaluating the effect of watching the video. The results of the current study are in line with those from previously reported studies on a similar topic. Earlier studies showed that a "personalized" video intervention about responsible antibiotics use (provided in the local language) is useful to enhance public awareness on this topic [27–29]. This was especially shown for the use of antibiotics (or not) to treat specific diseases, and for parents taking care of their children and being too eager to give them antibiotics [27].

The outpatient age distribution in this study reflects an "age–sex pyramid" population. The growth rate in the S-regency population (1.10) was higher than in the L-regency population (0.02). The distribution of various age groups in the S-regency population forms the expansive shape of a pyramid, showing that the population is growing, while an equal proportion in each age group of the L-regency population points to a stationary population pyramid. The difference between the female and male ratios may be ascribed to the differences in regional population and the characteristics of the two hospitals. Although both are general hospitals, the focus of the two hospitals is slightly different. SG General Hospital has a beauty clinic (aesthetics) and serves a larger female population, comparable with the larger female population in the region.

The knowledge increment about antibiotics of the respondents after watching the video in the S regency (23.9) was lower than that of respondents in the L regency (26.2). The results of the post-test of respondents at the L regency were significantly higher than those of the post-test of respondents at the S regency ($p = 0.001$). Similar to Schoen's study outcome [30], but different from Hjorth-Johansen's [31], our study shows that a higher baseline knowledge produced a higher knowledge increment.

In Indonesia, antibiotics are a prescription-only medicine. They bear a circle with a red color logo on the packaging, but patients with a lack of knowledge are unaware of this and purchase antibiotics for every symptom, even for minor ailments, thereby assuming the general benefits of antibiotics. In both hospitals, the initial outpatients' knowledge about how to obtain antibiotics was low (45.2 and 53.0). The outpatients did not know that antibiotics are prescription-only medicines (POM) [32] and are only indicated for the treatment of infectious diseases caused by bacteria. This situation is a yet-unknown threat from the community because people use antibiotics heedlessly, thereby unintentionally bringing harm to themselves and to others. The respondents' knowledge about obtaining antibiotics is associated with their lack of knowledge about antibiotic resistance [33].

Research showed that health education regarding the use of an assistive device is more effective than lectures because the animation video increases people's engagement

and interest [34–36]. An educational video may improve the patients' knowledge to a greater extent, so that people understand the content and can correctly answer when they are subsequently tested. Good knowledge provides better understanding, since regular exposure to accurate information can raise awareness and is likely to change behavior. Accordingly, educational video materials can yield many benefits as a tool for health prevention and promotion programs in the community, particularly concerning infectious diseases [26].

The patients' baseline knowledge about correct indications for antibiotics and antibiotic resistance varied even in the same typical area, as the difference of the respondent pre-test score in both hospitals was statistically significant. After watching the five-minute education video, a patient's knowledge may increase substantially. Besides this, many patients do not know that antibiotics are prescription-only medicines, but that there are no strict regulations for buying antibiotics without a prescription in Indonesia [37]. An immediate result of education is the increment of knowledge before and after the delivery of the information. This study cannot evaluate any patient behavioral change because a behavioral change is at level 3 of the benefit of education. The Kirkpatrick Model is a globally recognized method of evaluating the results of training and learning programs. It assesses both formal and informal training methods and rates them against four levels of criteria: reaction, learning, behavior, and results [38]. To become a habit, we recommend that healthcare practitioners provide this type of education regularly or each time a patient receives antibiotics. Customization is a long process, and a successful strategy for the rational use of medicines in any district in Java needs a combination of activities, i.e., educational, managerial, and regulational change [39,40].

Limitations

There are several limitations to our study. First, it was carried out in a regional setting. The study results are limited to two hospitals with their own specific characteristics in East Java, and do not represent the general Indonesian population. In total, there are thirty-nine government-sponsored general hospitals in East Java that cover thirty-eight regencies/cities. However, the results of our study may be seen as good practice for other hospitals. Second, it shows a seasonal result because of a purposive sampling strategy during the study period [41]. Third, there may be an influence of respondent self-reports because of face-to-face education (Hawthorne effect) [42]. Fourth, there is uncertainty as to longer-term changes in patient behavior, because of a short exposure to the education material [24].

4. Materials & Methods

4.1. Study Design

A one-group pre-test—post-test design in quasi-experimental research was conducted to determine the effect of the intervention on the participants. The participants in this study were recruited with a purposive sampling technique. The inclusion criterion was an outpatient receiving an antibiotic prescription. All participants who met this inclusion criterion and gave verbal consent were included in the study.

All participants who gave consent completed a pre-test to assess their initial condition (Appendix A). All participants were requested to answer a similar questionnaire before (pre-) and after (post-) watching the educational video from a laptop. The participants watched the video in the waiting room, one participant for every session, privately. The length of the video was 4 min and 40 s. It started with an opening section, introduction, information about infections, antibiotics definition, the procedure to obtain antibiotics, antibiotic administration, antibiotic storage, antibiotic resistance definition and prevention, infection transmission prevention, and ended with a compelling visual that ties to a take-home message at a closing section (Appendix B). The video can be watched via the link: https://youtu.be/UFa3YS5xhAQ, accessed on 18 May 2021 [43].

The study population consisted of outpatients in MZ General Hospital and SG General Hospital that met the inclusion criteria of visiting the hospital for infectious disease, and receiving an antibiotic prescription. The study was done within the period of November 2018 to January 2019. Both the MZ General Hospital and SG General Hospital are the largest hospitals in the S regency and L regency, located 22 km and 43 km, respectively, from Surabaya, the capital city of East Java Province. In Indonesia, there are primary care centers and referrals to secondary or tertiary care facilities. General practitioners work at the primary care center, whereas specialist doctors work at secondary or tertiary care centers. This study was held in the outpatient clinic of two secondary care centers.

The questionnaire was developed based on existing literature [40] and consisted of 19 questions categorized in five domains: five items under "Definition of Infections and Antibiotics", three items under "Obtaining the Antibiotics", four items under "Directions for Use", three items under "Storage Instructions", and four items under "Antibiotic Resistance". The questionnaire included all questions used, but not every question was applicable for both hospitals. When assessing face validity, several questions were dropped based on a good Cronbach alpha (reliability test) outcome. The reliability of the research questionnaire is considered to be good; the Cronbach alpha value was more than 0.6 for 10 item questions in MZ General Hospital, and 14 item questions in SG General Hospital [44]. In this study, the Cronbach's alpha was 0.742 (MZ General Hospital) and 0.762 (SG General Hospital). The face-to-face interview data collection method was used before and after watching the video.

The following formula was used for calculating the adequate sample size in the prevalence study, wherein n is the sample size, Z is the standard normal variate at 5% type I error, $p < 0.05$ (1.96), P is the expected prevalence (0.5), and d is the precision of the effect size (0.1) [45]. There were 98 outpatients at MZ General Hospital, and 96 outpatients at SG General Hospital, who participated in the study.

$$n = \frac{Z^2 P\,(1-P)}{d^2} \quad (1)$$

4.2. Statistical Analysis

The total knowledge test score was a cumulative score on the Guttman scale, where the respondents selected a "yes" or "no" answer for each individual item question. The answers were analyzed descriptively. The percentage of the correct answers is reported in the tables below. To determine the significance of the difference in knowledge before and after providing the educational video, a paired Student's *t*-test was applied. To examine the difference in the knowledge score between hospitals, Student's *t*-test was applied.

5. Conclusions

The use of educational videos may increase a patient's knowledge and awareness about the appropriate use of antibiotics. An educational video will improve patients' short-term knowledge about the purchase and correct use of antibiotics, in order to reduce microbial resistance. However, one-time education will not definitely change behavior. Education must be provided continuously until it becomes habitual to use antibiotics correctly and responsibly. Besides this, stricter regulation is needed to avoid dispensing antibiotics without a prescription. A successful strategy for advancing the rational use of antibiotics is a combination of educational, managerial, and regulatory measures.

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Institutional Review Board Statement: The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the Institutional Review Board (or Ethics Committee) of the Health Research Ethics Commission of the Surabaya Ministry of Health Office (number 025/5/KEPK/V/2017 and 9 May 2017).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: No new data were created or analyzed in this study. Data sharing is not applicable to this article.

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Conflicts of Interest: The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Appendix A

Table A1. The patient's knowledge questionnaire used before and after video intervention (Indonesian language version).

No.	Questions	True	False
Domain: Definition of Infections and Antibiotics (*Definisi Infeksi dan Antibiotik*)			
Q1.	*Antibiotik adalah obat untuk mengatasi penyakit yang disebabkan oleh infeksi bakteri.* Antibiotics are medicines used to treat diseases caused by bacterial infections.		
Q2.	*Penyakit dengan gejala demam, seperti pada flu/pilek, radang tenggorokan dapat diobati dengan antibiotik.* Antibiotics are remedies for diseases with the symptoms of fever, runny nose, and sore throat.		
Q3.	*Amoksisilin/ampisilin/siprofloksasin/sefixim/kloramfenikol/rifampisin/tetrasiklin/eritromisin adalah antibiotik.* Amoxicillin/ampicillin/ciprofloxacin/cefixime/chloramphenicol/rifampicin/tetracycline/erythromycin are antibiotics.		
Q4.	*Kebiasaan menggunakan cairan antiseptik (hand rub) atau sabun untuk mencuci tangan sebelum melakukan aktivitas dapat mencegah penularan infeksi.* Constant use of hand sanitizer or soap before doing an activity can prevent infection transmission.		
Q5.	*Menggunakan masker ketika menderita batuk, pilek & flu adalah tindakan untuk mencegah penyebaran infeksi.* Wearing a face mask when suffering from cough, cold or flu will prevent infection transmission.		
Domain: Obtaining the Antibiotics (*Cara Memperoleh*)			
Q6.	*Antibiotik adalah obat yang dapat dibeli tanpa resep dokter.* Antibiotics are medicines that can be purchased without a doctor's prescription.		
Q7.	*Jika mengalami penyakit dengan gejala yang sama dengan anggota keluarga atau teman dapat menggunakan sisa antibiotik dari keluarga atau teman yang sakit.* If the patient's disease has the same symptoms as a relative or a friend has, the patient can use the antibiotics left over by the relative or friend.		
Q8.	*Antibiotik bisa diperoleh di swalayan/supermarket/toko obat.* Antibiotics can be purchased from supermarkets or drug stores.		
Domain: Directions for Use (*Aturan Pakai*)			
Q9.	*Jika kondisi sudah membaik, jumlah atau takaran antibiotik yang diminum harus tetap sama sehingga seluruh antibiotik habis.* If the condition has improved, the amount or dose of antibiotics to be taken must remain the same until the entire course of antibiotics is complete.		
Q10.	*Antibiotik harus dikonsumsi setiap hari sesuai jadwal yang diinformasikan dokter atau tenaga kesehatan sampai habis.* Antibiotics must be taken every day following the schedule directed by the doctor or the pharmacist, until the course of antibiotics is finished.		

Table A1. *Cont.*

No.	Questions	True	False
Q11.	*Minum obat antibiotik yang tidak sesuai aturan pakai seperti anjuran dokter atau apoteker, membuat penyakit sembuhnya tidak tuntas.* Failure to comply with the antibiotics' directions for use as suggested by the doctor or pharmacist leads to an incomplete or no recovery from the disease.		
Q12.	*Mengkonsumsi makanan atau minuman yang disarankan oleh dokter atau apoteker untuk dihindari saat saya mengkonsumsi antibiotic dapat mengurangi kemanjuran obat yang saya konsumsi.* Consumption of food or beverage that the doctor or pharmacist recommends avoiding during antibiotics that can reduce the efficacy of the medicine.		
Domain: Storage Instructions (*Cara Penyimpanan*)			
Q13.	*Antibiotik yang tersisa dapat disimpan dan diminum kembali jika muncul sakit yang sama.* The remaining antibiotics tablet or syrup can be stored and used again if the same disease occurs.		
Q14.	*Antibiotik akan rusak jika disimpan pada tempat yang terkena sinar matahari.* Antibiotics will be ineffective when stored in a place exposed to sunlight.		
Q15.	*Antibiotik boleh disimpan di* freezer. Antibiotics can be stored in a freezer.		
Domain: Antibiotic Resistance (*Resistensi Antibiotik*)			
Q16.	*Menghentikan minum antibiotik tidak sesuai waktunya yang telah disarankan dokter menyebabkan bakteri menjadi kebal (resisten).* Stopping the use of antibiotics before completing the course of treatment recommended by the doctor can cause the bacteria to become resistant.		
Q17.	*Jika bakteri sudah kebal antibiotik, tidak akan mempengaruhi lama pengobatan.* When bacteria become resistant to antibiotics, the duration of the antibiotic course will not be affected.		
Q18.	*Terinfeksi bakteri kebal antibiotik dapat mengakibatkan biaya pengobatan lebih mahal.* Being infected with antibiotic-resistant bacteria can result in higher costs of treatment.		
Q19.	*Terinfeksi bakteri kebal antibiotik dapat menyebabkan kematian.* Being infected with antibiotic-resistant bacteria can have a deadly outcome.		

Appendix B

Table A2. The Educational Video Script. The antibiotic educational video narrative "Mengenal antibiotik dan resistensi antibiotik".

The Narrative Description	Images
Opening:	
	Open View: logo UBAYA and RISTEKDIKTI

Table A2. *Cont.*

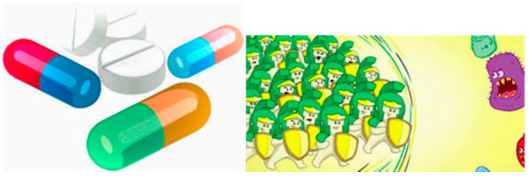
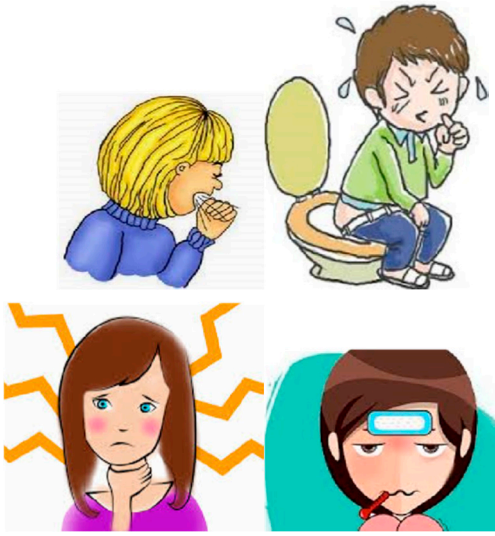
The Narrative Description	Images
Scene 1: Introduction	
Bacteria, viruses, and fungi can be anywhere, such as on pillows, stationery, drinking bottles, cars, and even cell phones, lift handles and door handles. If infected by bacteria, you can be treated with antibiotics. To find out if there is a bacterial infection, check with your doctor.	Illustrations of bacteria, pillows, stationery, drinking bottles, cars, cell phones, lift handles, and door handles. 
	Illustration of medicines- Illustration of invite to check the medical condition to a doctor Medicines Antibiotic 
Scene 2: Antibiotic definition and the procedure to obtain them	
Antibiotics cannot be used to treat cough and flu, fever, sore throat, or diarrhea, that are caused by viruses.	Illustration of people with cough, fever, sore throat, and diarrhea. 
There are many antibiotics on the market, such as Amoxicillin, Ciprofloxacin, Cefadroxil, Erythromycin, and Tetracycline.	Illustration of antibiotic drugs (bottles, capsules, tablets) with the brand name: Amoxicillin (Amoxan), Ciprofloxacin (Ciproxin), Cefadroxil (Lapicef), Erythromycin (Erysanbe), Tetracycline (Super Tetra).

Table A2. *Cont.*

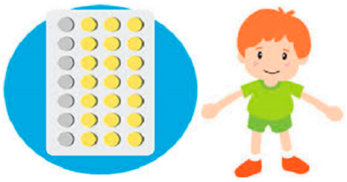
The Narrative Description	Images
Antibiotics can only be obtained with a prescription from a medical doctor.	Pictures of doctors and prescriptions, and a pharmacist. 
Never take antibiotics from someone else or without a doctor's prescription.	Illustration of a doctor's prescription; and "people receiving pills into the hand" marked with a red cross.
Scene 3: Antibiotic Administration & Storage	
The antibiotics must be used as indicated on the label instruction.	Illustration of medicine and its label of instruction.
Antibiotics in use must be stored properly, in a tightly closed container and a dry place. Avoid exposure to direct sunlight. Keep out of reach of children. A reconstituted antibiotic dry syrup in water should not be used for more than 7 days. The dry powder antibiotic should be stored in a dry place, such as on a separate shelf or in a medicine cabinet.	Illustration of a patient taking antibiotics. Illustration of a tightly closed container (Ziplock). Illustration of medicines stored in a medicine cabinet. Illustration of medicines stored away from direct sunlight. Illustration of young children reaching for the medicine on the shelf and then "the medicine marked with a red cross". Illustration of a reconstituted antibiotic dry syrup in water, stored in the refrigerator; and then a bottle with the text "stored for more than 7 days" with spilled/poured contents. Illustration of a dry powder antibiotic stored in a medical cabinet (a dry place).
Antibiotics must be taken regularly until the course is complete.	Illustration of antibiotics must be taken until the prescription is complete, even if feeling better. Illustration of drug labels with the text "Harus Dihabiskan". 
Stopping the administration of antibiotics in the middle of a course can cause infectious with bacteria that have not died to become resistant to the antibiotics in the future.	Illustration of an open blister of antibiotic drugs (only taken 1–2 days) and the text "bakteri resisten = bakterinya kebal".
Use antibiotics when necessary and as directed, to prevent antibiotic resistance.	Illustration of text "Baik dan Benar" and picture of healthy people 

Table A2. *Cont.*

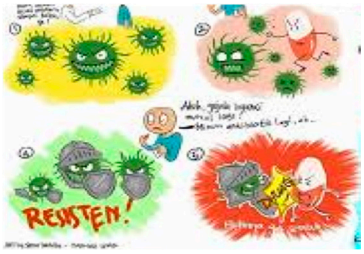
The Narrative Description	Images
Antibiotics such as tetracycline or ciprofloxacin (packaged tetracycline and ciprofloxacin are marked with a prescription-only medicine (POM) logo, a circle with red color) should not be taken together with milk, or ulcer medications such as Mylanta, and with vitamins that contain iron and calcium.	Illustration of people taking the medicine and then pictures of milk; eggs; stomach ulcer and Mylanta; a vitamin containing Fe and Ca, which is then marked with a red cross. 
Scene 4: Antibiotic Resistance	
Antibiotic resistance is a condition that antibiotics cannot kill the bacteria that invade the human body.	Illustration of antibiotics attacking bacteria, but bacteria have a shield so the antibiotics cannot kill the bacteria. Illustration of bacteria with the text "bakteri menjadi kebal" 
Scene 5: Antibiotic Resistance Prevention	
Some factors that can cause antibiotic resistance are: taking antibiotics irregularly; not finishing the entire antibiotic course; not following the doctor's instructions and recommendations.	Illustration of text with the addition of bubble text 
Inappropriate antibiotic use promotes antibiotic resistance. Antibiotic resistance causes infections to become harder to treat, higher medical costs, and higher mortality rates.	Illustration of a very sick patient in a bed  Illustration of Money  Illustration of Death 

Table A2. *Cont.*

The Narrative Description	Images
REMEMBER! Never purchase antibiotics without a doctor's prescription and don't take antibiotics prescribed for someone else.	
Let's use antibiotics properly and correctly to prevent antibiotic resistance, to stay healthy, and keep others healthy! Antibiotics that continue to be effective for us are a valuable asset for our children and grandchildren.	
Scene 6: Infection Transmission Prevention	
THEREFORE We must be keeping our environment clean to prevent infection: 1. Wash your hands before and after activities, according to the six steps of WHO hand-washing.In addition to taking precautions, we should wear a mask when coughing and when we have 'flu.	Illustration of hand-washing steps Illustration of a person wearing a mask 
Scene 7: The end	
Closing scene: Script consultants: Fauna Herawati, S.Si.,M.Farm-Klin., Apt Dr. Rika Yulia, S.Si., Sp.FRS., Apt. Voice actors: Patricia Valery R Ayu Amalia Putri Zakiya Bastiani Nur Sulthan Ismatul Hidayah Marzuki Bustanul Arifin Ikhwan Prasetyo	

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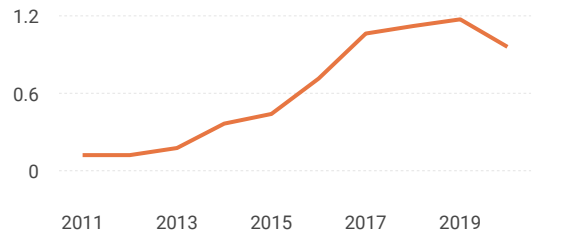

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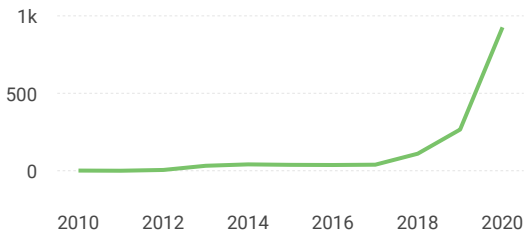

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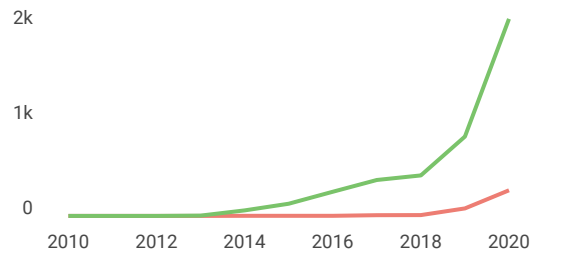

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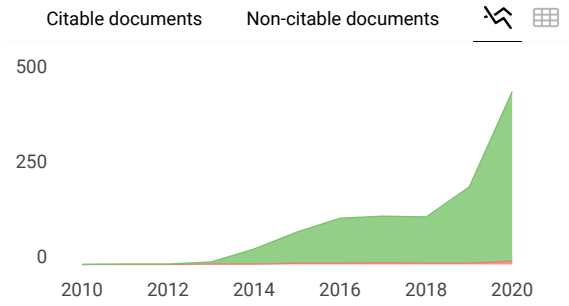

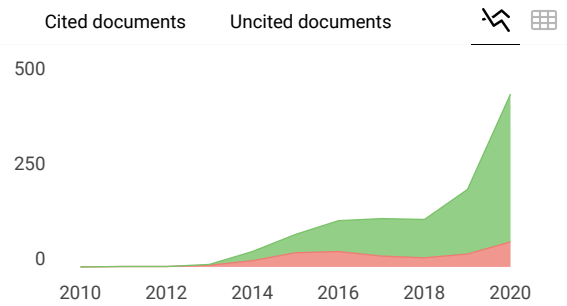

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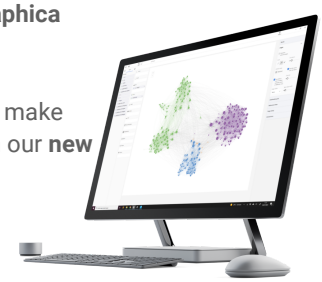

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Special Issue in *Antibiotics*: Multi-Drug Resistant Gram-Negative Infections: Molecular Epidemiology, Microbiological Diagnosis and Antimicrobial Treatment

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Special Issue in *Antibiotics*: Mining for New Antibiotics

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Special Issue in *Antibiotics*: Antibiotics Use and Antimicrobial Resistance in Hospital

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Special Issue in *Antibiotics*: Antimicrobial-Resistant Pathogens Isolated from Animals and Their Products

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Special Issue in *International Journal of Molecular Sciences*: Microbial Biofilms and Antibiofilm Agents
Special Issue in *International Journal of Molecular Sciences*: Microbial Biofilms and Antibiofilm Agents 2.0

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Special Issue in *Microorganisms*: Clinical Implications of Microbial Biofilm

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Special Issue in *Microorganisms*: Virulence of Viruses and Their Interaction with the Immune System

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Special Issues and Collections in MDPI journals
Special Issue in *Pharmaceutics*: Protein Therapeutics
Special Issue in *Molecules*: Dendrimers as Nanocarriers for Drug Delivery

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Antibiotics, Volume 10, Issue 5 (May 2021) – 141 articles

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Development and Pilot of an Interactive Online Course on Antimicrobial Stewardship in Companion Animals

by **Nonke E. M. Hopman**, **Jaap A. Wagenaar**, **Ingeborg M. van Geijlswijk** and **Els M. Broens**

Antibiotics 2021, *10*(5), 610; https://doi.org/10.3390/antibiotics10050610 - 20 May 2021

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Abstract A holistic approach to antimicrobial use (AMU) and prescribing is needed to combat the problem of antimicrobial resistance (AMR). Previously, an antimicrobial stewardship programme (ASP) was developed, introduced, and evaluated in 44 Dutch companion animal clinics, which resulted in an optimization of AMU. [...] Read more.

(This article belongs to the Special Issue Antimicrobial Stewardship in Veterinary Medicine)

Open Access Brief Report

Inhibition of LpxC Increases the Activity of Iron Chelators and Gallium Nitrate in Multidrug-Resistant *Acinetobacter baumannii*

by **Victor Vinuesa**, **Raquel Cruces**, **Francesca Nonnoi** and **Michael J. McConnell**

Antibiotics 2021, *10*(5), 609; https://doi.org/10.3390/antibiotics10050609 (registering DOI) - 20 May 2021

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Abstract Infections caused by multidrug-resistant *Acinetobacter baumannii* would benefit from the development of novel treatment approaches. Compounds that interfere with bacterial iron metabolism, such as iron chelators and gallium nitrate, have previously been shown to have antimicrobial activity against *A. baumannii*. In this [...] Read more.

(This article belongs to the Section Novel Antimicrobial Agents)

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Multi-Drug Resistant Organisms Infection Impact on Patients Length of Stay in Respiratory Care Ward

by **Yi-Ping Chen**, **Xian-Wen Tasi**, **Ko Chang**, **Xuan-Di Cao**, **Jung-Ren Chen** and **Chien-Sen Liao**

Antibiotics 2021, *10*(5), 608; https://doi.org/10.3390/antibiotics10050608 - 20 May 2021

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Abstract This study aimed to investigate the effects of multi-drug-resistant organism (MDRO) infection and other factors on the length of hospital stay (LOS) of patients in the respiratory care ward (RCW) of a regional hospital in Taiwan. In this retrospective study, we collected cases [...] Read more.

(This article belongs to the Special Issue Multi-Drug Resistant Gram-Negative Microorganisms: Epidemiology, Treatment and Alternative Approach)

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Sensitivity of Staphylococcal Biofilm to Selected Compounds of Plant Origin

by **Denis Swolana**, **Małgorzata Kępa**, **Agata Kabała-Dzik**, **Radosław Dzik** and **Robert D. Wojtyczka**

Antibiotics 2021, *10*(5), 607; https://doi.org/10.3390/antibiotics10050607 - 20 May 2021

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Abstract *Staphylococcus epidermidis* is a bacterium that belongs to the human microbiota. It is most plentiful on the skin, in the respiratory system, and in the human digestive tract. Moreover, it is the most frequently isolated microorganism belonging to the group of Coagulase Negative [...] Read more.

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Educational Video Improves Knowledge about Outpatients' Usage of Antibiotics in Two Public Hospitals in Indonesia

by **Fauna Herawati**, **Rika Yulia**, **Bustanul Arifin**, **Ikhwan Frasetyo**, **Setiasih**, **Herman J. Woerdenbag**, **Christina Avanti** and **Retnosari Andrajati**

Antibiotics 2021, *10*(5), 606; https://doi.org/10.3390/antibiotics10050606 - 20 May 2021

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Abstract The inappropriate use or misuse of antibiotics, particularly by outpatients, increases antibiotic resistance. A lack of public knowledge about "Responsible use of antibiotics" and "How to obtain antibiotics" is a major cause of this. This study aimed to assess the effectiveness of an [...] Read more.

(This article belongs to the Special Issue Antimicrobial Use, Resistance and Stewardship)

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The Perfect Condition for the Rising of Superbugs: Person-to-Person Contact and Antibiotic Use Are the Key Factors Responsible for the Positive Correlation between Antibiotic Resistance Gene Diversity and Virulence Gene Diversity in Human Metagenomes

by **Célia P. F. Domingues**, **João S. Rebelo**, **Joël Pothier**, **Francisca Monteiro**, **Teresa Nogueira** and **Francisco Dionisio**

Antibiotics 2021, *10*(5), 605; https://doi.org/10.3390/antibiotics10050605 (registering DOI) - 20 May 2021

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Abstract Human metagenomes with a high diversity of virulence genes tend to have a high diversity of antibiotic-resistance genes and vice-versa. To understand this positive correlation, we simulated the transfer of these genes and bacterial pathogens in a community of interacting people that take [...] Read more.

(This article belongs to the Special Issue Antibiotic Resistance Genes: Spread and Evolution)

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Enrofloxacin Dose Optimization for the Treatment of Colibacillosis in Broiler Chickens Using a Drinking Behaviour Pharmacokinetic Model

by Robin Temmerman, Ludovic Pelligand, Wim Schelstraete, Gunther Antonissen, An Garmyn and Mathias Devreese

Antibiotics 2021, *10*(5), 604; https://doi.org/10.3390/antibiotics10050604 - 19 May 2021

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Abstract Enrofloxacin is frequently administered via drinking water for the treatment of colibacillosis in broiler chickens. However, the EMA/CVMP has urged to re-evaluate historically approved doses, especially for antimicrobials administered via drinking water. In response, the objectives of this study were two-fold. First, to [...] Read more.

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An Antisense *yycF* RNA Modulates Biofilm Organization of Methicillin-Resistant *Staphylococcus aureus* and Pathogenicity in a Rat Model of Osteomyelitis

by Shizhou Wu, Yunjie Liu, Lei Lei and Hui Zhang

Antibiotics 2021, *10*(5), 603; https://doi.org/10.3390/antibiotics10050603 - 19 May 2021

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Abstract *Staphylococcus aureus* (*S. aureus*) is one of most common opportunistic pathogens and is attributed to several human infections. The increasing incidence of methicillin-resistant *S. aureus* (MRSA) is a serious clinical threat for osteomyelitis crisis. The YycFG two-component system of *S. aureus* [...] Read more.

(This article belongs to the Special Issue Antibiotic Resistance and Treatment of MRSA Infection)

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Pharmacodynamic Evaluation of a Single Dose versus a 24-Hour Course of Multiple Doses of Cefazolin for Surgical Prophylaxis

by Aaron Heffernan, Jowana Alawie, Steven C Wallis, Saiyuri Naicker, Santosh Adiraju, Jason A. Roberts and Fekade Bruck Sime

Antibiotics 2021, *10*(5), 602; https://doi.org/10.3390/antibiotics10050602 - 19 May 2021

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Abstract The optimal perioperative duration for the administration of cefazolin and other prophylactic antibiotics remains unclear. This study aimed to describe the pharmacodynamics of cefazolin for a single 2 g dose versus a 24 h course of a 2 g single dose plus a [...] Read more.

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Antibiotic Prescriptions among China Ambulatory Care Visits of Pregnant Women: A Nationwide Cross-Sectional Study

by Houyu Zhao, Mei Zhang, Jiaming Bian and Siyan Zhan

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Abstract Background: Antibiotic use in pregnant women at the national level has rarely been reported in China. Objectives: We aimed to investigate antibiotic prescriptions during pregnancy in ambulatory care settings in China. Methods: Data of 4,574,961 ambulatory care visits of pregnant women from October [...] Read more.

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Xanthones Active against Multidrug Resistance and Virulence Mechanisms of Bacteria

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Antibiotics 2021, *10*(5), 600; https://doi.org/10.3390/antibiotics10050600 - 19 May 2021

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Abstract The emergence of multidrug and extensively drug-resistant pathogenic bacteria able to resist to the action of a wide range of antibiotics is becoming a growing problem for public health. The search for new compounds with the potential to help in the reversion of [...] Read more.

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by Jana Avberšek, Bojan Papić, Darja Kušar, Vladimira Erjavec, Katja Seme, Majda Golob and Irena Zdovc

Antibiotics 2021, *10*(5), 599; https://doi.org/10.3390/antibiotics10050599 - 18 May 2021

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Abstract Methicillin-resistant *Staphylococcus aureus* (MRSA) is an important cause of nosocomial infections in humans, but its importance in small animal practice is increasing. Here, we present a case of feline otitis externa (OE) caused by MRSA; both hemolytic and nonhemolytic variants with a stable [...] Read more.

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Antibiotics 2021, *10*(5), 598; https://doi.org/10.3390/antibiotics10050598 - 18 May 2021

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Abstract Antimicrobial resistance (AMR) is a global health challenge and antimicrobial use (AMU) in the livestock sector has been considered as one of the contributing factors towards the development of AMR in bacteria. This study summarizes the results of a point prevalence survey conducted [...] Read more.

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The Influence of Cellulose-Type Formulants on Anti-*Candida* Activity of the Tyrocidines

by Yasamin Masoudi, Wilma van Rensburg, Bernice Barnard-Jenkins and Marina Rautenbach

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Abstract *Candida* species are highly adaptable to environmental changes with their phenotypic flexibility allowing for the evasion of most host defence mechanisms. Moreover, increasing resistance of human pathogenic *Candida* strains has been reported against all four classes of available antifungal drugs, which highlights the [...] Read more.

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by Diego Lucas Neres Rodrigues, Francielly Morais-Rodrigues, Raquel Hurtado, Roselane Gonçalves dos Santos, Daniela Camargos Costa, Debmalya Barh, Preetam Ghosh, Khalid J. Alzahrani, Siomar Castro Soares, Rommel Ramos, Aristóteles Góes-Neto, Vasco Azevedo and Flávia Figueira Aburjaile

Antibiotics 2021, *10*(5), 596; https://doi.org/10.3390/antibiotics10050596 - 18 May 2021

Abstract *Acinetobacter baumannii* is an important Gram-negative opportunistic pathogen that is responsible for many nosocomial infections. This etiologic agent has acquired, over the years, multiple mechanisms of resistance to a wide range of antimicrobials and the ability to survive in different environments. In this [...] Read more.

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Colistin Dosing Regimens against *Pseudomonas aeruginosa* in Critically Ill Patients: An Application of Monte Carlo Simulation

by Van Thi Khanh Nguyen, Preecha Montakantikul, Pramote Tragulpiankit, Jantana Houngsaitong and Mohd Fazli Shuib

Antibiotics 2021, *10*(5), 595; https://doi.org/10.3390/antibiotics10050595 - 17 May 2021

Abstract Our aims are to assess various colistin dosing regimens against *Pseudomonas aeruginosa* (*P. aeruginosa*) infection in critically ill patients and to propose an appropriate regimen based on microbiological data. A Monte Carlo simulation was performed using the published colistin's pharmacokinetic parameters [...] Read more.

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by Sydney E. Schnur, Raghavendra G. Amachawadi, Giovanna Baca, Sarah Sexton-Bowser, Davina H. Rhodes, Dmitriy Smolensky, Thomas J. Herald, Ramasamy Perumal, Daniel U. Thomson and Tiruvoor G. Nagaraja

Antibiotics 2021, *10*(5), 594; https://doi.org/10.3390/antibiotics10050594 - 17 May 2021

Abstract Antimicrobial resistance in bacterial pathogens associated with bovine mastitis and human foodborne illnesses from contaminated food and water have an impact on animal and human health. Phenolic compounds have antimicrobial properties and some specialty sorghum grains are high in phenolic compounds, and the [...] Read more.

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by Manuel F. Varela, Jerusha Stephen, Manjusha Lekshmi, Manisha Ojha, Nicholas Wenzel, Leslie M. Sanford, Alberto J. Hernandez, Ammini Parvathi and Sanath H. Kumar

Antibiotics 2021, *10*(5), 593; https://doi.org/10.3390/antibiotics10050593 - 17 May 2021

Abstract Bacterial pathogens as causative agents of infection constitute an alarming concern in the public health sector. In particular, bacteria with resistance to multiple antimicrobial agents can confound chemotherapeutic efficacy towards infectious diseases. Multidrug-resistant bacteria harbor various molecular and cellular mechanisms for antimicrobial resistance. [...] Read more.

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Antifungal and Anti-Inflammatory Potential of *Bupleurum rigidum* subsp. *paniculatum* (Brot.) H.Wolff Essential Oil

by Mónica Zuzarte, Pedro M. P. Correia, Jorge M. Alves-Silva, Maria J. Gonçalves, Carlos Cavaleiro, Teresa Cruz and Lígia Salgueiro

Antibiotics 2021, *10*(5), 592; https://doi.org/10.3390/antibiotics10050592 - 17 May 2021

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Abstract Fungal infections remain a major health concern with aromatic plants and their metabolites standing out as promising antifungal agents. The present study aims to assess, for the first time, the antifungal and anti-inflammatory potential of *Bupleurum* subsp. *paniculatum* (Brot.) H.Wolff essential oil from [...] Read more.

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Impact of the COVID-19 Pandemic on the Prescribing Patterns of First-Line Antibiotics in English Primary Care: A Longitudinal Analysis of National Prescribing Dataset

by Alisha Zubair Hussain, Vibhu Paudyal and Muhammad Abdul Hadi

Antibiotics 2021, *10*(5), 591; https://doi.org/10.3390/antibiotics10050591 - 17 May 2021

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Abstract The COVID-19 pandemic has impacted on public access to health services. This study aimed to investigate the impact of COVID-19 pandemic on commonly prescribed first-line antibiotics in English primary care. A secondary analysis of publicly available government data pertaining to primary care prescribing [...] Read more.

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Coaching Belgian and Dutch Broiler Farmers Aimed at Antimicrobial Stewardship and Disease Prevention

by Nele Caekebeke, Moniek Ringenier, Franca J. Jonquiere, Tijs J. Tobias, Merel Postma, Angelique van den Hoogen, Manon A. M. Houben, Francisca C. Velkers, Nathalie Sleeckx, Arjan Stegeman, Jeroen Dewulf and on behalf of the i-4-1-Health Study Group

Antibiotics 2021, *10*(5), 590; https://doi.org/10.3390/antibiotics10050590 - 17 May 2021

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Abstract A reduction in antimicrobial use (AMU) is needed to curb the increase in antimicrobial resistance in broiler production. Improvements in biosecurity can contribute to a lower incidence of disease and thereby lower the need for AMU. However, veterinary advice related to AMU reduction [...] Read more.

(This article belongs to the Special Issue Antimicrobial Stewardship in Veterinary Medicine)

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Insight on the Structure-to-Activity of Carbosilane Metallodendrimers in the Fight against *Staphylococcus aureus* Biofilms

by Celia Llamazares, Natalia Sanz del Olmo, Juan Soliveri, F. Javier de la Mata, José Luis Copa-Patiño and Sandra García-Gallego

Antibiotics 2021, *10*(5), 589; https://doi.org/10.3390/antibiotics10050589 - 17 May 2021

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Abstract Biofilm formation is a critical health concern, involved in most human bacterial infections. Combatting this mechanism, which increases resistance to traditional antibiotics and host immune defences, requires novel therapeutic approaches. The remarkable biocide activity and the monodispersity of carbosilane metallodendrimers make them excellent [...] Read more.

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Effects of Antifungal Carriers Based on Chitosan-Coated Iron Oxide Nanoparticles on Microcosm Biofilms

by Anne Caroline Morais Caldeirão, Heitor Ceolin Araujo, Camila Miranda Tomasella, Caio Sampaio, Marcelo José dos Santos Oliveira, Gordon Ramage, Juliano Pelim Pessan and Douglas Roberto Monteiro
Antibiotics 2021, *10*(5), 588; https://doi.org/10.3390/antibiotics10050588 - 17 May 2021
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Abstract Resistance of *Candida* species to conventional therapies has motivated the development of antifungal nanocarriers based on iron oxide nanoparticles (IONPs) coated with chitosan (CS). This study evaluates the effects of IONPs-CS as carriers of miconazole (MCZ) or fluconazole (FLZ) on microcosm biofilms. Pooled [...] Read more.
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A Pilot Randomised Clinical Trial Comparing a Short-Term Perioperative Prophylaxis Regimen to a Long-Term Standard Protocol in Equine Colic Surgery

by Sabita Diana Stöckle, Dania A. Kannapin, Anne M. L. Kauter, Antina Lübke-Becker, Birgit Walther, Roswitha Merle and Heidrun Gehlen
Antibiotics 2021, *10*(5), 587; https://doi.org/10.3390/antibiotics10050587 - 16 May 2021
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Abstract Background: For surgical interventions classified as clean or clean-contaminated, including laparotomy, guidelines in human and veterinary medicine recommend a short-term perioperative antibiotic prophylaxis (PAP). In equine colic surgery, however, PAP commonly exceeds 24 h. Objectives: The aim of this study was to compare [...] Read more.
(This article belongs to the Special Issue Optimization and Improvement of Veterinary Antimicrobial Treatment to Reduce Antimicrobial Resistance)

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Impact of an Antimicrobial Stewardship Program on the Incidence of Carbapenem Resistant Gram-Negative Bacilli: An Interrupted Time-Series Analysis

by Teresa López-Viñau, Germán Peñalva, Lucrecia García-Martínez, Juan José Castón, Montserrat Muñoz-Rosa, Ángela Cano, Manuel Recio, José Miguel Cisneros, Elena Pérez-Nadales, José Rumbao Aguirre, Elena García-Martínez, Inmaculada Salcedo, José Ramón del Prado, Carmen de la Fuente, Luis Martínez-Martínez, Irene Gracia-Ahufinger and Julián Torre-Cisneros
Antibiotics 2021, *10*(5), 586; https://doi.org/10.3390/antibiotics10050586 - 16 May 2021
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Abstract Carbapenem-resistant Gram-negative bacilli (CR-GNB) are a critical public health threat, and carbapenem use contributes to their spread. Antimicrobial stewardship programs (ASPs) have proven successful in reducing antimicrobial use. However, evidence on the impact of carbapenem resistance remains unclear. We evaluated the impact of [...] Read more.
(This article belongs to the Section Antibiotics Use and Antimicrobial Stewardship)

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Clinical and Economic Impact of Community-Onset Urinary Tract Infections Caused by ESBL-Producing *Klebsiella pneumoniae* Requiring Hospitalization in Spain: An Observational Cohort Study

by Dawid Rozenkiewicz, Erika Esteve-Palau, Mar Arenas-Miras, Santiago Grau, Xavier Duran, Luisa Sorlí, María Milagro Montero and Juan P. Horcajada

Antibiotics 2021, *10*(5), 585; https://doi.org/10.3390/antibiotics10050585 - 15 May 2021

Abstract *Objective*: To analyze the clinical and economic impact of community-onset urinary tract infections (UTIs) caused by extended-spectrum beta-lactamase (ESBL)-producing *Klebsiella pneumoniae* requiring hospitalization. *Methods*: A retrospective cohort study that included all adults with a UTI caused by *K. pneumoniae* that were [...] Read more.

(This article belongs to the Special Issue Hospital Acquired Infections, Multidrug Resistant (MDR) Bacteria, Alternative Approaches to Antibiotic Therapy)

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Antibacterial Activities of Homemade Matrices Miming Essential Oils Compared to Commercial Ones

by Sofia Oliveira Ribeiro, Véronique Fontaine, Véronique Mathieu, Zhiri Abdesselam, Baudoux Dominique, Stévigny Caroline and Souard Florence

Antibiotics 2021, *10*(5), 584; https://doi.org/10.3390/antibiotics10050584 - 14 May 2021

Abstract The increasing bacterial resistance to antibiotics is a worldwide concern. Essential oils are known to possess remarkable antibacterial properties, but their high chemical variability complicates their development into new antibacterial agents. Therefore, the main purpose of this study was to standardize their chemical [...] Read more.

(This article belongs to the Special Issue Antimicrobial Activity of Essential Oils)

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Apt (Adenine Phosphoribosyltransferase) Mutation in Laboratory-Selected Vancomycin-Intermediate *Staphylococcus aureus*

by Reena Lamichhane-Khadka, Santosh Dulal, Jesus A. Cuaron, Richard Pfeltz, Sushim Kumar Gupta, Brian J. Wilkinson and John E. Gustafson

Antibiotics 2021, *10*(5), 583; https://doi.org/10.3390/antibiotics10050583 - 14 May 2021

Abstract Comparative genomic sequencing of laboratory-derived vancomycin-intermediate *Staphylococcusaureus* (VISA) (MM66-3 and MM66-4) revealed unique mutations in both MM66-3 (in *apt* and *ssaA6*), and MM66-4 (in *apt* and *walK*), compared to hetero-VISA parent strain MM66. Transcriptional profiling revealed that both MM66 VISA [...] Read more.

(This article belongs to the Section Mechanism and Evolution of Antibiotic Resistance)

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Open Access Feature Paper Article

Risk Factors for Amoxicillin-Clavulanate Resistance in Community-Onset Urinary Tract Infections Caused by *Escherichia coli* or *Klebsiella pneumoniae*: The Role of Prior Exposure to Fluoroquinolones

by Javier Martínez-Casanova, Silvia Gómez-Zorrilla, Nuria Prim, Agustina Dal Molin, Daniel Echeverría-Esnal, María Pilar Gracia-Arnillas, Elena Sendra, Robert Güerri-Fernández, Xavier Durán-Jordà, Eduardo Padilla, Juan Pablo Horcajada, Santiago Grau and on behalf of the PROA-PSMAR Group

Antibiotics 2021, *10*(5), 582; https://doi.org/10.3390/antibiotics10050582 - 14 May 2021

Abstract Background: High rates of amoxicillin-clavulanate (AMC) resistance among Enterobacterales isolated from urinary tract infections (UTIs) were observed in our area. The aim of this study was to identify risk factors associated with AMC resistance in patients with community-onset UTI in emergency departments (EDs). [...] Read more.

Open Access Article

Targeting Internalized *Staphylococcus aureus* Using Vancomycin-Loaded Nanoparticles to Treat Recurrent Bloodstream Infections

by Danielle Nader, Fajer Yousef, Nicola Kavanagh, Benedict K. Ryan and Steven W. Kerrigan
Antibiotics 2021, *10*(5), 581; https://doi.org/10.3390/antibiotics10050581 - 14 May 2021
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Abstract The bacterial pathogen *Staphylococcus aureus* is a leading cause of bloodstream infections, where patients often suffer from relapse despite antibiotic therapy. Traditional anti-staphylococcal drugs display reduced effectivity against internalised bacteria, but nanoparticles conjugated with antibiotics can overcome these challenges. In the present study, [...] Read more.
(This article belongs to the Special Issue Nanoparticles-Based Antimicrobials)

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Presepsin (Soluble CD14 Subtype) as an Early Marker of Neonatal Sepsis and Septic Shock: A Prospective Diagnostic Trial

by Carlo Pietrasanta, Andrea Ronchi, Claudia Vener, Chiara Poggi, Claudia Ballerini, Lea Testa, Rosaria Maria Colombo, Elena Spada, Carlo Dani, Fabio Mosca and Lorenza Pugni
Antibiotics 2021, *10*(5), 580; https://doi.org/10.3390/antibiotics10050580 - 14 May 2021
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Abstract In the context of suspected neonatal sepsis, early diagnosis and stratification of patients according to clinical severity is not yet effectively achieved. In this diagnostic trial, we aimed to assess the accuracy of presepsin (PSEP) for the diagnosis and early stratification of supposedly [...] Read more.

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Prevalence of Antimicrobial Resistance (AMR) *Salmonella* spp. and *Escherichia coli* Isolated from Broilers in the East Coast of Peninsular Malaysia

by Shamsaldeen Ibrahim, Loh Wei Hoong, Yip Lai Siong, Zaharuddin Mustapha, C. W. Salma C. W. Zalati, Erkihun Aklilu, Maizan Mohamad and Nor Fadhilah Kamaruzzaman
Antibiotics 2021, *10*(5), 579; https://doi.org/10.3390/antibiotics10050579 - 13 May 2021
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Abstract *Salmonella species* (spp.) and *Escherichia coli* (*E. coli*) are the most common infectious pathogens in poultry. Antimicrobials are given either as growth promoters or as treatment, thereby increasing the possibility of the emergence of antimicrobial resistance (AMR). We determined the prevalence [...] Read more.

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Unveiling the Impact of Antibiotics and Alternative Methods for Animal Husbandry: A Review

by Chuen Xian Low, Loh Teng-Hern Tan, Nurul-Syakima Ab Mutalib, Priyia Pusparajah, Bey-Hing Goh, Kok-Gan Chan, Vengadesh Letchumanan and Learn-Han Lee
Antibiotics 2021, *10*(5), 578; https://doi.org/10.3390/antibiotics10050578 - 13 May 2021
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Abstract Since the 1950s, antibiotics have been used in the field of animal husbandry for growth promotion, therapy and disease prophylaxis. It is estimated that up to 80% of the antibiotics produced by the pharmaceutical industries are used in food production. Most of the [...] Read more.
(This article belongs to the Section Antibiotics Use and Antimicrobial Stewardship)

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A New Twist: The Combination of Sulbactam/Avibactam Enhances Sulbactam Activity against Carbapenem-Resistant *Acinetobacter baumannii* (CRAB) Isolates

by Fernando Pasteran, Jose Cedano, Michelle Baez, Ezequiel Albornoz, Melina Rapoport, Jose Osteria, Sabrina Montaña, Casin Le, Grace Ra, Robert A. Bonomo, Marcelo E. Tolmasky, Mark Adams, Alejandra Corso and Maria Soledad Ramirez

Antibiotics 2021, *10*(5), 577; https://doi.org/10.3390/antibiotics10050577 - 13 May 2021

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Abstract An increasing number of untreatable infections are recorded every year. Many studies have focused their efforts on developing new β-lactamase inhibitors to treat multi-drug resistant (MDR) isolates. In the present study, sulbactam/avibactam and sulbactam/relebactam combination were tested against 187 multi-drug resistant (MDR) *Acinetobacter* [...] Read more.

(This article belongs to the Special Issue Dissemination, Evolution, Molecular Mechanism of Antibiotic Resistance and Novel Approaches to Combat Multidrug Resistant Isolates)

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Combined Effects of Sulfamethoxazole and Erythromycin on a Freshwater Microalga, *Raphidocelis subcapitata*: Toxicity and Oxidative Stress

by Yibo Zhang, Da He, Fang Chang, Chenyuan Dang and Jie Fu

Antibiotics 2021, *10*(5), 576; https://doi.org/10.3390/antibiotics10050576 - 13 May 2021

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Abstract This study investigated the environmental effects of two familiar emerging contaminants, sulfamethoxazole (SMX) and erythromycin (ERY), and their mixture (10:1 *w/w*) using a green microalga, *R. subcapitata*. The cell density, pigment content, and the activities of superoxide dismutase (SOD), [...] Read more.

(This article belongs to the Special Issue Antibiotics in the Environment and Removal Technology)

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Comparison of Antibiotic Resistance Profile of *Escherichia coli* between Pristine and Human-Impacted Sites in a River

by Emi Nishimura, Masateru Nishiyama, Kei Nukazawa and Yoshihiro Suzuki

Antibiotics 2021, *10*(5), 575; https://doi.org/10.3390/antibiotics10050575 - 13 May 2021

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Abstract Information on the actual existence of antibiotic-resistant bacteria in rivers where sewage, urban wastewater, and livestock wastewater do not load is essential to prevent the spread of antibiotic-resistant bacteria in water environments. This study compared the antibiotic resistance profile of *Escherichia coli* upstream [...] Read more.

(This article belongs to the Special Issue Antimicrobial Resistance and the Environment: One Health Approach)

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Does an Antibiotic Stewardship Applied in a Pig Farm Lead to Low ESBL Prevalence?

by Claudine Fournier, Patrice Nordmann, Olivier Pittet and Laurent Poirel

Antibiotics 2021, *10*(5), 574; https://doi.org/10.3390/antibiotics10050574 - 13 May 2021

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Abstract *Background*. The aim of the present study was to prospectively evaluate the prevalence of intestinal carriage of colistin-resistant and extended-spectrum β-lactamase (ESBL)-producing *Enterobacterales* among pigs from a Swiss farm attending an animal health and antibiotic stewardship program and to determine the associated mechanisms [...] Read more.

(This article belongs to the Special Issue Antimicrobial Resistance: From Farm to Fork)

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Seconeolitsine, the Novel Inhibitor of DNA Topoisomerase I, Protects against Invasive Pneumococcal Disease Caused by Fluoroquinolone-Resistant Strains

by Jose Manuel Tirado-Vélez, David Carreño, David Sevillano, Luis Alou, José Yuste and Adela G. de la Campa

Antibiotics 2021, *10*(5), 573; https://doi.org/10.3390/antibiotics10050573 - 13 May 2021

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Abstract Antibiotic resistance in *Streptococcus pneumoniae* has increased worldwide, making fluoroquinolones an alternative therapeutic option. Fluoroquinolones inhibit the type II DNA topoisomerases (topoisomerase IV and gyrase). In this study we have evaluated the in vivo activity of seconeolitsine, an inhibitor of topoisomerase I. Levofloxacin [...] Read more.

(This article belongs to the Special Issue Research and Development of Antibiotics)

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Maternal Vaginal Colonization and Extended-Spectrum Beta-Lactamase-Producing Bacteria in Vietnamese Pregnant Women

by Nguyen Thanh Viet, Vu Van Du, Nghiem Duc Thuan, Hoang Van Tong, Nguyen Linh Toan, Can Van Mao, Nguyen Van Tuan, Srinivas Reddy Pallerla, Dennis Nurjadi, Thirumalaisamy P. Velavan and Ho Anh Son

Antibiotics 2021, *10*(5), 572; https://doi.org/10.3390/antibiotics10050572 - 13 May 2021

Viewed by 263

Abstract Extended-spectrum β-lactamase-producing Enterobacterales (ESBL-E) resistance to commonly prescribed drugs is increasing in Vietnam. During pregnancy, ESBL-E may predispose women to reproductive tract infections and increases the risk for neonatal morbidity. Vaginal colonization and infections by *Escherichia coli* and *Klebsiella pneumoniae* are seldom studied [...] Read more.

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Antibiotic-Resistant Bacteria in Clams—A Study on Mussels in the River Rhine

by Nicole Zacharias, Iris Löckener, Sarah M. Essert, Esther Sib, Gabriele Bierbaum, Thomas Kistemann and Christiane Schreiber

Antibiotics 2021, *10*(5), 571; https://doi.org/10.3390/antibiotics10050571 - 12 May 2021

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Abstract Bacterial infections have been treated effectively by antibiotics since the discovery of penicillin in 1928. A worldwide increase in the use of antibiotics led to the emergence of antibiotic resistant strains in almost all bacterial pathogens, which complicates the treatment of infectious diseases. [...] Read more.

(This article belongs to the Special Issue Seafood and Antibiotics)

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Detection of Antimicrobial Resistance of Bacteria *Staphylococcus chromogenes* Isolated from Sheep's Milk and Cheese

by Ivana Regecová, Jana Výrostková, František Zigo, Gabriela Gregová and Mariana Kováčová

Antibiotics 2021, *10*(5), 570; https://doi.org/10.3390/antibiotics10050570 - 12 May 2021

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Abstract Antimicrobial and multidrug resistance is detected in nonaureus staphylococci, including *Staphylococcus chromogenes*, which commonly causes intramammary infections. Recent clinical studies point to the presence of methicillin-resistant *S. chromogenes*. Therefore, this study aims to determine the prevalence of this species in samples of [...] Read more.

(This article belongs to the Special Issue Staphylococcus spp. in Animals: Resistance to Antimicrobials, Virulence and Genetic Lineages)

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Phenothiazinium Photosensitizers Associated with Silver Nanoparticles in Enhancement of Antimicrobial Photodynamic Therapy

by Glaucia Rigotto Caruso, Ludmilla Tonani, Priscyla Daniely Marcato and Marcia Regina von Zeska Kress
Antibiotics 2021, *10*(5), 569; https://doi.org/10.3390/antibiotics10050569 - 12 May 2021
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Abstract Antimicrobial photodynamic therapy (APDT) and silver nanoparticles (AgNPs) are known as promising alternatives for the control of microorganisms. This study aims to evaluate the antifungal activity of APDT, particularly by using the association of low concentrations of phenothiazinium photosensitizers (PS) methylene blue (MB), [...] Read more.
(This article belongs to the Special Issue New and Innovative Applications of Antimicrobial Photodynamic Therapy)

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Antibiotic-Resistant *Enterobacteriaceae* in Wastewater of Abattoirs

by Timo Homeier-Bachmann, Stefan E. Heiden, Phillip K. Lübcke, Lisa Bachmann, Jürgen A. Bohnert, Dirk Zimmermann and Katharina Schaufler
Antibiotics 2021, *10*(5), 568; https://doi.org/10.3390/antibiotics10050568 - 12 May 2021
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Abstract Antibiotic-resistant *Enterobacteriaceae* are regularly detected in livestock. As pathogens, they cause difficult-to-treat infections and, as commensals, they may serve as a source of resistance genes for other bacteria. Slaughterhouses produce significant amounts of wastewater containing antimicrobial-resistant bacteria (AMRB), which are released into the [...] Read more.
(This article belongs to the Special Issue Antimicrobial Resistance: From Farm to Fork)

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Synbiotic Effects of *Saccharomycescerevisiae*, Mannan Oligosaccharides, and β-Glucan on Innate Immunity, Antioxidant Status, and Disease Resistance of Nile Tilapia, *Oreochromis niloticus*

by Gamal El-Nobi, Mohammed Hassanin, Alshimaa A. Khalil, Alaa Y. Mohammed, Shimaa A. Amer, Metwally M. Montaser and Mohamed E. El-sharnouby
Antibiotics 2021, *10*(5), 567; https://doi.org/10.3390/antibiotics10050567 - 12 May 2021
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Abstract Synbiotic (SYN) additives were assessed as an antibiotic alternative on the effects on the nonspecific immune response and disease resistance of *O. niloticus* to *P. aeruginosa*. Healthy fish (n = 120, average initial weight 18 ± 2 g) were allotted randomly into [...] Read more.
(This article belongs to the Special Issue Seafood and Antibiotics)

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Open Access Technical Note

Citrate Mediated Europium-Based Detection of Oxytetracycline in Citrus Tissues

by Faraj Hijaz, Yasser Nehela, Ozgur Batuman and Nabil Killiny
Antibiotics 2021, *10*(5), 566; https://doi.org/10.3390/antibiotics10050566 - 12 May 2021
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Abstract Oxytetracycline (OTC) and streptomycin have been used for the control of several plant diseases and were recently permitted for the control of citrus greening disease, Huanglongbing. Consequently, sensitive and reliable methods are highly needed for the detection of OTC in citrus tissues. Herein, [...] Read more.
(This article belongs to the Section Plant-Derived Antibiotics)

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Open Access Review

Technologies for High-Throughput Identification of Antibiotic Mechanism of Action

by Bernardo Ribeiro da Cunha, Paulo Zoio, Luís P. Fonseca and Cecília R. C. Calado
Antibiotics 2021, *10*(5), 565; https://doi.org/10.3390/antibiotics10050565 - 12 May 2021
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Abstract There are two main strategies for antibiotic discovery: target-based and phenotypic screening. The latter has been much more successful in delivering first-in-class antibiotics, despite the major bottleneck of delayed Mechanism-of-Action (MOA) identification. Although finding new antimicrobial compounds is a very challenging task, identifying [...] Read more.
(This article belongs to the Special Issue Discovery of Novel Antibiotics)

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Antibiotic Resistance and Virulence Gene Patterns Associated with Avian Pathogenic *Escherichia coli* (APEC) from Broiler Chickens in Qatar

by Alreem Johar, Najlaa Al-Thani, Sara H. Al-Hadidi, Elyes Dlissi, Mahmoud H. Mahmoud and Nahla O. Eltai
Antibiotics 2021, *10*(5), 564; https://doi.org/10.3390/antibiotics10050564 - 11 May 2021
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Abstract Avian Pathogenic *Escherichia coli* (APEC) is the contributing agent behind the avian infectious disease colibacillosis, which causes substantial fatalities in poultry industries that has a significant impact on the economy and food safety. Several virulence genes have been shown to be concomitant with [...] Read more.
(This article belongs to the Special Issue Antimicrobial Resistance and Antibiotic Alternatives in Livestock)

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WGS-Based Analysis of Carbapenem-Resistant *Acinetobacter baumannii* in Vietnam and Molecular Characterization of Antimicrobial Determinants and MLST in Southeast Asia

by Gamal Wareth, Jörg Linde, Ngoc H. Nguyen, Tuan N. M. Nguyen, Lisa D. Sprague, Mathias W. Pletz and Heinrich Neubauer
Antibiotics 2021, *10*(5), 563; https://doi.org/10.3390/antibiotics10050563 - 11 May 2021
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Abstract Carbapenem-resistant *Acinetobacter baumannii* (*A. baumannii*, CRAb) is an emerging global threat for healthcare systems, particularly in Southeast Asia. Next-generation sequencing (NGS) technology was employed to map genes associated with antimicrobial resistance (AMR) and to identify multilocus sequence types (MLST). Eleven strains [...] Read more.
(This article belongs to the Special Issue Host-Microbe Interactions in Clinically Relevant Acinetobacter Spp.: New Models of Acinetobacter Spp. Virulence and Its Interactions with Antibiotic Resistance)

Open Access Article

Antibiotic Stewardship for Canine and Feline Acute Urinary Tract Infection: An Observational Study in a Small Animal Hospital in Northwest Italy

by Cristina Vercelli, Massimiliano Della Ricca, Mariachiara Re, Graziana Gambino and Giovanni Re
Antibiotics 2021, *10*(5), 562; https://doi.org/10.3390/antibiotics10050562 - 11 May 2021
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Abstract Antimicrobial stewardship programs (ASPs) have been suggested to reduce antimicrobial resistance phenomena in veterinary medicine, as antibiotics are commonly used without microbiological confirmation. The aim of the present study is to design a specific working flow for a tailored antimicrobial treatment in the [...] Read more.
(This article belongs to the Special Issue Optimization and Improvement of Veterinary Antimicrobial Treatment to Reduce Antimicrobial Resistance)

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Open Access Case Report

Carbapenem-Resistant *Klebsiella pneumoniae* Associated with COVID-19

by Irina Magdalena Dumitru, Mirela Dumitrascu, Nicoleta Dorina Vlad, Roxana Carmen Cernat, Carmen Ilie-Serban, Aurelia Hangan, Raluca Elena Slujitoru, Aura Gherghina, Corina Mitroi-Maxim, Licdan Curtali, Dalia Sorina Carp, Anca Dumitrescu, Romelia Mitan, Rodica Lesanu and Sorin Rugina

Antibiotics 2021, *10*(5), 561; https://doi.org/10.3390/antibiotics10050561 - 11 May 2021

Abstract Infections with carbapenem-resistant *Enterobacteriaceae* are emerging as an important challenge in healthcare settings. Currently, carbapenem-resistant *Klebsiella pneumoniae* (CRKP) are the species of CRE most commonly encountered in hospitals. CRKP is resistant to almost all available antimicrobial agents, and infections with CRKP have been [...] Read more.

Open Access Communication

Draft Genome Sequence and Biofilm Production of a Carbapenemase-Producing *Klebsiella pneumoniae* (KpR405) Sequence Type 405 Strain Isolated in Italy

by Teresa Fasciana, Andrea Ciammaruconi, Bernardina Gentile, Paola Di Carlo, Roberta Virruso, Maria Rita Tricoli, Daniela Maria Palma, Giovanna Laura Pitarresi, Florigio Lista and Anna Giammanco

Antibiotics 2021, *10*(5), 560; https://doi.org/10.3390/antibiotics10050560 - 11 May 2021

Abstract Rapid identification and characterization of multidrug-resistant *Klebsiella pneumoniae* strains is essential to diagnose severe infections in patients. In clinical routine practice, *K. pneumoniae* is frequently identified and characterized for outbreak investigation. Pulsed-field gel electrophoresis or multilocus sequence typing could be used, but, unfortunately, [...] Read more.
(This article belongs to the Special Issue Spread of Multidrug-Resistant Microorganisms)

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Phage Therapy in Livestock and Companion Animals

by Celia Ferriol-González and Pilar Domingo-Calap

Antibiotics 2021, *10*(5), 559; https://doi.org/10.3390/antibiotics10050559 - 11 May 2021

Abstract The irrational use of antibiotics has led to a high emergence of multi-drug resistant (MDR) bacteria. The traditional overuse of antibiotics in the animal feed industry plays a crucial role in the emergence of these pathogens that pose both economic and health problems. [...] Read more.

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Open Access Brief Report

RapidResa Polymyxin *Acinetobacter* NP® Test for Rapid Detection of Polymyxin Resistance in *Acinetobacter baumannii*

by Maxime Bouvier, Mustafa Sadek, Stefano Pomponio, Fernando D'Emidio, Laurent Poirel and Patrice Nordmann

Antibiotics 2021, *10*(5), 558; https://doi.org/10.3390/antibiotics10050558 - 11 May 2021

Abstract A homemade and culture-based test, relying on the visual detection of the reduction of the resazurin reagent (a cell viability indicator), has been developed for the rapid detection of polymyxin resistance in *Acinetobacter baumannii*. Here, we evaluated the industrial version of this [...] Read more.
(This article belongs to the Special Issue Rapid Diagnostics of the Antimicrobial Resistance)

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Pharmacokinetic/Pharmacodynamic Target Attainment Based on Measured Versus Predicted Unbound Ceftriaxone Concentrations in Critically Ill Patients with Pneumonia: An Observational Cohort Study

by Matthias Gijsen, Erwin Dreesen, Ruth Van Daele, Pieter Annaert, Yves Debaveye, Joost Wauters and Isabel Spriet

Antibiotics 2021, *10*(5), 557; https://doi.org/10.3390/antibiotics10050557 - 11 May 2021

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Abstract The impact of ceftriaxone pharmacokinetic alterations on protein binding and PK/PD target attainment still remains unclear. We evaluated pharmacokinetic/pharmacodynamic (PK/PD) target attainment of unbound ceftriaxone in critically ill patients with severe community-acquired pneumonia (CAP). Besides, we evaluated the accuracy of predicted vs. measured [...] Read more.

(This article belongs to the Special Issue Optimizing Antibiotic Treatment: Pharmacokinetics and Clinical Trials)

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Clinical Pharmacology of Bacteriophage Therapy: A Focus on Multidrug-Resistant *Pseudomonas aeruginosa* Infections

by Dana Holger, Razieh Kebriaei, Taylor Morrisette, Katherine Lev, Jose Alexander and Michael Rybak

Antibiotics 2021, *10*(5), 556; https://doi.org/10.3390/antibiotics10050556 - 11 May 2021

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Abstract *Pseudomonas aeruginosa* is one of the most common causes of healthcare-associated diseases and is among the top three priority pathogens listed by the World Health Organization (WHO). This Gram-negative pathogen is especially difficult to eradicate because it displays high intrinsic and acquired resistance [...] Read more.

(This article belongs to the Section Bacteriophages)

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Biological Properties of Bee Bread Collected from Apiaries Located across Greece

by Nikos Asoutis Didaras, Ioannis Kafantaris, Tilemachos G. Dimitriou, Chrysanthi Mitsagga, Katerina Karatasou, Ioannis Giavasis, Dimitris Stagos, Grigoris D. Amoutzias, Fani Hatjina and Dimitris Mossialos

Antibiotics 2021, *10*(5), 555; https://doi.org/10.3390/antibiotics10050555 - 10 May 2021

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Abstract Bee bread is the only fermented product of the beehive. It constitutes the main source of proteins, lipids, vitamins, and macro- and microelements in honeybee nutrition and it exerts antioxidant and antimicrobial properties, though research on these aspects has been limited so far. [...] Read more.

(This article belongs to the Special Issue Honey Bee Products as an Alternative or Complement to Classical Antibiotics – 2nd Edition)

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Phage PPPL-1, A New Biological Agent to Control Bacterial Canker Caused by *Pseudomonas syringae* pv. *actinidiae* in Kiwifruit

by Yu-Rim Song, Nguyen Trung Vu, Jungkum Park, In Sun Hwang, Hyeon-Ju Jeong, Youn-Sup Cho and Chang-Sik Oh

Antibiotics 2021, *10*(5), 554; https://doi.org/10.3390/antibiotics10050554 - 10 May 2021

Abstract *Pseudomonas syringae* pv. *actinidiae* (Psa) is a Gram-negative bacterium that causes bacterial canker disease in kiwifruit. Copper or antibiotics have been used in orchards to control this disease, but the recent emergence of antibiotic-resistant Psa has called for the development of a new [...] Read more.

(This article belongs to the Special Issue Phage Therapy to Control Pathogenic Bacteria)

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Selection of a Gentamicin-Resistant Variant Following Polyhexamethylene Biguanide (PHMB) Exposure in *Escherichia coli* Biofilms

by Clémence Cuzin, Paméla Houée, Pierrick Lucas, Yannick Blanchard, Christophe Soumet and Arnaud Bridier

Antibiotics 2021, *10*(5), 553; https://doi.org/10.3390/antibiotics10050553 - 10 May 2021

Abstract Antibiotic resistance is one of the most important issues facing modern medicine. Some biocides have demonstrated the potential of selecting resistance to antibiotics in bacteria, but data are still very scarce and it is important to better identify the molecules concerned and the [...] Read more.

(This article belongs to the Special Issue Antimicrobial Resistance and Virulence - 2nd Volume)

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Synergistic Effect of Plant Extracts on Endodontic Pathogens Isolated from Teeth with Root Canal Treatment Failure: An In Vitro Study

by Suraj Arora, Shahabe Abullais Saquib, Youssef A Algarni, Mohammed Abdul Kader, Irfan Ahmad, Mohammad Y Alshahrani, Priyanka Saluja, Suheel Manzoor Baba, Anshad M. Abdulla and Shashit Shetty Bavabeedu

Antibiotics 2021, *10*(5), 552; https://doi.org/10.3390/antibiotics10050552 - 09 May 2021

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Abstract Background and objectives: This study aimed to evaluate the synergistic antimicrobial activity of extracts obtained from *Salvadora persica* (Miswak), *Commiphora molmol* (myrrh) and *Azadirachta indica* (neem) in combination with commercially available antimicrobial agents: penicillin, tetracycline, ofloxacin and fluconazole on endodontic pathogens such as [...] Read more.

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Honey as an Ecological Reservoir of Antibacterial Compounds Produced by Antagonistic Microbial Interactions in Plant Nectars, Honey and Honey Bee

by Katrina Brudzynski

Antibiotics 2021, *10*(5), 551; https://doi.org/10.3390/antibiotics10050551 - 09 May 2021

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Abstract The fundamental feature of "active honeys" is the presence and concentration of antibacterial compounds. Currently identified compounds and factors have been described in several review papers without broader interpretation or links to the processes for their formation. In this review, we indicate that the [...] Read more.

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Antibiotics or No Antibiotics, That Is the Question: An Update on Efficient and Effective Use of Antibiotics in Dental Practice

by Alessio Buonavoglia, Patrizia Leone, Antonio Giovanni Solimando, Rossella Fasano, Eleonora Malerba, Marcella Prete, Marialaura Corrente, Carlo Prati, Angelo Vacca and Vito Racanelli

Antibiotics 2021, *10*(5), 550; https://doi.org/10.3390/antibiotics10050550 - 09 May 2021

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Abstract The antimicrobial resistance (AMR) phenomenon is an emerging global problem and is induced by overuse and misuse of antibiotics in medical practice. In total, 10% of antibiotic prescriptions are from dentists, usually to manage oro-dental pains and avoid postsurgical complications. Recent research and [...] Read more.

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Stability and Compatibility Aspects of Drugs: The Case of Selected Cephalosporins

by Szymon Tomczak, Aleksandra Gostyńska, Malwina Nadolna, Karolina Reisner, Marta Orlando, Anna Jelińska and Maciej Stawny

Antibiotics 2021, *10*(5), 549; https://doi.org/10.3390/antibiotics10050549 - 09 May 2021

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Abstract Intravenous drug incompatibilities are a common cause of medical errors, contributing to ineffective therapy and even life-threatening events. The co-administration of drugs must always be supported by studies confirming compatibility and thus guarantee the therapy's safety. Particular attention should be paid to the [...] Read more.

(This article belongs to the Special Issue Interactions Between Antibiotics and Other Drugs - Common Clinical Problem)

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Retrospective Data Insight into the Global Distribution of Carbapenemase-Producing *Pseudomonas aeruginosa*

by Min-Ge Wang, Zhi-Yong Liu, Xiao-Ping Liao, Ruan-Yang Sun, Run-Bo Li, Yan Liu, Liang-Xing Fang, Jian Sun, Ya-Hong Liu and Rong-Min Zhang

Antibiotics 2021, *10*(5), 548; https://doi.org/10.3390/antibiotics10050548 - 09 May 2021

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Abstract This study aimed to determine the global distribution and molecular characteristics of carbapenemase-producing *Pseudomonas aeruginosa* isolates. A total of 328 (11.1%, 328/2953) carbapenemase-producing *P. aeruginosa* isolates from humans were obtained from public databases as of October 2019. Of which, the bla_{VIM} and [...] Read more.

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Appropriateness of Antibiotic Prescription for Prophylactic Purposes among Italian Dental Practitioners: Results from a Cross-Sectional Study

by Aida Bianco, Vincenza Cautela, Francesco Napolitano, Francesca Licata and Maria Pavia

Antibiotics 2021, *10*(5), 547; https://doi.org/10.3390/antibiotics10050547 - 08 May 2021

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Abstract The primary objective of this study was to investigate the pattern of antibiotic prescription for prophylaxis purposes among Italian DPs (dental practitioners). A nationwide cross-sectional study was conducted using a multi-stage sampling design. A structured questionnaire was used to collect socio-demographic data and [...] Read more.

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Antimicrobial Activity of Selected Essential Oils against Selected Pathogenic Bacteria: In Vitro Study

by Nikola Puvača, Jovana Milenković, Tamara Galonja Coghill, Vojislava Bursić, Aleksandra Petrović, Snežana Tanasković, Miloš Pelić, Dragana Ljubojević Pelić and Tatjana Miljković

Antibiotics 2021, *10*(5), 546; https://doi.org/10.3390/antibiotics10050546 - 08 May 2021

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Abstract The worldwide problem of infectious diseases has appeared in recent years, and antimicrobial agents are crucial in reducing disease emergence. Nevertheless, the development and distribution of multidrug-resistant (MDR) strains in pathogenic bacteria, such as *Escherichia coli*, *Staphylococcus aureus*, *Salmonella Typhi* and [...] Read more.
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Ventilator-Associated Pneumonia in Patients with COVID-19: A Systematic Review and Meta-Analysis

by Mariachiara Ippolito, Giovanni Misseri, Giulia Catalisano, Claudia Marino, Giulia Ingoglia, Marta Alessi, Elisa Consiglio, Cesare Gregoretti, Antonino Giarratano and Andrea Cortegiani

Antibiotics 2021, *10*(5), 545; https://doi.org/10.3390/antibiotics10050545 - 07 May 2021

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Abstract The aim of this systematic review and meta-analysis was to estimate the pooled occurrence of ventilator-associated pneumonia (VAP) among patients admitted to an intensive care unit with COVID-19 and mortality of those who developed VAP. We performed a systematic search on PubMed, EMBASE [...] Read more.

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Prospective Surveillance of Healthcare-Associated Infections in Residents in Four Long-Term Care Facilities in Graz, Austria

by Elisabeth König, Mara Medwed, Christian Pux, Michael Uhlmann, Walter Schippinger, Robert Krause and Ines Zollner-Schwetz

Antibiotics 2021, *10*(5), 544; https://doi.org/10.3390/antibiotics10050544 - 07 May 2021

Abstract Healthcare-associated infections (HCAI) are a common cause for residents' mortality and morbidity associated with a significant socio-economic burden. Data on HCAIs in Austrian long-term care facilities are scare. Therefore, we evaluated the incidence rate of HCAIs per 1000 resident days in four LTC [...] Read more.

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Rhodomyrtone Accumulates in Bacterial Cell Wall and Cell Membrane and Inhibits the Synthesis of Multiple Cellular Macromolecules in Epidemic Methicillin-Resistant *Staphylococcus aureus*

by Ozioma F. Nwabor, Sukanlaya Leejae and Supayang P. Voravuthikunchai

Antibiotics 2021, *10*(5), 543; https://doi.org/10.3390/antibiotics10050543 - 07 May 2021

Abstract As the burden of antibacterial resistance worsens and treatment options become narrower, rhodomyrtone—a novel natural antibiotic agent with a new antibacterial mechanism—could replace existing antibiotics for the treatment of infections caused by multi-drug resistant Gram-positive bacteria. In this study, rhodomyrtone was detected within [...] Read more.

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Cnicin as an Anti-SARS-CoV-2: An Integrated In Silico and In Vitro Approach for the Rapid Identification of Potential COVID-19 Therapeutics

by Hani A. Alhadrami, Ahmed M. Sayed, Hossam M. Hassan, Khayrya A. Youssif, Yasser Gaber, Yassmin Moatasim, Omnia Kutkat, Ahmed Mostafa, Mohamed Ahmed Ali, Mostafa E. Rateb, Usama Ramadan Abdelmohsen and Noha M. Gamaleldin

Antibiotics 2021, *10*(5), 542; https://doi.org/10.3390/antibiotics10050542 - 07 May 2021

Abstract Since the emergence of the SARS-CoV-2 pandemic in 2019, it has remained a significant global threat, especially with the newly evolved variants. Despite the presence of different COVID-19 vaccines, the discovery of proper antiviral therapeutics is an urgent necessity. Nature is considered as [...] Read more.

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A C-Type Lectin Highly Expressed in *Portunus trituberculatus* Intestine Functions in AMP Regulation and Prophenoloxidase Activation

by Yuan Liu, Yue Su, Ao Zhang and Zhaoxia Cui

Antibiotics 2021, *10*(5), 541; https://doi.org/10.3390/antibiotics10050541 - 07 May 2021

Abstract A C-type lectin (PtCLec2) from *Portunus trituberculatus* was identified for characterization of its role in defense and innate immunity. PtCLec2 contains a single carbohydrate-recognition domain (CRD) with a conserved QPD motif, which was predicted to have galactose specificity. The mRNA expression of PtCLec2 [...] Read more.

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Serious Neurological Adverse Events of Ceftriaxone

by Clémence Lacroix, Annie-Pierre Bera-Jonville, François Montastruc, Lionel Velly, Joëlle Micallef and Romain Guilhaumou

Antibiotics 2021, *10*(5), 540; https://doi.org/10.3390/antibiotics10050540 - 06 May 2021

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Abstract We described ceftriaxone-induced CNS adverse events through the largest case series of Adverse Drug Reactions (ADRs) reports, from 1995 to 2017, using the French Pharmacovigilance Database. In total, 152 cases of serious CNS ADRs were analyzed; 112 patients were hospitalized or had a [...] Read more.

(This article belongs to the Section Pharmacokinetics and Pharmacodynamics of Drugs)

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Pollution by Antibiotics and Antimicrobial Resistance in LiveStock and Poultry Manure in China, and Countermeasures

by Ming Tian, Xinmiao He, Yanzhong Feng, Wentao Wang, Heshu Chen, Ming Gong, Di Liu, Jihong Liu Clarke and André van Eerde

Antibiotics 2021, *10*(5), 539; https://doi.org/10.3390/antibiotics10050539 - 06 May 2021

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Abstract The demand for animal protein has increased considerably worldwide, especially in China, where large numbers of livestock and poultry are produced. Antibiotics have been widely applied to promote growth and prevent diseases. However, the overuse of antibiotics in animal feed has caused serious [...] Read more.

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Antimicrobial Resistance Profiles of Human Commensal *Neisseria* Species

by Maira Goytia, Symone T. Thompson, Skylar V. L. Jordan and Kacey A. King

Antibiotics 2021, *10*(5), 538; https://doi.org/10.3390/antibiotics10050538 - 06 May 2021

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Abstract Pathogenic *Neisseria gonorrhoeae* causes the sexually transmitted infection gonorrhea. *N. gonorrhoeae* has evolved high levels of antimicrobial resistance (AR) leading to therapeutic failures even in dual-therapy treatment with azithromycin and ceftriaxone. AR mechanisms can be acquired by genetic transfer from closely related species, [...] Read more.

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Involvement of a Multidrug Efflux Pump and Alterations in Cell Surface Structure in the Synergistic Antifungal Activity of Nagilactone E and Anethole against Budding Yeast *Saccharomyces cerevisiae*

by Yuki Ueda, Yuhei O. Tahara, Makoto Miyata, Akira Ogita, Yoshihiro Yamaguchi, Toshio Tanaka and Ken-ichi Fujita

Antibiotics 2021, *10*(5), 537; https://doi.org/10.3390/antibiotics10050537 - 06 May 2021

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Abstract Nagilactone E, an antifungal agent derived from the root bark of *Podocarpus nagi*, inhibits 1,3-β glucan synthesis; however, its inhibitory activity is weak. Anethole, the principal component of anise oil, enhances the antifungal activity of nagilactone E. We aimed to determine the [...] Read more.

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Epidemiology of Meropenem/Vaborbactam Resistance in KPC-Producing *Klebsiella pneumoniae* Causing Bloodstream Infections in Northern Italy, 2018

by Paolo Gaibani, Donatella Lombardo, Linda Bussini, Federica Bovo, Beatrice Munari, Maddalena Giannella, Michele Bartoletti, Pierluigi Viale, Tiziana Lazzarotto and Simone Ambretti

Antibiotics 2021, *10*(5), 536; https://doi.org/10.3390/antibiotics10050536 - 06 May 2021

Abstract Meropenem/Vaborbactam (MEM-VAB) is a novel carbapenem- β-lactamase inhibitor active against KPC-producing Enterobacteria. Herein, we evaluate the incidence of meropenem/vaborbactam-resistance among KPC-producing *K. pneumoniae* (KPC-Kp) bloodstream infection in a large Italian hospital. Meropenem/vaborbactam-resistance was found in 8% (*n* = 5) KPC-Kp, while 5% [...] Read more.

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Comparison of Immunological Profiles of SARS-CoV-2 Variants in the COVID-19 Pandemic Trends: An Immunoinformatics Approach

by **Jenifer Mallavarpu Ambrose**, Vishnu Priya Veeraraghavan, **Malathi Kullappan**, Poongodi Chellapandiyan, **Surapaneni Krishna Mohan** and Vivek Anand Manivel

Antibiotics 2021, *10*(5), 535; https://doi.org/10.3390/antibiotics10050535 - 06 May 2021

Abstract The current dynamics of the COVID-19 pandemic have become a serious concern with the emergence of a series of mutant variants of the SARS-CoV-2 virus. Unlike the previous strain, it is reported that the descendants are associated with increased risk of transmission yet [...] Read more.

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Antimicrobial Residues in Food from Animal Origin—A Review of the Literature Focusing on Products Collected in Stores and Markets Worldwide

by Fritz Michael Treiber and Heide Beranek-Knauer

Antibiotics 2021, *10*(5), 534; https://doi.org/10.3390/antibiotics10050534 - 06 May 2021

Abstract The extensive use of antibiotics leads to antibiotic residues in frequently consumed foods. Generally, the main use of antibiotics in animals is to treat and prevent diseases and growth promotion. However, the residues and their breakdown products have several side effects on the [...] Read more.

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Community-Acquired, Extended-Spectrum β-Lactamase-Producing and Extensively Drug-Resistant *Escherichia coli* in a 28-Year-Old Pyelonephritis Patient Lacking Risk Factors

by Connor W. Evins, Caroline M. Sutton, Sarah T. Withers, Jennifer T. Grier, Christine M. G. Schammel and Steven E. Fiester

Antibiotics 2021, *10*(5), 533; https://doi.org/10.3390/antibiotics10050533 - 05 May 2021

Abstract While *Escherichia coli* is a common cause of urinary tract infections and pyelonephritis, there are few documented cases of extended-spectrum β-lactamase (ESBL)-producing and extensively drug-resistant (XDR) isolates from the community resulting in infection requiring hospitalization, especially in individuals lacking risk factors. In the [...] Read more.

(This article belongs to the Special Issue Dissemination, Evolution, Molecular Mechanism of Antibiotic Resistance and Novel Approaches to Combat Multidrug Resistant Isolates)

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Prevalence, Virulence Gene Distribution and Alarming the Multidrug Resistance of *Aeromonas hydrophila* Associated with Disease Outbreaks in Freshwater Aquaculture

by Doan Thi Nhinh, Dung Viet Le, Kim Van Van, Nguyen Thi Huong Giang, Lua Thi Dang and Truong Dinh Hoai

Antibiotics 2021, *10*(5), 532; https://doi.org/10.3390/antibiotics10050532 - 04 May 2021

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Abstract The study aims to evaluate the infection prevalence, virulence gene distribution and antimicrobial resistance of *Aeromonas hydrophila* associated in diseased outbreaks of cultured freshwater fish in Northern Vietnam. The confirmed *A. hydrophila* were screened for the presence of the five pitutative-virulence genes including [...] Read more.

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Point Prevalence Survey of Antimicrobial Use in a Malaysian Tertiary Care University Hospital

by Nurul Adilla Hayat Jamaluddin, Petrick Periyasamy, Chee Lan Lau, Sasheela Ponnampalavanar, Pauline Siew Mei Lai, Ramliza Ramli, Toh Leong Tan, Najma Kori, Mei Kuen Yin, Nur Jannah Azman, Rodney James, Karin Thursky and Isa Naina-Mohamed

Antibiotics 2021, *10*(5), 531; https://doi.org/10.3390/antibiotics10050531 - 04 May 2021

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Abstract Antimicrobial resistance remains a significant public health issue, and to a greater extent, caused by the misuse of antimicrobials. Monitoring and benchmarking antimicrobial use is critical for the antimicrobial stewardship team to enhance prudent use of antimicrobial and curb antimicrobial resistance in healthcare [...] Read more.

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Clinical Use and Adverse Drug Reactions of Linezolid: A Retrospective Study in Four Belgian Hospital Centers

by Hélène Thirot, Caroline Briquet, Frédéric Frippiat, Frédérique Jacobs, Xavier Holemans, Séverine Henrard, Paul M. Tulkens, Anne Spinewine and Françoise Van Bambeke

Antibiotics 2021, *10*(5), 530; https://doi.org/10.3390/antibiotics10050530 - 04 May 2021

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Abstract In Belgium, linezolid is indicated for pneumonia and skin and soft tissue infections, but is more broadly used, due to its oral bioavailability and activity against multiresistant organisms. This could increase the risk of adverse drug reactions (ADR), notably hematological disorders (anemia, thrombocytopenia), [...] Read more.

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Discovery of Pyrrolidine-2,3-diones as Novel Inhibitors of *P. aeruginosa* PBP3

by Arancha López-Pérez, Stefan Freischem, Immanuel Grimm, Oliver Weiergräber, Andrew J. Dingley, María Pascual López-Alberca, Herbert Waldmann, Waldemar Vollmer, Kamal Kumar and Cuong Vuong

Antibiotics 2021, *10*(5), 529; https://doi.org/10.3390/antibiotics10050529 - 04 May 2021

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Abstract The alarming threat of the spread of multidrug resistant bacteria currently leaves clinicians with very limited options to combat infections, especially those from Gram-negative bacteria. Hence, innovative strategies to deliver the next generation of antibacterials are urgently needed. Penicillin binding proteins (PBPs) are [...] Read more.

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Colistin Treatment Affects Lipid Composition of *Acinetobacter baumannii*

by Ye Tao, Sébastien Acket, Emma Beaumont, Henri Galez, Luminita Duma and Yannick Rossez
Antibiotics 2021, *10*(5), 528; https://doi.org/10.3390/antibiotics10050528 - 03 May 2021
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Abstract Multidrug-resistant *Acinetobacter baumannii* (*A. baumannii*) causes severe and often fatal healthcare-associated infections due partly to antibiotic resistance. There are no studies on *A. baumannii* lipidomics of susceptible and resistant strains grown at lethal and sublethal concentrations. Therefore, we analyzed the impact [...] Read more.
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Antimicrobial Susceptibility Patterns and Resistance Trends of *Staphylococcus aureus* and Coagulase-Negative Staphylococci Strains Isolated from Ocular Infections

by Francesco Petrillo, Danilo Pignataro, Federica Maria Di Lella, Michele Reibaldi, Matteo Fallico, Niccolò Castellino, Guglielmo Parisi, Maria Consiglia Trotta, Michele D'Amico, Biagio Santella, Veronica Folliero, Maria Teresa Della Rocca, Michele Rinaldi, Gianluigi Franci, Teresio Avitabile, Marilena Galdiero and Giovanni Boccia
Antibiotics 2021, *10*(5), 527; https://doi.org/10.3390/antibiotics10050527 - 03 May 2021
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Abstract Ocular bacterial infections represent a serious problem that affecting people of all age and genders. These infections can lead to visual impairment and blindness if not properly treated. The current study evaluates the antimicrobial resistance profiles and the resistance trend of both *Staphylococcus* [...] Read more.
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Exploring the One Health Perspective in Sweden's Policies for Containing Antibiotic Resistance

by Jaran Eriksen, Ingeborg Björkman, Marta Röing, Sabiha Y. Essack and Cecilia Stålsby Lundborg
Antibiotics 2021, *10*(5), 526; https://doi.org/10.3390/antibiotics10050526 - 03 May 2021
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Abstract Antibiotic resistance is considered to be a major threat to global health. The main driver of antibiotic resistance is antibiotic use. Antibiotics are used in humans, animals, and food production and are released into the environment. Therefore, it is imperative to include all [...] Read more.
(This article belongs to the Special Issue The Policy Design, Implementation and Governance of Antimicrobial Resistance)

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Rescue Therapies for *H. pylori* Infection in Italy

by Vincenzo De Francesco, Angelo Zullo, Luigi Gatta, Raffaele Manta, Matteo Pavoni, Ilaria Maria Saracino, Giulia Fiorini and Dino Vaira
Antibiotics 2021, *10*(5), 525; https://doi.org/10.3390/antibiotics10050525 - 03 May 2021
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Abstract **Background/Aims**: Curing *Helicobacter pylori* infection remains challenging for clinicians, as no proposed first-line therapy achieves bacterial eradication in all treated patients so that several patients need two or more consecutive treatments. Bacterial culture with antibiotics susceptibility testing is largely unachievable in Italy. [...] Read more.
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Antimicrobial and Wound Healing Properties of FeO Fabricated Chitosan/PVA Nanocomposite Sponge

by Anbazhagan Sathiyaseelan, Kandasamy Saravanakumar, Arokia Vijay Anand Mariadoss and Myeong-Hyeon Wang

Antibiotics 2021, *10*(5), 524; https://doi.org/10.3390/antibiotics10050524 - 03 May 2021

Abstract Diabetic and anemia-associated diabetic wounds increase the considerable morbidity and mortality in people, as reported by clinical studies. However, no anemia-associated diabetic wound dressing materials have been developed until now. Hence, this study aimed to develop a nanocomposite scaffold composed of chitosan (CS), [...] Read more.

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Heterogeneity of Antibiotics Multidrug-Resistance Profile of Uropathogens in Romanian Population

by Răzvan-Cosmin Petca, Silvius Negoiță, Cristian Mareș, Aida Petca, Răzvan-Ionuț Popescu and Călin Bogdan Chibelean

Antibiotics 2021, *10*(5), 523; https://doi.org/10.3390/antibiotics10050523 - 02 May 2021

Abstract Urinary tract infections (UTIs) are a leading cause of morbidity for both males and females. The overconsumption of antibiotics in general medicine, veterinary, or agriculture has led to a spike in drug-resistant microorganisms; obtaining standardized results is imposed by standard definitions for various [...] Read more.

(This article belongs to the Special Issue Hospital Acquired Infections, Multidrug Resistant (MDR) Bacteria, Alternative Approaches to Antibiotic Therapy)

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Insights into Emergence of Antibiotic Resistance in Acid-Adapted Enterohaemorrhagic *Escherichia coli*

by Salma Waheed Sheikh, Ahmad Ali, Asma Ahsan, Sidra Shakoor, Fei Shang and Ting Xue

Antibiotics 2021, *10*(5), 522; https://doi.org/10.3390/antibiotics10050522 - 02 May 2021

Abstract The emergence of multidrug-resistant pathogens presents a global challenge for treating and preventing disease spread through zoonotic transmission. The water and foodborne Enterohaemorrhagic *Escherichia coli* (EHEC) are capable of causing intestinal and systemic diseases. The root cause of the emergence of these strains [...] Read more.

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Pilot Study on Alteration of LA-MRSA Status of Pigs during Fattening Period on Straw Bedding by Two Types of Cleaning

by Hannah Schollenbruch, Iris Kobusch, Iris Schröter, Alexander Mellmann, Robin Köck and Marc Boelhauve

Antibiotics 2021, *10*(5), 521; https://doi.org/10.3390/antibiotics10050521 - 02 May 2021

Abstract In countries with professional pig husbandry in stables, the prevalence of livestock-associated (LA) methicillin-resistant *Staphylococcus aureus* (MRSA) on farms has remained high or has further increased in recent years. Simple measures to reduce LA-MRSA among pigs have not yet been successfully implemented. The [...] Read more.

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Potential Application of Combined Therapy with Lectins as a Therapeutic Strategy for the Treatment of Bacterial Infections

by João Victor de Oliveira Santos, Ana Lúcia Figueiredo Porto and Isabella Macário Ferro Cavalcanti
Antibiotics 2021, *10*(5), 520; https://doi.org/10.3390/antibiotics10050520 - 02 May 2021
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Abstract Antibiotic monotherapy may become obsolete mainly due to the continuous emergence of resistance to available antimicrobials, which represents a major uncertainty to human health. Taking into account that natural products have been an inexhaustible source of new compounds with clinical application, lectins are [...] Read more.
(This article belongs to the Special Issue Combination Therapy of Antimicrobial)

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Effect of Restriction of Fluoroquinolone Antibiotics on *Clostridioides difficile* Infections in the University Hospital Hradec Králové

by Kristýna Vaverková, Martin Kracík, Lenka Ryšková, Pavla Paterová, Rudolf Kukla, Lenka Hobzová, Roman Špánek and Helena Žemličková
Antibiotics 2021, *10*(5), 519; https://doi.org/10.3390/antibiotics10050519 - 02 May 2021
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Abstract *Clostridioides difficile* is the most common pathogen responsible for hospital-acquired diarrhea. This complication of antibiotic treatment mainly endangers the health of elder patients. Preventing the development of *C. difficile* infections (CDI) is still a challenge that needs to be addressed. In our study, [...] Read more.
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Phenotypic and Molecular Traits of *Staphylococcus coagulans* Associated with Canine Skin Infections in Portugal

by Sofia Santos Costa, Valéria Oliveira, Maria Serrano, Constança Pomba and Isabel Couto
Antibiotics 2021, *10*(5), 518; https://doi.org/10.3390/antibiotics10050518 - 02 May 2021
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Abstract *Staphylococcus coagulans* is among the three most frequent pathogens of canine pyoderma. Yet, studies on this species are scarce. Twenty-seven *S. coagulans* and one *S. schleiferi*, corresponding to all pyoderma-related isolations from these two species at two veterinary laboratories in Lisbon, Portugal, [...] Read more.
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Phage Biocontrol of Bacterial Leaf Blight Disease on Welsh Onion Caused by *Xanthomonas axonopodis* pv. *allii*

by Nguyen Thi Thu Nga, Tran Ngoc Tran, Dominique Holtappels, Nguyen Le Kim Ngan, Nguyen Phuoc Hao, Marta Vallino, Doan Thi Kieu Tien, Nguyen Huan Khanh-Pham, Rob Lavigne, Kaeko Kamei, Jeroen Wagemans and Jeffrey B. Jones
Antibiotics 2021, *10*(5), 517; https://doi.org/10.3390/antibiotics10050517 - 01 May 2021
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Abstract Bacterial leaf blight, which is caused by *Xanthomonas axonopodis* pv. *allii*, annually causes significant yield losses to Welsh onion in many producing countries, including Vietnam. In this study, we isolated and characterized lytic phages Φ16, Φ17A and Φ31, specific to *X. axonopodis* [...] Read more.
(This article belongs to the Special Issue Phage Biocontrol in Food Production)

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Use of Procalcitonin during the First Wave of COVID-19 in the Acute NHS Hospitals: A Retrospective Observational Study

by Neil Powell, Philip Howard, Martin J. Llewelyn, Tamas Szakmany, Mahableswhar Albur, Stuart E Bond, Joanne Euden, Lucy Brookes-Howell, Paul Dark, Thomas P Hellyer, Susan Hopkins, Iain J McCullagh, Margaret Ogden, Philip Pallmann, Helena Parsons, David G Partridge, Dominick E. Shaw, Bethany Shinkins, Stacy Todd, Emma Thomas-Jones, Robert West, Enitan D Carrol and Jonathan A. T. Sandoe

Antibiotics 2021, *10*(5), 516; https://doi.org/10.3390/antibiotics10050516 - 01 May 2021

Abstract A minority of patients presenting to hospital with COVID-19 have bacterial co-infection. Procalcitonin testing may help identify patients for whom antibiotics should be prescribed or withheld. This study describes the use of procalcitonin in English and Welsh hospitals during the first wave of [...] Read more.

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Choosing New Therapies for Gonorrhoea: We Need to Consider the Impact on the Pan-*Neisseria* Genome. A Viewpoint

by Chris Kenyon, Jolein Laumen and Sheeba Manoharan-Basil

Antibiotics 2021, *10*(5), 515; https://doi.org/10.3390/antibiotics10050515 - 01 May 2021

Abstract The development of new gonorrhoea treatment guidelines typically considers the resistance-inducing effect of the treatment only on *Neisseria gonorrhoeae*. Antimicrobial resistance in *N. gonorrhoeae* has, however, frequently first emerged in commensal *Neisseria* species and then been passed on to *N. gonorrhoeae* via [...] Read more.

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Distinct Resistomes and Microbial Communities of Soils, Wastewater Treatment Plants and Households Suggest Development of Antibiotic Resistances Due to Distinct Environmental Conditions in Each Environment

by Laura Schages, Florian Wichern, Stefan Geisen, Rainer Kalscheuer and Dirk Bockmühl

Antibiotics 2021, *10*(5), 514; https://doi.org/10.3390/antibiotics10050514 - 01 May 2021

Abstract The use of antibiotics in humans and animals results in a release of excess antibiotic residues into the environment through wastewaters and insufficient removal in wastewater treatment plants (WWTP), leading to increasing numbers of bacteria enriched in antibiotic resistance genes (ARG). However, the [...] Read more.

(This article belongs to the Section Antibiotics Use and Antimicrobial Stewardship)

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Photophysical and Antibacterial Properties of Porphyrins Encapsulated inside Acetylated Lignin Nanoparticles

by Nidia Maldonado-Carmona, Tan-Sothea Ouk, Nicolas Villandier, Claude Alain Calliste, Mário J. F. Calvete, Mariette M. Pereira and Stéphanie Leroy-Lhez

Antibiotics 2021, *10*(5), 513; https://doi.org/10.3390/antibiotics10050513 - 30 Apr 2021

Abstract Lignin has recently attracted the attention of the scientific community, as a suitable raw material for biomedical applications. In this work, acetylated lignin was used to encapsulate five different porphyrins, aiming to preserve their photophysical properties, and for further use as antibacterial treatment. [...] Read more.

(This article belongs to the Special Issue New and Innovative Applications of Antimicrobial Photodynamic Therapy)

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The Treatment of Peri-Implant Diseases: A New Approach Using HYBENX® as a Decontaminant for Implant Surface and Oral Tissues

by Michele Antonio Lopez, Pier Carmine Passarelli, Emmanuele Godino, Nicolò Lombardo, Francesca Romana Altamura, Alessandro Speranza, Andrea Lopez, Piero Papi, Giorgio Pompa and Antonio D'Addona

Antibiotics 2021, *10*(5), 512; https://doi.org/10.3390/antibiotics10050512 - 30 Apr 2021

Abstract Background: Peri-implantitis is a pathological condition characterized by an inflammatory process involving soft and hard tissues surrounding dental implants. The management of peri-implant disease has several protocols, among which is the chemical method HYBENX®. The aim of this study is to [...] Read more.

(This article belongs to the Special Issue Peri-Implant Diseases: Diagnostic Features, Microbiological Characteristics and Novel Surface Decontamination and Treatment Strategies)

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Catalase Protects Biofilm of *Staphylococcus aureus* against Daptomycin Activity

by Cristina El Haj, Mads Lichtenberg, Karen Leth Nielsen, Thomas Bjarnsholt and Peter Østrup Jensen

Antibiotics 2021, *10*(5), 511; https://doi.org/10.3390/antibiotics10050511 - 30 Apr 2021

Abstract Daptomycin is recommended for the treatment of *Staphylococcus aureus* infections due to its bactericidal activity. However, its mechanism of action is poorly understood. The involvement of reactive oxygen species (ROS) in the bactericidal activity of daptomycin has been proved against planktonic *S. aureus* [...] Read more.

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ESBL-Producing *Escherichia coli* Carrying CTX-M Genes Circulating among Livestock, Dogs, and Wild Mammals in Small-Scale Farms of Central Chile

by Julio A. Benavides, Marília Salgado-Caxito, Andrés Opazo-Capurro, Paulina González Muñoz, Ana Piñeiro, Macarena Otto Medina, Lina Rivas, Jose Munita and Javier Millán

Antibiotics 2021, *10*(5), 510; https://doi.org/10.3390/antibiotics10050510 - 30 Apr 2021

Abstract Antibiotic-resistant bacteria of critical importance for global health such as extended-spectrum beta-lactamases-producing (ESBL)-*Escherichia coli* have been detected in livestock, dogs, and wildlife worldwide. However, the dynamics of ESBL-*E. coli* between these animals remains poorly understood, particularly in small-scale farms of low [...] Read more.

(This article belongs to the Special Issue Antibiotic Resistance: A One-Health Approach)

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Multimodal Interventions to Prevent and Control Carbapenem-Resistant Enterobacteriaceae and Extended-Spectrum β-Lactamase Producer-Associated Infections at a Tertiary Care Hospital in Egypt

by Noha A. Kamel, Khaled M. Elsayed, Mohamed F. Awad, Khaled M. Aboshanab and Mervat I. El Borhamy

Antibiotics 2021, *10*(5), 509; https://doi.org/10.3390/antibiotics10050509 - 30 Apr 2021

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Abstract The current rise of multidrug-resistant (MDR) Gram-negative Enterobacteriaceae including the extended-spectrum β-lactamase (ESBL)-producing organisms and carbapenem-resistant Enterobacteriaceae (CRE) has been increasingly reported worldwide, posing new challenges to health care facilities. Accordingly, we evaluated the impact of multimodal infection control interventions at one of [...] Read more.

(This article belongs to the Special Issue Antimicrobial Resistance in Gram-Negative Bacteria, 2nd Edition)

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Antibacterial Potential by Rupture Membrane and Antioxidant Capacity of Purified Phenolic Fractions of *Persea americana* Leaf Extract

by Laura María Solís-Salas, Crystel Aleyvick Sierra-Rivera, Luis Enrique Cobos-Puc, Juan Alberto Ascacio-Valdés and Sonia Yesenia Silva-Belmares

Antibiotics 2021, *10*(5), 508; https://doi.org/10.3390/antibiotics10050508 - 29 Apr 2021

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Abstract The present research focused on evaluating the antibacterial effect and the mechanism of action of partially purified fractions of an extract of *Persea americana*. Furthermore, both its antioxidant capacity and composition were evaluated. The extract was fractionated by vacuum liquid chromatography. The [...] Read more.

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Aminoglycosides in the Intensive Care Unit: What Is New in Population PK Modeling?

by Alexandre Duong, Chantale Simard, Yi Le Wang, David Williamson and Amélie Marsot

Antibiotics 2021, *10*(5), 507; https://doi.org/10.3390/antibiotics10050507 - 29 Apr 2021

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Abstract Background: Although aminoglycosides are often used as treatment for Gram-negative infections, optimal dosing regimens remain unclear, especially in ICU patients. This is due to a large between- and within-subject variability in the aminoglycoside pharmacokinetics in this population. Objective: This review provides comprehensive data [...] Read more.

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Photodynamic Therapy for the Treatment of Infected Leg Ulcers—A Pilot Study

by Magdalena Krupka, Andrzej Bożek, Dorota Bartusik-Aebisher, Grzegorz Cieślar and Aleksandra Kawczyk-Krupka

Antibiotics 2021, *10*(5), 506; https://doi.org/10.3390/antibiotics10050506 - 29 Apr 2021

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Abstract Chronic and infected leg ulcers (LUs) are painful, debilitating, resistant to antibiotics, and immensely reduce a patient's quality of life. The purpose of our study was to demonstrate the efficacy of photodynamic therapy (PDT) for the treatment of infected chronic LUs. Patients were [...] Read more.

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Prevalence, Genetic Diversity, Antimicrobial Resistance, and Toxigenic Profile of *Vibrio vulnificus* Isolated from Aquatic Environments in Taiwan

by I-Ching Lin, Bashir Hussain, Bing-Mu Hsu, Jung-Sheng Chen, Yu-Ling Hsu, Yi-Chou Chiu, Shih-Wei Huang and Jiun-Ling Wang

Antibiotics 2021, *10*(5), 505; https://doi.org/10.3390/antibiotics10050505 - 29 Apr 2021

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Abstract *Vibrio vulnificus* is a gram-negative, opportunistic human pathogen associated with life-threatening wound infections and is commonly found in warm coastal marine water environments, globally. In this study, two fishing harbors and three tributaries of the river basin were analyzed for the prevalence of [...] Read more.

(This article belongs to the Special Issue Antibiotics and Antibiotic Resistance in Aquatic Environments)

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Pharmacokinetics and Pharmacodynamics of Cefepime in Adults with Hematological Malignancies and Febrile Neutropenia after Chemotherapy

by José C. Álvarez, Sonia I. Cuervo, Edelberto Silva, Jorge A. Díaz, Lorena L. Jiménez, Daniel S. Parra, Julio C. Gómez, Ricardo Sánchez and Jorge A. Cortés

Antibiotics 2021, *10*(5), 504; https://doi.org/10.3390/antibiotics10050504 - 29 Apr 2021

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Abstract Patients with chemotherapy-induced febrile neutropenia (CIFN) may have changes in the pharmacokinetics (PK) compared to patients without malignancies or neutropenia. Those changes in antibiotic PK could lead to negative outcomes for patients if the therapy is not adequately adjusted to this. In this, [...] Read more.

(This article belongs to the Special Issue Optimizing Antibiotic Treatment: Pharmacokinetics and Clinical Trials)

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Exploring the Contribution of the AcrB Homolog MdtF to Drug Resistance and Dye Efflux in a Multidrug Resistant *E. coli* Isolate

by Sabine Schuster, Martina Vavra, Ludwig Greim and Winfried V. Kern

Antibiotics 2021, *10*(5), 503; https://doi.org/10.3390/antibiotics10050503 - 28 Apr 2021

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Abstract In *Escherichia coli*, the role of RND-type drug transporters other than the major efflux pump AcrB has largely remained undeciphered (particularly in multidrug resistant pathogens), because genetic engineering in such isolates is challenging. The present study aimed to explore the capability of [...] Read more.

(This article belongs to the Special Issue The Structural and Functional Study of Efflux Pumps Belonging to the RND Transporters Family from Gram-Negative Bacteria)

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Anaerobic Digestion and Removal of Sulfamethoxazole, Enrofloxacin, Ciprofloxacin and Their Antibiotic Resistance Genes in a Full-Scale Biogas Plant

by Andrea Visca, Anna Barra Caracciolo, Paola Grenni, Luisa Patrolecco, Jasmin Rauseo, Giulia Massini, Valentina Mazzurco Miritana and Francesca Spataro

Antibiotics 2021, *10*(5), 502; https://doi.org/10.3390/antibiotics10050502 - 28 Apr 2021

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Abstract Anaerobic digestion is one of the best ways to re-use animal manure and agricultural residues, through the production of combustible biogas and digestate. However, the use of antibiotics for preventing and treating animal diseases and, consequently, their residual concentrations in manure, could introduce [...] Read more.

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Proteomic Charting of Imipenem Adaptive Responses in a Highly Carbapenem Resistant Clinical *Enterobacter roggenkampii* Isolate

by Suruchi Nepal, Sandra Maaß, Stefano Grasso, Francis M. Cavallo, Jürgen Bartel, Dörte Becher, Erik Bathoorn and Jan Maarten van Dijl

Antibiotics 2021, *10*(5), 501; https://doi.org/10.3390/antibiotics10050501 - 28 Apr 2021

Abstract Gram-negative bacteria belonging to the *Enterobacter cloacae* complex are increasingly implicated in difficult-to-treat nosocomial infections, as exemplified by a recently characterized highly carbapenem-resistant clinical *Enterobacter roggenkampii* isolate with sequence type (ST) 232. While mechanisms of carbapenem resistance are well-understood, little is known about [...] Read more.

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Pan and Core Genome Analysis of 183 *Mycobacterium tuberculosis* Strains Revealed a High Inter-Species Diversity among the Human Adapted Strains

by Fathiah Zakham, Tarja Sironen, Olli Vapalahti and Ravi Kant

Antibiotics 2021, *10*(5), 500; https://doi.org/10.3390/antibiotics10050500 - 28 Apr 2021

Abstract Tuberculosis (TB) is an airborne communicable disease with high morbidity and mortality rates, especially in developing countries. The causal agents of TB belong to the complex *Mycobacterium tuberculosis* (MTBc), which is composed of different human and animal TB associated species. Some animal associated [...] Read more.

(This article belongs to the Special Issue The Genomics of Pathogens)

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The Use of Colistin in Food-Producing Animals in Estonia—Vaccination as an Effective Alternative to Consumption of Critically Important Antimicrobials in Pigs

by Marju Sammul, Kerli Mõtus and Piret Kalmus

Antibiotics 2021, *10*(5), 499; https://doi.org/10.3390/antibiotics10050499 - 28 Apr 2021

Abstract Reducing the use of critically important antimicrobials in veterinary medicine is increasingly important to avoid the development and spread of antimicrobial resistance. The aim of this study was to analyse ten-year trends of colistin consumption in Estonia and to ascertain the possible association [...] Read more.

(This article belongs to the Special Issue Antimicrobial Stewardship in Veterinary Medicine)

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Distribution of β-Lactamase Genes in Clinical Isolates from California Central Valley Hospital Deviates from the United States Nationwide Trends

by Candace Guzman-Cole, Fabian Santiago, Sona Garsevanyan, Suzanne Sindi and Miriam Barlow

Antibiotics 2021, *10*(5), 498; https://doi.org/10.3390/antibiotics10050498 - 27 Apr 2021

Abstract The evolution and dissemination of antibiotic resistance genes throughout the world are clearly affected by the selection and migration of resistant bacteria. However, the relative contributions of selection and migration at a local scale have not been fully explored. We sought to identify [...] Read more.

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The General Population's Inappropriate Behaviors and Misunderstanding of Antibiotic Use in China: A Systematic Review and Meta-Analysis

by Lixia Duan, Chenxi Liu and Dan Wang

Antibiotics 2021, *10*(5), 497; https://doi.org/10.3390/antibiotics10050497 - 26 Apr 2021

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Abstract The general population has increasingly become the key contributor to irrational antibiotic use in China, which fuels the emergence of antibiotic resistance. This study aimed to estimate the prevalence of the general population's irrational use behaviors of antibiotics and identify the potential reasons [...] Read more.

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Initially Reduced Linezolid Dosing Regimen to Prevent Thrombocytopenia in Hemodialysis Patients

by Hitoshi Kawasuji, Yasuhiro Tsuji, Chika Ogami, Makito Kaneda, Yushi Murai, Kou Kimoto, Akitoshi Ueno, Yuki Miyajima, Yasutaka Fukui, Ippei Sakamaki and Yoshihiro Yamamoto

Antibiotics 2021, *10*(5), 496; https://doi.org/10.3390/antibiotics10050496 - 26 Apr 2021

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Abstract This retrospective cohort study investigated the effects of an initially reduced linezolid dosing regimen in hemodialysis patients through therapeutic drug monitoring (TDM). Patients were divided into two groups depending on their initial dose of linezolid (standard dose of 600 mg every 12 h [...] Read more.

(This article belongs to the Special Issue Novel Targets of Drug Monitoring for Antibiotics)

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Prevalence of Antibiotic-Resistant Bacteria ESKAPE among Healthy People Estimated by Monitoring of Municipal Wastewater

by Masateru Nishiyama, Susan Praise, Keiichi Tsurumaki, Hiroaki Baba, Hajime Kanamori and Toru Watanabe

Antibiotics 2021, *10*(5), 495; https://doi.org/10.3390/antibiotics10050495 - 26 Apr 2021

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Abstract There is increasing attention toward factors that potentially contribute to antibiotic resistance (AR), as well as an interest in exploring the emergence and occurrence of antibiotic resistance bacteria (ARB). We monitored six ARBs that cause hospital outbreaks in wastewater influent to highlight the [...] Read more.

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Association between Antimicrobial Peptide Histatin 5 Levels and Prevalence of *Candida* in Saliva of Patients with Down Syndrome

by Tomoko Komatsu, Kiyoko Watanabe, Nobushiro Hamada, Eva Helmerhorst, Frank Oppenheim and Masaichi Chang-il Lee

Antibiotics 2021, *10*(5), 494; https://doi.org/10.3390/antibiotics10050494 - 26 Apr 2021

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Abstract There are no studies on *Candida* colonization and micropeptides of saliva in any patient. Therefore, we studied the effects of the salivary antimicrobial peptide histatin 5 on oral fungal colonization; subjects were subdivided into Down syndrome (D) and normal (N) groups by age: [...] Read more.

(This article belongs to the Special Issue Small Antimicrobial Peptides against Inflammation)

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Serotyping and Antimicrobial Resistance Profile of Enteric Nontyphoidal *Salmonella* Recovered from Febrile Neutropenic Patients and Poultry in Egypt

by Reem A. Youssef, Ahmad M. Abbas, Ahmed M. El-Shehawi, Mona I. Mabrouk and Khaled M. Aboshanab

Antibiotics 2021, *10*(5), 493; https://doi.org/10.3390/antibiotics10050493 - 26 Apr 2021

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Abstract A total of 300 human fecal samples were collected from febrile neutropenic patients suffering from severe gastroenteritis, followed by identification and serological characterization of recovered isolates. Fifty nontyphoidal *Salmonella* (NTS) serovars were recovered. A total of serologically identified 50 NTS serovars recovered from [...] Read more.

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Dissemination of Carbapenemases (OXA-48, NDM and VIM) Producing *Enterobacteriaceae* Isolated from the Mohamed VI University Hospital in Marrakech, Morocco

by Souad Loqman, Nabila Soraa, Seydina M. Diene and Jean-Marc Rolain

Antibiotics 2021, *10*(5), 492; https://doi.org/10.3390/antibiotics10050492 - 26 Apr 2021

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Abstract The emergence and spread of carbapenem-resistant *Enterobacteriaceae* (CRE) represent a major clinical problem and raise serious health concerns. The present study aimed to investigate and ascertain the occurrence of CRE among hospitalized patients of Mohamed VI University Hospital, Marrakech, Morocco. Biological samples were [...] Read more.

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New Sequence Type ST3449 in Multidrug-Resistant *Pseudomonas aeruginosa* Isolates from a Cystic Fibrosis Patient

by Catalina Díaz-Ríos, Marta Hernández, David Abad, Laura Álvarez-Montes, Athanasia Varsaki, David Iturbe, Jorge Calvo and Alain A. Ocampo-Sosa

Antibiotics 2021, *10*(5), 491; https://doi.org/10.3390/antibiotics10050491 - 23 Apr 2021

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Abstract *Pseudomonas aeruginosa* is one of the most critical bacterial pathogens associated with chronic infections in cystic fibrosis patients. Here we show the phenotypic and genotypic characterization of five consecutive multidrug-resistant isolates of *P. aeruginosa* collected during a month from a CF patient with [...] Read more.

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Intrauterine Blood Plasma Platelet-Therapy Mitigates Persistent Breeding-Induced Endometritis, Reduces Uterine Infections, and Improves Embryo Recovery in Mares

by Lorenzo G. T. M. Segabinazzi, Igor F. Canisso, Giorgia Podico, Lais L. Cunha, Guilherme Novello, Michael F. Rosser, Shavahn C. Loux, Fabio S. Lima and Marco A. Alvarenga

Antibiotics 2021, *10*(5), 490; https://doi.org/10.3390/antibiotics10050490 - 23 Apr 2021

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Abstract Microorganisms, including pathogenic or opportunistic bacteria and fungi, may gain access to the uterus during breeding, and infectious endometritis plays a major role in equine subfertility. This study aimed to assess the post-breeding inflammatory response, endometrial culture, and embryo recovery of mares susceptible [...] Read more.
(This article belongs to the Special Issue Antimicrobial Stewardship in Livestock)

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Triphenilphosphonium Analogs of Chloramphenicol as Dual-Acting Antimicrobial and Antiproliferating Agents

by Julia A. Pavlova, Zimfira Z. Khairullina, Andrey G. Tereshchenkov, Pavel A. Nazarov, Dmitrii A. Lukianov, Inna A. Volynkina, Dmitry A. Skvortsov, Gennady I. Makarov, Etna Abad, Somay Y. Murayama, Susumu Kajiwara, Alena Paleskava, Andrey L. Konevega, Yuri N. Antonenko, Alex Lyakhovich, Ilya A. Osterman, Alexey A. Bogdanov and Natalia V. Sumbatyan

Antibiotics 2021, *10*(5), 489; https://doi.org/10.3390/antibiotics10050489 - 23 Apr 2021

Abstract In the current work, in continuation of our recent research, we synthesized and studied new chimeric compounds, including the ribosome-targeting antibiotic chloramphenicol (CHL) and the membrane-penetrating cation triphenylphosphonium (TPP), which are linked by alkyl groups of different lengths. Using various biochemical assays, we [...] Read more.

(This article belongs to the Special Issue New Ribosome-Acting Antibiotic Derivatives)

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The Link between Occurrence of Class I Integron and Acquired Aminoglycoside Resistance in Clinical MRSA Isolates

by Ahmed M. El-Baz, Galal Yahya, Basem Mansour, Mohamed M. A. El-Sokkary, Reem Alshaman, Abdullah Alattar and Amira M. El-Ganiny

Antibiotics 2021, *10*(5), 488; https://doi.org/10.3390/antibiotics10050488 - 23 Apr 2021

Abstract Methicillin-resistant *Staphylococcus aureus* (MRSA) is a major cause of nosocomial infections because of its high resistance. Here, we study the antibiotic resistance in MRSA clinical isolates and their relation to integron I occurrence. A total of 88 clinical *Staphylococcusaureus* isolates were collected. [...] Read more.

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Therapeutic Drug Monitoring of Isavuconazole: Serum Concentration Variability and Success Rates for Reaching Target in Comparison with Voriconazole

by Malene Risum, Mai-Britt Vestergaard, Ulla Møller Weinreich, Marie Helleberg, Nadja Hawwa Vissing and René Jørgensen

Antibiotics 2021, *10*(5), 487; https://doi.org/10.3390/antibiotics10050487 - 23 Apr 2021

Abstract Isavuconazole (ISZ) is used in the treatment of aspergillosis and mucormycosis. The purpose of this study was to evaluate the therapeutic drug monitoring (TDM) of ISZ samples from a clinical setting performed at Statens Serum Institut. **Materials/methods:** Isavuconazole serum concentrations were determined by [...] Read more.

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Treatment of Pulmonary Disease of Cystic Fibrosis: A Comprehensive Review

by Rosa María Girón Moreno, Marta García-Clemente, Layla Diab-Cáceres, Adrián Martínez-Vergara, Miguel Ángel Martínez-García and Rosa Mar Gómez-Punter

Antibiotics 2021, *10*(5), 486; https://doi.org/10.3390/antibiotics10050486 - 23 Apr 2021

Abstract Cystic fibrosis (CF) is a genetic disease that causes absence or dysfunction of a protein named transmembrane conductance regulatory protein (CFTR) that works as an anion channel. As a result, the secretions of the organs where CFTR is expressed are very viscous, so [...] Read more.

(This article belongs to the Special Issue The Treatment of Cystic Fibrosis (CF) Disease)

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Antimicrobial Resistance Patterns and Dynamics of Extended-Spectrum β-Lactamase-Producing Uropathogenic *Escherichia coli* in Cusco, Peru

by Steev Loyola, Fátima Concha-Velasco, Jimena Pino-Dueñas, Nancy Vasquez-Luna, Paola Juarez, Carlos Llanos, Guillermo Salvatierra, Jesus Tamariz and Andres G. Lescano

Antibiotics 2021, *10*(5), 485; https://doi.org/10.3390/antibiotics10050485 - 22 Apr 2021

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Abstract Urinary tract infections (UTIs) are a common human infection. Antibiotic resistance in extended-spectrum β-lactamase (ESBL)-producing uropathogenic *E. coli* (UPEC) is a major therapeutic challenge due to limited treatment alternatives. The aim was to characterize the antimicrobial resistance (AMR) and dynamics of ESBL-producing UPEC [...] Read more.

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Short-Course Versus Long-Course Colistin for Treatment of Carbapenem-Resistant *A.baumannii* in Cancer Patient

by Wasan Katip, Suriyon Uitrakul and Peninnah Oberdorfer

Antibiotics 2021, *10*(5), 484; https://doi.org/10.3390/antibiotics10050484 - 22 Apr 2021

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Abstract Carbapenem-resistant *Acinetobacter baumannii* (CRAB) is one of the most commonly reported nosocomial infections in cancer patients and could be fatal because of suboptimal immune defenses in these patients. We aimed to compare clinical response, microbiological response, nephrotoxicity, and 30-day mortality between cancer patients [...] Read more.

(This article belongs to the Special Issue Hospital Acquired Infections, Multidrug Resistant (MDR) Bacteria, Alternative Approaches to Antibiotic Therapy)

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Actinomycetes: A Never-Ending Source of Bioactive Compounds—An Overview on Antibiotics Production

by Davide De Simeis and Stefano Serra

Antibiotics 2021, *10*(5), 483; https://doi.org/10.3390/antibiotics10050483 - 22 Apr 2021

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Abstract The discovery of penicillin by Sir Alexander Fleming in 1928 provided us with access to a new class of compounds useful at fighting bacterial infections: antibiotics. Ever since, a number of studies were carried out to find new molecules with the same activity. [...] Read more.

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Dispensing of Non-Prescribed Antibiotics from Community Pharmacies of Pakistan: A Cross-Sectional Survey of Pharmacy Staff's Opinion

by Muhammad Majid Aziz, Fatima Haider, Muhammad Fawad Rasool, Furqan Khurshid Hashmi, Sadia Bahsir, Pengchao Li, Mingyue Zhao, Thamir M. Alshammary and Yu Fang

Antibiotics 2021, *10*(5), 482; https://doi.org/10.3390/antibiotics10050482 - 22 Apr 2021

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Abstract Community pharmacies are the main channel of antibiotics distribution. We aimed to analyze the dispensing of non-prescribed antibiotics and knowledge of pharmacy staff. We conducted a cross-sectional study in Punjab, Pakistan between December 2017 and March 2018. A self-administered, structured, pretested, and validated [...] Read more.

(This article belongs to the Special Issue Antibiotic Use in the Communities)

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Long-Term Use of Oral Hygiene Products Containing Stannous and Fluoride Ions: Effect on Viable Salivary Bacteria

by Anne Brigitte Kruse, Nadine Schlueter, Viktoria Konstanze Kortmann, Cornelia Frese, Annette Anderson, Annette Wittmer, Elmar Hellwig, Kirstin Vach and Ali Al-Ahmad

Antibiotics 2021, *10*(5), 481; https://doi.org/10.3390/antibiotics10050481 - 22 Apr 2021

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Abstract The aim of this randomized, controlled clinical trial was to isolate and identify viable microorganisms in the saliva of study participants that continuously used a stannous and fluoride ion (F/Sn)-containing toothpaste and mouth rinse over a period of three years in comparison to [...] Read more.

(This article belongs to the Special Issue Oral Microorganisms and Inactivation of Oral Biofilms)

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Virulence Determinants and Antimicrobial Profiles of *Pasteurella multocida* Isolated from Cattle and Humans in Egypt

by Mohamed Sabry Abd Elraheam Elsayed, Samah Mahmoud Eldsouky, Tamer Roshdy, Lamia Said, Nahed Thabet, Tamer Allam, A. B. Abeer Mohammed, Ghada M. Nasr, Mohamed S. M. Basiouny, Behairy A. Akl, Maha M. Nader, Al Shaimaa Hasan and Ahmed Salah

Antibiotics 2021, *10*(5), 480; https://doi.org/10.3390/antibiotics10050480 - 22 Apr 2021

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Abstract *Pasteurella multocida* is a Gram-negative bacterium that causes drastic infections in cattle and humans. In this study, 55 isolates were recovered from 115 nasal swabs from apparently healthy and diseased cattle and humans in Minufiya and Qalyubia, Egypt. These isolates were confirmed by [...] Read more.

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Surveillance of Antimicrobial Susceptibility of Anaerobe Clinical Isolates in Southeast Austria: *Bacteroides fragilis* Group Is on the Fast Track to Resistance

by Elisabeth König, Hans P. Ziegler, Julia Tribus, Andrea J. Grisold, Gebhard Feierl and Eva Leitner

Antibiotics 2021, *10*(5), 479; https://doi.org/10.3390/antibiotics10050479 - 21 Apr 2021

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Abstract Anaerobic bacteria play an important role in human infections. *Bacteroides* spp. are some of the 15 most common pathogens causing nosocomial infections. We present antimicrobial susceptibility testing (AST) results of 114 Gram-positive anaerobic isolates and 110 *Bacteroides-fragilis*-group-isolates (BFGI). Resistance profiles were determined [...] Read more.

(This article belongs to the Special Issue Antimicrobial Resistance and Healthcare-Associated Infection)

Open Access Study Protocol

Antibiotic Resistance in Wastewater Treatment Plants and Transmission Risks for Employees and Residents: The Concept of the AWARE Study

by Laura Wengenroth, Fanny Berglund, Hetty Blaak, Mariana Carmen Chifiriuc, Carl-Fredrik Flach, Gratiela Gradisteanu Pircalabioru, D. G. Joakim Larsson, Luminita Marutescu, Mark W. J. van Passel, Marcela Popa, Katja Radon, Ana Maria de Roda Husman, Daloha Rodriguez-Molina, Tobias Weinmann, Andreas Wieser and Heike Schmitt

Antibiotics 2021, *10*(5), 478; https://doi.org/10.3390/antibiotics10050478 - 21 Apr 2021

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Abstract Antibiotic resistance has become a serious global health threat. Wastewater treatment plants may become unintentional collection points for bacteria resistant to antimicrobials. Little is known about the transmission of antibiotic resistance from wastewater treatment plants to humans, most importantly to wastewater treatment plant [...] Read more.

(This article belongs to the Special Issue Antibiotic Resistance in Wastewater and Its Treatment)

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A Complementary Herbal Product for Controlling Giardiasis

by Tarek Hamdy Abd-Elhamid, Iman A. M. Abdel-Rahman, Amany Refaat Mahmoud, Khaled S. Allemailem, Ahmad Almatroudi, Samer S. Fouad, Osama H. Abdella, Hatem A. Elshabrawy and Asmaa M. El-Kady
Antibiotics 2021, *10*(5), 477; https://doi.org/10.3390/antibiotics10050477 - 21 Apr 2021
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Abstract Giardiasis is an intestinal protozoal disease caused by *Giardia lamblia*. The disease became a global health issue due to development of resistance to commonly used drugs. Since many plant-derived products have been used to treat many parasitic infestations, we aimed to assess the [...] Read more.
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Existence of Multiple ESBL Genes among Phenotypically Confirmed ESBL Producing *Klebsiella pneumoniae* and *Escherichia coli* Concurrently Isolated from Clinical, Colonization and Contamination Samples from Neonatal Units at Bugando Medical Center, Mwanza, Tanzania

by Vitus Silago, Dory Kovacs, Happyness Samson, Jeremiah Seni, Louise Matthews, Katarina Oravcová, Athumani M. Lupindu, Abubakar S. Hoza and Stephen E. Mshana
Antibiotics 2021, *10*(5), 476; https://doi.org/10.3390/antibiotics10050476 - 21 Apr 2021
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Abstract The proportions and similarities of extended-spectrum β-lactamase (ESBL) producing *K. pneumoniae* (ESBL-KP) and *E. coli* (ESBL-EC) carrying multiple ESBL genes is poorly known at our setting. This study investigated the existence of multiple ESBL genes (bla_{CTX-M}, bla_{TEM}, and *bla* [...] Read more.
(This article belongs to the Special Issue Current and Novel Antimicrobial Strategies for Bacterial and Fungal Infections by Resistant Organisms)

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Prosthetic Shoulder Joint Infection by *Cutibacterium acnes*: Does Rifampin Improve Prognosis? A Retrospective, Multicenter, Observational Study

by Helem H. Vilchez, Rosa Escudero-Sanchez, Marta Fernandez-Sampedro, Oscar Murillo, Álvaro Auñón, Dolors Rodríguez-Pardo, Alfredo Jover-Sáenz, Mª Dolores del Toro, Alicia Rico, Luis Falgueras, Julia Praena-Segovia, Laura Guío, José A. Iribarren, Jaime Lora-Tamayo, Natividad Benito, Laura Morata, Antonio Ramirez, Melchor Riera, Study Group on Osteoarticular Infections (GEIO) and the Spanish Network for Research in Infectious Pathology (REIPI)
Antibiotics 2021, *10*(5), 475; https://doi.org/10.3390/antibiotics10050475 - 21 Apr 2021
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Abstract This retrospective, multicenter observational study aimed to describe the outcomes of surgical and medical treatment of *C. acnes*-related prosthetic joint infection (PJI) and the potential benefit of rifampin-based therapies. Patients with *C. acnes*-related PJI who were diagnosed and treated between January [...] Read more.
(This article belongs to the Special Issue Prosthetic Joint Infection: The Challenges of Prevention, Diagnosis and Treatment and Opportunities for Future Research)

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High Throughput Virtual Screening and Molecular Dynamics Simulation for Identifying a Putative Inhibitor of Bacterial CTX-M-15

by Shazi Shakil, Syed M. Danish Rizvi and Nigel H. Greig
Antibiotics 2021, *10*(5), 474; https://doi.org/10.3390/antibiotics10050474 - 21 Apr 2021
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Abstract Background: Multidrug resistant bacteria are a major therapeutic challenge. CTX-M-type enzymes are an important group of class A extended-spectrum β-lactamases (ESBLs). ESBLs are the enzymes that arm bacterial pathogens with drug resistance to an array of antibiotics, notably the advanced-generation cephalosporins. The current [...] Read more.
(This article belongs to the Special Issue Antibacterial Resistance and Novel Therapeutic Strategies)

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Nanomaterials in Wound Healing and Infection Control

by Ali Pormohammad, Nadia K. Monych, Sougata Ghosh, Diana L. Turner and Raymond J. Turner
Antibiotics 2021, *10*(5), 473; https://doi.org/10.3390/antibiotics10050473 - 21 Apr 2021
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Abstract Wounds continue to be a serious medical concern due to their increasing incidence from injuries, surgery, burns and chronic diseases such as diabetes. Delays in the healing process are influenced by infectious microbes, especially when they are in the biofilm form, which leads [...] Read more.
(This article belongs to the Special Issue Nanoparticles-Based Antimicrobials)

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Evaluation of Aerosol Therapy during the Escalation of Care in a Model of Adult Cystic Fibrosis

by Elena Fernández Fernández, Mary Joyce, Andrew O'Sullivan and Ronan MacLoughlin
Antibiotics 2021, *10*(5), 472; https://doi.org/10.3390/antibiotics10050472 - 21 Apr 2021
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Abstract Lung disease is the main cause of morbidity and mortality in cystic fibrosis (CF). CF patients inhale antibiotics regularly as treatment against persistent bacterial infections. The goal of this study was to investigate the effect of clinical intervention on aerosol therapy during the [...] Read more.
(This article belongs to the Special Issue The Treatment of Cystic Fibrosis (CF) Disease)

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Alternatives to Antibiotics: A Symposium on the Challenges and Solutions for Animal Health and Production

by Todd R. Callaway, Hyun Lillehoj, Rungtip Chuanchuen and Cyril G. Gay
Antibiotics 2021, *10*(5), 471; https://doi.org/10.3390/antibiotics10050471 - 21 Apr 2021
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Abstract Antibiotics have improved the length and quality of life of people worldwide and have had an immeasurable influence on agricultural animal health and the efficiency of animal production over the last 60 years. The increased affordability of animal protein for a greater proportion [...] Read more.
(This article belongs to the Special Issue Antimicrobial Stewardship in Veterinary Medicine)

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Antimicrobial Stewardship and Its Impact on the Changing Epidemiology of Polymyxin Use in a South Indian Healthcare Setting

by Dipu T. Sathyapalan, Jini James, Sangita Sudhir, Vrinda Nampoothiri, Praveena N. Bhaskaran, Nandita Shashindran, Jisha Thomas, Preetha Prasanna, Zubair Umer Mohamed, Fabia Edathadathil, Sanjeev Singh and Merlin Moni

Antibiotics 2021, *10*(5), 470; https://doi.org/10.3390/antibiotics10050470 - 21 Apr 2021

Abstract Polymyxins being last resort drugs to treat infections triggered by multidrug-resistant pathogens necessitates the implementation of antimicrobial stewardship program (ASP) initiatives to support its rational prescription across healthcare settings. Our study aims to describe the change in the epidemiology of polymyxins and patient [...] Read more.

(This article belongs to the Section Antibiotics Use and Antimicrobial Stewardship)

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