POSTER WEEK

Poster Week 22/2024

ABSTRACT BOOK

11th – 15th November 2024

estesc

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Calendário

Poster Week 22/2024

	2ªf		3ªf		4ªf	5ªf	6ªf		
	11/nov		12/nov		13/nov	14/nov	15/nov		
8-9h									
9-10h					Imuohemoterapia Clínico-Laboratorial II 3º CBL Fernando Mendes 8 P	Farmacologia 2º DN João J. Joaquim 11 P	Gestão da Qualidade da Água I 2º SA Cristina Santos 2 P	Morfologia e Histotecnologia 3º CBL Diana Martins 10P	Toxicologia Alimentar Ana Lúcia Baltazar 3º DN 9 P
10-11h									
11-12h	Introdução à Farmácia 1º Farmácia Rui Cruz + Balteiro 5 P				Tecnologia e Farmácia Galénica II 2º Farmácia Balteiro 10 P				
12-13h									
13-14h									
14-15h	Qualidade e Segurança Alimentar 3º SA Cristina Santos 5 P	Introdução à Farmácia 1º Farmácia Balteiro 5 P	Genética em Audiologia 2º Audiologia Célia A. Gomes 5 P	Higiene e Segurança Alimentar 3º SA Cristina Santos 3 P	Investigação Aplicada 4º Farmácia Célia A. Gomes 1P				
15-16h									
16-17h									
17-18h							Tecnologias da Informação e Inteligência Artificial 4º Audiologia António Carvalho Santos 7 P		
18-19h									
19-20h									

LINKS TO POSTER FOLDERS

Folder	Disciplines	Year	Degree	Poster links
22.1	Introduction to Pharmacy	1º	Pharmacy	https://photos.app.goo.gl/FrTAn7WKyCjADDDx5
22.2	Food Quality and Safety	3º	Environmental Health	https://photos.app.goo.gl/bSwCz3e2HpzXmsDAA
22.3	Genetics in Audiology	2º	Audiology	https://photos.app.goo.gl/amEtzJJ4YQbziiu99
22.4	Food Hygiene and Safety	3º	Environmental Health	https://photos.app.goo.gl/ngyoL27keWMLrWqH6
22.5	Clinical-Laboratorial Immunohemotherapy II	3º	Biomedical Laboratory Sciences	https://photos.app.goo.gl/soDUrFVak9k1vunF6
22.6	Applied Research in Pharmacy	4º	Pharmacy	https://photos.app.goo.gl/rMFnvnUw88XiRuNw6
22.7	Pharmacology	2º	Dietetics and Nutrition	https://photos.app.goo.gl/44kr3x7BMHUcU8NP7
22.8	Technology and Galenic Pharmacy II	2º	Pharmacy	https://photos.app.goo.gl/8p96ySNxLtKrnTcz5
22.9	Water Management and Quality I	2º	Environmental Health	https://photos.app.goo.gl/f6m7ALHkkBUg4qxD8
22.10	Morphology and Histotechnology	3º	Biomedical Laboratory Sciences	https://photos.app.goo.gl/eN6QK4HydjFgmfnm6
22.11	Food Toxicology	3º	Dietetics and Nutrition	https://photos.app.goo.gl/APLdWmWcyrcrE5vP9
22.12	Information Technology and Artificial Intelligence	4º	Audiology	https://photos.app.goo.gl/Z3Pv5cNRinSPsyiw9

INDEX

Abstract number	Discipline	Program
A1 – A10	Introduction to Pharmacy	Pharmacy
A11– A15	Food Quality and Safety	Environmental Health
A16 – A20	Genetics in Audiology	Audiology
A21– A23	Food Hygiene and Safety	Environmental Health
A24 – A31	Clinical-Laboratorial Immunohemotherapy II	Biomedical Laboratory Sciences
A32	Applied Research in Pharmacy	Pharmacy
A33– A43	Pharmacology	Dietetics and Nutrition
A44– A45	Water Management and Quality I	Environmental Health
A46 – A54	Food Toxicology	Dietetics and Nutrition
A55 – A64	Morphology and Histotechnology	Biomedical Laboratory Sciences
A65 – A71	Information Technology and Artificial Intelligence	Audiology
A72 – A81	Technology and Galenic Pharmacy II	Pharmacy

ABSTRACTS

Discipline: Introduction to Pharmacy

Professor: Jorge Balteiro, Rui Cruz

Degree: Pharmacy

A 1

Edition 22/2024

WHAT IS POLYPHARMACY?

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Polypharmacy is the phenomenon of continuous and simultaneous use of several drugs for the treatment and control of pathologies. First defined by the WHO, the current quantitative value generally used for studies on this issue is 5 drugs. This led to the definition of minor polypharmacy (less than 5 drugs per day) and major polypharmacy (more than 5 drugs per day). This is more common in the elderly, chronically ill and people at risk, for whom medication is used to respond to various symptoms and possible comorbid conditions, which are the multiple chronic issues one might be afflicted with at one time. Statistically, in the USA, around 36% take 3 or more medications for a long time.

However, polypharmacy can cause adverse effects due to the increased risk of possible interactions between drugs or other substances, as well as limiting the medications available for treating acute conditions. Added to these consequences is the difficulty in reconciling administration times and possible irregularities in them, due to dosages and the existence of medications that cannot be taken at the same time. Therefore, we must not only resort to non-drug therapies, when possible, but also drugs capable of responding to more than one problem, in order to reduce the number of medications taken daily by a given individual.

Keywords: Polypharmacy; drugs; comorbidity; adverse effects.

ORPHAN DRUGS

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Orphan drugs play a key role in addressing rare diseases, which affect part of the world's population but receive very little attention. As the number of people who need this type of medicine is very small, production costs are very high. Orphan drugs are essential in treating rare diseases which, although they affect many people, receive little attention in pharmaceutical research. Producing these drugs faces high costs, economic viability challenges, and regulatory barriers. This work explores the definition, challenges, regulation, and use of orphan drugs in Portugal. Orphan drugs are intended to treat rare diseases and are often neglected by industries due to the low number of patients and the difficulty of profiting from these treatments. The authorities offer incentives such as market exclusivity and reduced fees to encourage development. Defined in Europe as those that affect less than 5 out of every 10,000 habitants, rare diseases are chronically debilitating and require concerted efforts to tackle. In this work, we will also analyze some graphs that allow us to understand the action of orphan drugs in hospitals. Orphan drugs are essential for the treatment of rare diseases, but their creation faces challenges. Incentives are therefore needed to ensure that these treatments are available.

Keywords: Orphan Drugs; Rare Diseases; EMA; Public Health.

SELF-MEDICATION

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Self-medication is a widespread practice, characterized by the use of medicines without a doctor's prescription. Although it offers benefits, such as the quick relief of mild symptoms like headaches or fever, it is a practice that involves considerable risks. The main benefit is the patient's autonomy to treat minor health problems in an accessible and practical way, as long as the guidelines on the labels and leaflets of over-the-counter medicines are followed. However, irresponsible self-medication can have serious consequences, such as camouflaging more serious illnesses and delaying a correct diagnosis. In addition, the inappropriate use of medicines can result in dangerous interactions or even poisoning. One of the most worrying risks is the increase in bacterial resistance, especially with the improper use of antibiotics. To minimize these risks, it is essential to promote responsible self-medication, which is based on the conscious use of non-prescription medicines, suitable only for treating minor, temporary health problems. A consultation with a pharmacist can be essential to clarify doubts and avoid the inappropriate use of medicines. Self-medication therefore requires care and information. Educational campaigns that encourage the rational use of medicines are crucial to guide the population and ensure that the benefits of this practice are enjoyed without compromising health.

Keywords: Self-medication; benefits; risks; responsible.

PORTUGUESE NATIONAL VACCINATION PROGRAM (PNV)

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Launched in 1965, the Portuguese National Vaccination Program (PNV) is a public health initiative devoted to the long-standing mission of protecting the population from infectious diseases. It has a strong focus on the principles of equity, universality, and accessibility, meaning that in Portugal, vaccines are available and free of charge to those who are eligible, regardless of their income or social situation. The PNV's main aim is to achieve herd immunity, which is just about the most basic and important public health objective one can have, the achievement of which prevents outbreaks and drastically slows the spread of infections. Immunization against certain diseases is a long-standing component of the Plan. There is a long list of mainly childhood diseases against which individuals are protected, including hepatitis B, diphtheria, tetanus, pertussis, poliomyelitis, and a number of childhood viruses like those that cause measles, rubella, and certain forms of meningitis. The vaccines recommended by Portugal's National Vaccination Program (PNV) are typically quite safe. They do pose a slight risk, however, to certain susceptible individuals like people with severe immunodeficiencies and pregnant women who may need to avoid live vaccines. The PNV's success hinges largely on public adherence to its recommended vaccination schedule. That the program even has a clear "success" narrative is due, in part, to the sacrifices made by program stakeholders who inhabit the public education space. There, under a flag of "pro-vaccination," they combat vaccine hesitancy and misinformation.

Keywords: Vaccine; herd immunity; diseases.

GENERIC MEDICINES

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Generic medicines are pharmaceutical options equivalent to the original reference medicines. They contain the same active substance, in the same dosage and pharmaceutical form, guaranteeing the same therapeutic effect. They are identified by the acronym "MG" on the packaging and can only be launched on the market after the end of the ten year exclusivity period for the original medicine, granted to protect innovation. These medicines are subject to the same strict approval and quality control criteria as reference medicines, which includes proof of bioavailability and bioequivalence. This means that the generic offers the same therapeutic efficacy as the original. However, they may vary in colour, shape or flavor due to differences in excipients (non-active substances). Furthermore, generics are prescribed by the International Common Name (INN) of the active substance, accompanied by the dosage and pharmaceutical form. One of the reasons that make them more economically accessible is the absence of high research and development costs, present when the original medicine was launched. However, not all reference medicines have a corresponding generic, due to the exclusivity period still in force. We therefore conclude that generic medicines are safe and effective alternatives to original medicines, offering the same therapeutic effect at a lower cost and strictly following established quality and bioequivalence standards.

Keywords: Safety; Quality; Efficiency; Generic Medicine; Active Substance.

PLACEBO EFFECT

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The word "placebo" began to be used in the 18th century, initially as a “common medication.” Starting in 1796, with the invention of the Perkins Tractor by Elisha Perkins, the placebo effect began to be better understood. This effect was validated by John Haygarth, who demonstrated that even inert devices could bring benefits to patients, revealing the role of belief in recovery. Placebos work largely due to a psychological effect: when patients believe they are being treated, they often observe improvements, especially in issues like anxiety and depression. These treatments, while visually similar to medications, are made of inert substances, such as sugar or starch. However, the use of placebos generates ethical dilemmas. For the placebo effect to work, it is essential that patients are unaware they are receiving an inert treatment, which can undermine the trust relationship between doctor and patient. In clinical trials, methods such as "double-blind" are used to ensure that neither doctors nor patients know which treatment is being administered, thus avoiding bias in the results. The concept of nocebo, which refers to negative effects resulting from adverse expectations, is also relevant. Placebos have their advantages, such as avoiding the use of potentially harmful substances and helping to identify patients who truly need treatment. However, there are disadvantages, including the risk of dependence on placebos and the possibility of delaying the administration of effective treatments. Thus, the use of placebos requires careful analysis of their ethical and practical implications.

Keywords: Placebo effect; psychological effect; ethical dilemmas; double-blind; nocebo.

BIOSIMILARS MEDICINES

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A biosimilar is a biological medicine highly similar to another already approved biological medicine (the 'reference medicine'). Biosimilar medicine is a drug produced by recombinant DNA technology in animal cells. The main classes of biological medicine are therapeutic proteins (such as insulin, somatropin) and monoclonal antibodies. The main goal with biosimilars' is to reduce the cost of and increase access to biological medicines. When biosimilars are introduced onto the market, they have to compete with the reference medicine (which becomes so called when it is no longer protected by its 10-year exclusivity period and its patent), meaning that biosimilars will be marketed at a lower price. However, biosimilar medicines are not just “cheap copies” of the medicines they come from (the reference medicines). They are manufactured in accordance with strict quality requirements and using the most advanced methods, and the production facilities are subject to the same inspections as all other medicines (although they don't have to go through research processes, they do go through other things such as bioavailability and bioequivalence). They can be used in the treatment of various pathologies, most notably cancer, autoimmune diseases (multiple sclerosis, rheumatoid arthritis, acting as response modifiers); anemia (the most common being associated with chronic diseases); diabetes (biosimilar insulin can be used to treat type 1 and type 2 diabetes); and transplants (used to prevent transplant rejection). Biosimilar medicines have been used in the EU since 2006 as a safe alternative to reference medicines.

Keywords: Biosimilars; Bioavailability; Bioequivalence; Biological; Reference Medicines.

PHARMACOVIGILANCE

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In order to guarantee the safety and effectiveness of medicines placed on the market, the World Health Organization developed in the 1960s a project to create a global system for detecting adverse reactions to medicines. This project then led to the creation of national Pharmacovigilance systems that monitor the safety of medicines in different countries. In the case of Portugal we have Infarmed, I. P. the National Authority for Medicines and Health Products, whose mission is to regulate and supervise the medicines and health products sectors ensuring their quality, efficiency and safety. The OMS defines Pharmacovigilance as the set of activities for detecting, recording and evaluating adverse reactions (RAMs), with the aim of determining the incidence, severity and causal link with medicines, based on the systematic and multidisciplinary study of the effects of medicines. Information collected at national level is then reported to the European Medicines Agency (EMA), which coordinates the European Union's Pharmacovigilance system. Pharmaceutical laboratories that sell medicines also have an obligation to collect and report suspected ADRs to regulatory authorities.

Currently, all participants in the medicine circuit, namely healthcare professionals and citizens who use medicines, can report potential ADRs to the Infarmed, I.P. Pharmacovigilance system. Pharmacovigilance consists of monitoring the safety of medicines throughout the marketing period, with these activities coordinated by the regulatory authorities that authorize the use of medicines. However, pharmacy professionals in particular, healthcare professionals in general and patients have an important role in detecting and reporting RAMs.

Keywords: Pharmacovigilance; safety of medicines; regulate; supervise.

CLINICAL TRIALS

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For medicines to reach the market and be used by people, they need to be proven to be effective, safe and of good quality. To do this, clinical trials are carried out on human beings to discover or verify the effects of one or more experimental medicines. These studies conducted on human beings, they are regulated at national level by Law nº21/2014, of April 16 (Clinical Research Law), amended by Law nº 73/2015, of July 27, which repealed Law no. 46/2004, of August 19, transposing it into national law. Clinical trials are divided into several phases to obtain information on the efficacy and safety of the experimental drug. Phase 0: begins by testing in small groups that the drug works as expected. Phase 1: participants receive different doses of the drug to determine their safety. Phase 2: the drug is administered to a larger group of patients with the aim of assessing the drug's effectiveness in the short term. Phase 3: a new drug is administered to a larger group of individuals to see if this treatment is more effective than the previous one. Phase 4: researchers continue to study the drug after it has been approved to assess the long-term effects. In conclusion, clinical trials are experimental strategies to prove that a certain substance has a certain effect, making them the only experimental method that establishes a causal and benefit-risk relationship, with the benefit prevailing.

Keywords: Clinical trials; medicines; drug evaluation.

PHARMACOGENETICS AND PHARMACOGENOMICS

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Pharmacogenetics and pharmacogenomics are fields of science that aim to investigate the relationship between genetic variations and the response of individuals to drugs. The main objective of these areas is to personalize medical treatments by adjusting therapy according to the genetic characteristics of each patient, minimizing adverse effects and increasing the effectiveness of drugs. The study of individual genetic variants that modify human responses to pharmacological agents is called pharmacogenetics, and the evaluation of the action of many genes that act simultaneously on these responses is called pharmacogenomics. Many studies have shown that a large number of drugs administered to patients do not have the desired therapeutic effect and lead to negative effects. Pharmacogenetic tests are essential for adjusting a treatment in a personalized way, considering the genetic variations of each person, rather than relying solely on the average response observed in the general population and the disease being treated. In clinical practice, for example, variations in the *CYP2C9* and *VKORC1* genes can alter the response to warfarin, an anticoagulant, thus requiring dosage adjustments to avoid complications such as bleeding. The application of pharmacogenetics makes it possible to predict the patient's response by avoiding adverse reactions and optimizing treatment. The application of genomics in the pharmaceutical industry has been fundamental in selecting the best drugs for specific therapeutic targets, by contributing to the understanding of the molecular mechanisms of diseases. In the case of cancer, complex genetic alterations occur in tumor cells, such as somatic mutations caused by environmental factors. These mutations can be detected by genetic tests, allowing the development of targeted therapies. To conclude, pharmacogenetics and pharmacogenomics improve the efficacy and safety of cancer treatments, promoting a more personalized approach and minimizing side effects.

Keywords: Pharmacogenetics; Pharmacogenomics; Genetic variations; *CYP2C9*; *VKORC1*.

FOOD SAFETY AND THE CONSUMPTION OF SUSHI AND SASHIMI

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Food safety aims to ensure that food, when consumed, does not cause harm to consumers, and is one of the main concerns of the food industry. The poor preparation of these foods can bring microbiological risks and the lack of information influences the standards of safety, trust and consumption. This study aimed to evaluate the risks associated with the consumption of sushi and sashimi and the perception of consumers.

For this study, a literature review was carried out and a questionnaire was applied to the population to assess knowledge about food safety when consuming sushi and sashimi.

With the questionnaire, 57 responses were collected, and 63.2% of the participants said they did not know the safety recommendations for the consumption of raw fish. The lack of knowledge may be related to the fact that 89.5% of the participants did not have training in the area. Around 79.6% of consumers consider the reputation of the food establishment to be the most important factor in choosing where to eat, and 92.7% would have more confidence if they knew that safety standards were met.

It was concluded that establishments must strictly follow good practices in the preparation of sushi and sashimi, and consumers need to have access to information on safe consumption.

Keywords: Food safety; sushi; sashimi; raw fish; microbiological risk.

CONSUMER PERCEPTION

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Food security, being a basic requirement, is, therefore, an inalienable condition in food, it is seen as a strategy to guarantee everyone, without exception, the right to a healthy and adequate diet. The wide dissemination of contaminants in food, especially microbiological hazards that have led to extremely serious incidents and high risk to the health of consumers, has begun to require the implementation of systems that aim to guarantee food safety.

This study's main objective was to evaluate good practices in purchasing, preserving, preparing and cooking food at home. Therefore, we chose to analyze scientific articles and apply a questionnaire with a view to achieving the objectives, in which 32 people participated.

According to the results obtained, 93.8% of respondents say that food safety is important in their daily lives. Furthermore, 65.6% of the population incorrectly stated that they defrost food at room temperature and 25% of those interviewed in the refrigerator. When it comes to checking the expiration date when purchasing, 75% of respondents say they check it.

In short, food safety is a fundamental pillar in the food sector, ensuring that products are produced, processed, preserved, prepared and made in a way that prevents any form of contamination that could compromise the health of consumers. The data collected in this study reveal the awareness of most interviewees about the importance of specific care to be taken with the conservation and correct preparation of food, with the aim of avoiding cross-contamination.

Keywords: Quality; Hygiene; Food Sector; Contamination; Food Hazards.

FOOD SAFETY: GOOD PRACTICES IN PURCHASING, PRESERVING, PREPARING AND COOKING FOOD

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Food waste occurs when food that is intended for human consumption is devalued along the food chain due to deterioration caused by negligence or forgetfulness on the part of consumers. This waste is also related to oversupply in the markets or to society's inadequate purchasing habits. Unfortunately, this problem is global and therefore requires the implementation of measures and strategies that promote zero waste, in an attempt to reduce or eliminate this negative impact.
The aim of this work is to assess the population's knowledge and practices in relation to food waste. For the design of the article, we analyzed scientific articles on the subject of the work and then collected population data using a brief questionnaire, in which we obtained around 66 responses.
According to the data observed, the majority of the population understands what food waste is, as they selected “Decision not to use food that still has value”; “Losing food due to poor conservation or inadequate storage” and “Buying too much food”. However, with regard to its causes, there is still a significant percentage who answered incorrectly, meaning that they have no way of acting to mitigate this global problem.
In short, we believe that in addition to obtaining data on knowledge, we have also fostered interest in the topic, observed the population's knowledge of the subject and promoted essential practices so that this topic is no longer a problem.

Keywords: Waste; Habits; Food; Consumption; Excess.

FOOD WASTE

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Today, more than ever, the safety of food products is a central concern in the eyes of citizens and responsible entities. In this context, over time, several references were created on this topic, specifically applied to restaurants, where the mandatory implementation of food safety systems such as Hazard Analysis and Critical Control Points emerged.

The objective of this study was to understand and analyze the population's level of knowledge about the implementation of the Food Safety System in a food establishment, as well as to investigate people's perception in relation to the possible effects arising from the low or absence of food quality in the restaurant and its implications for health.

A literature review was carried out on the topic and a questionnaire was applied to the general population.

It was found that 54.5% had never heard of the Food Safety System. Of those who have already heard, 70% of those interviewed believe that the implementation of the Food Safety System brings numerous benefits, such as improving food safety, reducing the risk of contamination and increasing customer confidence.

The implementation of the Food Safety System is extremely important in the food industry, as it acts preventively, guaranteeing a product free of physical, chemical or biological contaminants.

Strict control in the food manufacturing process provides greater quality, safety, reduced losses and reduced rework in the production process. Food safety systems based on the principles of Hazard Analysis and Critical Control Points are the foundations of a Total Quality System.

Keywords: Food quality, Safety, Contamination, Control.

IMPLEMENTATION OF THE HACCP SYSTEM IN A CATERING ESTABLISHMENT

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This paper focuses on good practices in the purchase, preservation and consumption of chilled and frozen foodstuffs. The correct management of these foods is essential, as inadequate temperatures can encourage the development of harmful microorganisms.

The aim of this work is to provide some insight into food safety and minimize risks to consumer health. In addition, the impact of new technologies, such as digital thermometers, on temperature monitoring and food preservation was explored.

To support these objectives, a questionnaire was developed for the public in order to assess knowledge and practices related to the purchase, preservation and consumption of chilled and frozen food.

The methodology included a review of scientific articles and guidelines from entities such as ASAE and the Portuguese Environment Agency, in order to identify recommended best practices. A questionnaire was also administered to consumers, asking them about their buying habits, food preservation and defrosting, as well as their knowledge of ideal preservation temperatures.

The results of the questionnaire revealed that many consumers regularly check the shelf life and integrity of packaging, but there is a significant gap in terms of knowledge about correct refrigeration temperatures and the organization of food in the fridge, which are essential for preventing cross-contamination. In addition,

it was observed that the price of food tends to be the main factor in purchasing decisions, with less attention paid to the quality of packaging and the shelf life of products.

In conclusion, the work highlights the importance of following good practices throughout the process, from purchase to consumption of chilled and frozen food. These practices not only guarantee food safety, but also help to reduce waste, promoting more conscious and safer consumption.

Keywords: Consumption; Preventing; Good practices; Food safety.

USHER SYNDROME

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Usher syndrome (US) is an autosomal recessive disease, affecting 3:100,000 people. It is characterized by the association of hereditary neurosensory deficiencies: hearing loss, partial or total, and progressive decrease in vision due to the degeneration of photoreceptor cells in the retina, a process known as retinitis pigmentosa (RP). This pathology is currently subdivided into four subtypes: type 1 - RP, congenital total deafness and absence of vestibular function; type 2 - RP, partial congenital deafness and normal vestibular function; type 3 - RP, congenital total deafness, vestibulocerebellar ataxia; type 4 - RP, total congenital deafness and mental retardation.

The cause of this disease lies in several genetic mutations, and to date, mutations in type 1 US have been implicated in five genes (*MYO7A, USH1C, CDH23, PCDH15, USH1G*) and one locus (*USH1E*). In US type 2, three genes have been implicated (*USH2A, GPR98* and *DFNB31*). In US type 3, only mutations in one gene (*CLRN1*) were implicated. However, cases of heredity with combined heterozygosity have been described.

To date, there is no cure for Usher syndrome, however, treatments that improve retinal degeneration or hearing loss are available, but none of them are able to completely reverse the damage caused by the disease.

This work aims to describe the clinical manifestations of Usher syndrome as well as study the hereditary pattern of the disease in patients.

Keywords: hearing loss, genetic mutations, hair cells, retinitis pigmentosa, inner ear.

WAARDENBURG SYNDROME

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Waardenburg Syndrome is a rare genetic condition, accounting for approximately 2% to 5% of congenital hearing loss cases, affecting around 1 in every 40,000 individuals. It influences the development of various physical and auditory traits and is transmitted in an autosomal dominant manner. The syndrome is characterized by pigmentary changes and congenital deafness, with variable clinical manifestations. These may include skin depigmentation, premature white hair, heterochromatic or unusually light-colored eyes, and, in many cases, hearing loss of varying degrees.

Waardenburg Syndrome is classified into four types and is considered genetically heterogeneous, meaning it arises from mutations in different genes. It's considered genetically heterogeneous, caused by mutations in different genes, such as *PAX3, MITF, EDN3, EDNRB, SOX10* and *SNAI2*. In 20% of cases, the syndrome does not fully manifest, indicating incomplete penetrance, where not all individuals with the mutation will exhibit the full spectrum of symptoms.

Diagnosis is clinical but should be confirmed with genetic and audiological testing. Treatment typically involves hearing aids, cochlear implants, sign language, and educational support, with early intervention being key to enhancing the quality of life for those affected.

The hearing loss associated with this syndrome can be categorized into several types: sensorineural hearing loss, unilateral or bilateral deafness, congenital hearing loss, and varying degrees of hearing impairment.

This study aims to deepen our understanding of the connection between Waardenburg Syndrome and hearing loss.

Keywords: deafness; depigmentation; mutations; genetics; treatment.

BRANCHIO-OTO-RENAL SYNDROME

Mariana Tomé; Maria Sarmento; Sofia Zhurakviska; Diana Antunes; Beatriz Brandão

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Branchio-Oto-Renal syndrome (BOR) is an autosomal dominant genetic disorder that affects the development of structures in the neck, ears, and kidneys. Its main features include branchial arch anomalies (clefts, fistulas, cysts), ear malformations associated with hearing loss, and renal problems such as dysplasia or renal agenesis. BOR has a prevalence of 1 in 40,000 people and displays variable expressivity, meaning symptoms can differ among individuals with the same mutation.

Hearing impairments are one of the most significant manifestations of BOR, with conductive, sensorineural, or mixed hearing loss that can affect one or both ears. Common malformations include abnormalities of the auricle, preauricular pits, and anomalies in the middle and inner ear. Early identification of these hearing issues is crucial for appropriate treatment, such as hearing aids or cochlear implants.

BOR is caused by mutations in the *EYA1, SIX1,* and *SIX5* genes, with *EYA1* being the most common. These genes play critical roles in embryonic development, particularly in the formation of structures derived from the branchial arches, including the ear. The second branchial arch is especially important, contributing to the formation of the middle ear, including the stapes, and the external ear. The characteristic hearing malformations in BOR are linked to developmental failures in this arch. Incomplete formation of the second branchial arch explains auditory anomalies, such as preauricular pits, auricular malformations, and problems with the ossicles of the ear.

Diagnosis includes clinical evaluation, family history, and genetic testing, with treatment focused on correcting hearing, renal, and branchial anomalies to improve patients' quality of life.

Keywords: Syndrome; Ears; hearing loss; Branchiootorenal; Kidney.

RENAL TUBULAR ACIDOSIS

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In renal tubular acidosis (RTA), the malfunction of the renal tubules gives rise to high blood acid levels (acidosis). This acidosis results from the appearance of acidic metabolic by-products, which are not eliminated by the kidneys.

There are 4 types of RTA: type 1, distal acidosis, and type 2, proximal acidosis, correspond to a decrease in potassium levels in the blood, which causes neurological problems or muscle weakness; type 3 is caused by a deficiency of the enzyme, carbonic anhydrase, responsible for regulating blood acidity, and is extremely rare; type 4 corresponds to increased levels of potassium in the blood, which can cause irregular heart rhythm and muscle paralysis.

Distal RTA may be associated with hearing problems such as sensorineural hearing loss, especially in the hereditary form of the disease. Some cases of RTA are caused by mutations in autosomal dominant genes that encode proteins involved in ion transport in the kidneys and inner ear.

The *ATP6V0A4* gene encodes an H+ transporter, mutations in this gene will affect the transport of H^+ ions, thus compromising the acid-base balance, which interferes with the ability to transmit stimuli from the hair cells of the inner ear to the brain.

Diagnosis of this disease is made through blood tests and urine tests. In the case of types 1 and 2, tests reveal increased levels of acid and low levels of bicarbonate and potassium in the blood. In the case of type 4, they reveal high levels of potassium and acid, accompanied by low values of bicarbonate in the blood.

As for treatment, types 1 and 2 are treated with daily intake of a sodium bicarbonate solution. In type 4, RTA, which is not as severe, does not require bicarbonate intake and blood potassium levels can be controlled by restricting potassium intake.

By carrying out this work, we intend to deepen knowledge about this atypical form of deafness associated with Renal Tubular Acidosis.

Keywords: genetic mutation, renal tubules, renal failure, sensorineural hearing loss.

TREACHER COLLINS SYNDROME

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Treacher Collins syndrome is a rare genetic disorder that affects facial bone and tissue development. Key facial features include downward-slanting eyes, underdeveloped cheekbones, small or absent ears, and a small lower jaw. Some may also experience a cleft palate, leading to feeding challenges. The syndrome often affects hearing due to ear malformations and can cause respiratory problems due to jaw underdevelopment, leading to airway obstruction.

This syndrome is caused by mutations in the *TCOF1, POLR1C*, or *POLR1D* genes. Most mutations are in the *TCOF1* gene, which is involved in producing proteins essential for facial development, while mutations in the other genes are rarer and play a crucial role in ribosome synthesis. It typically follows an autosomal dominant inheritance pattern, but in 60% of cases, it results from a spontaneous mutation. Diagnosis involves clinical evaluations, family history, genetic testing, and imaging studies.

Treatment is individualized and may involve reconstructive surgeries for facial deformities, ear surgeries, hearing aids, speech therapy, and respiratory interventions. Multidisciplinary follow-up is essential to manage hearing, breathing, and communication difficulties. Although there is no prevention, genetic counseling and prenatal testing can help families assess the risk.

Early diagnosis and intervention can significantly improve the quality of life for individuals with Treacher Collins syndrome.

With this work, we aim to understand how Treacher Collins syndrome affects an individual's hearing loss and how it influences the overall life of an individual with this syndrome.

Keywords: Treacher Collins, , hearing, autosomal dominant, facial deformitie.

FOOD SECURITY IN HIGHER EDUCATION STUDENTS

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Food safety in higher education students has great importance, as difficulties in accessing healthy food can have a serious impact on their health and academic performance.

The general objective of the study was to analyze the food security of university students, considering the daily challenges, the influence of socio-economic factors and knowledge about food security in relation to their food choices.

The methodology adopted was a literature review on the subject and the application of a questionnaire to the general population.

Taking into account the data obtained through a questionnaire applied to 106 people, it was observed that 84% of the people use the same cutting board for raw and cooked food, which indicates that there is still a lack of knowledge on this subject, since cutting food on the same board could be contaminating other foods.

When it comes to checking and rejecting food that is past its sell-by date, around 59.4% check and reject any type of food that is past its sell-by date.

This work has shown how crucial food security is not only to the academic success of higher education students, but also to their general health, emotional development and well-being. In addition, creating policies that promote food security within universities helps to combat social inequalities and promote equality within the academic environment.

Keywords: Food safety; higher education; health, academic performance and socio-economic factors.

SUSTAINABILITY IN FOOD PRODUCTION

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The production of food, essential to sustain a growing population, puts pressure on the environment, affecting biodiversity, soil quality, and water resources. Regenerative and precision agriculture models, which promote resource-use efficiency, have been suggested as promising solutions. In addition, sustainable diets, with a lower environmental impact, are an important part of the debate. The objective was to assess knowledge about sustainable practices in food production. For this study, a literature review was conducted, and a questionnaire was applied to the population. The results showed that all respondents correctly identified the main goal of sustainable agriculture as the preservation of natural resources to ensure long-term food security. They also mentioned that "soil degradation and water pollution" are the biggest negative impacts of traditional food production. Regarding the main objective of regenerative agriculture, 81.8% of respondents correctly mentioned "the promotion of soil and biodiversity health," showing that the population demonstrates a growing awareness but also indicates the need for greater education on topics such as sustainable intensification and the social challenges associated with transitioning to more equitable food systems. The study concluded that, for a sustainable future, cooperation between governments, farmers, consumers, and businesses is essential, as well as the promotion of public policies that encourage responsible agricultural practices.

Keywords: Sustainability; Food Production; Regenerative Agriculture.

CLIMATE CHANGE AND FOOD IMPLICATIONS

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Climate change is affecting food production in a variety of ways, such as reducing the amount of water available to plants, increasing the frequency of pests and diseases, and changing the ideal conditions for growing different crops.

These changes in agriculture can lead to food shortages in some regions, rising prices, and consequently food insecurity.

There are different solutions to address this problem, such as developing new agricultural technologies, adopting more sustainable practices, and changing our eating habits.

The objective of this work was to assess the level of knowledge of the population about climate change and how to opt for sustainably produced food and reduce food waste.

The results show that most respondents know that climate change is affecting food production; that greenhouse gases cause the problem and that the climate is getting warmer. In addition, 98% of respondents recognize that climate change affects food production and 90% of respondents agree that greenhouse gas emissions are one of the main causes of climate change, which is strongly corroborated by scientific studies. Also, 89% of respondents believe that climate change could lead to an increase in food prices. When it comes to more sustainable diets, such as plant-based ones, 54% of respondents say they can help reduce the impacts of climate change.

To address these challenges, it is necessary to act quickly and effectively. Sustainable agriculture, biotechnology, early warning systems and changing eating habits are some of the solutions that can help ensure food security for future generations.

Keywords: Climate change; Food insecurity; Food production.

THE RELEVANCE OF ARBOVIRUS IN EUROPE, IMPLICATIONS IN SCIENCE TRANSFUSION

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Historically, the safety of blood transfusions has been compromised by the emergence of various infectious agents. Nowadays, patients expect complete protection against any transfusion-related transmission of infectious diseases. In the last two decades, there has been a rise in outbreaks of arboviral diseases.

They are primarily transmitted by arthropods, particularly mosquitoes and ticks, and can result in a wide range of symptoms, from mild flu to severe hemorrhagic and neurological disorders. The highest priority agents include several arboviruses, such as West Nile virus, dengue virus, chikungunya virus, and tick-borne encephalitis virus.

These viruses exhibit highly variable epidemiology, ranging from isolated and localized cases to seasonal waves and epidemic outbreaks. Originating in tropical regions, arboviruses have significantly expanded their influence area. Additionally, the lack of specific antiviral therapies has led to a considerable global impact, representing a significant public health challenge.

Within the emerging viruses, arboviruses are particularly significant because of their risk for transmission via blood transfusion.

The screening methods for detecting the arboviruses enclose serological and non-serological rapid antigen tests. While these are routinely employed, they may not be adequate to ensure complete transfusion safety, particularly for donors with very low viral loads or those in the window period. So, the most effective approach is using nucleic acid testing in donor screening. For blood donors, there are methods to inactive pathogens using strategies like radiation or detergents.

Keywords: arbovirus; blood transfusions; antigen tests; donors.

THE RELEVANCE OF ARBOVIRUS IN EUROPE, IMPLICATIONS IN SCIENCE TRANSFUSION

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Arboviruses are viruses transmitted by arthropods, such as insects, spiders, and ticks. They include various RNA viruses, namely Chikungunya (CHIKV), Dengue (DENV), Yellow fever (YFV), Zika (ZIKV), Usutu (USUV) and West Nile (WNV), as well as a DNA virus, African swine fever (ASFV), which causes severe agricultural damage but does not infect humans.

Climate change, urbanization, and land use affect vector dynamics, particularly mosquitoes, as well as host reservoir populations, and the transmission of pathogens by vectors lead to an increasing number of infections. Certain arboviruses have expanded their geographic range, resulting in a greater number of human outbreaks, thus representing an emerging threat for human health. In Europe, the most relevant are WNV and USUV, with their first reported human case in France and Austria, respectively. The number of cases has significantly increased in the past decade and is predicted to continue increasing.

The exposure of donors in endemic regions is acknowledged as a critical threat to blood transfusion safety. The viruses can be transmitted in donations from recently infected donors, in whom virus concentrations are low. Diagnosis consists in detecting viral RNA in blood, using a reverse-transcription polymerase chain reaction. However, most human infections are currently diagnosed using serological methods, specifically enzyme-linked immunosorbent assays, that detect arbovirus-specific antibodies, and neutralization tests.

Symptoms may vary from mild, such as fever, rash and headache, and severe, like neuropathy and meningitis. There are no authorized vaccines, meaning the treatment is mainly directed to symptoms.

Keywords: Arbovirus; RNA virus; Blood transfusion; Arthropods.

THE RELEVANCE OF ARBOVIRUS IN EUROPE, IMPLICATIONS IN SCIENCE TRANSFUSION

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Arbovirus is the definition used for all viruses transmitted to humans by arthropods, including insects and arachnids, therefore by vector transmission. According to the Committee on Taxonomy of Viruses, Arboviruses do not belong to viral taxonomy, however, they encompass several families, such as: Flaviviridae and Togaviridae, through the West Nile Virus (WNV) and Chikungunya Virus, respectively.

In Europe, the incidence is low, with WNV being one of the most prevalent. In 1950, the first case of lineage 1 WNV appeared in Mediterranean Europe and in 2004 the first case of lineage 2 WNV was detected and quickly spread throughout Central Europe, causing worse outbreaks. Nowadays, the incidence of Arbovirus has been increasing due to climate change and international travels.

Animals such as birds and horses are the primary hosts of transmission, which can lead to their death. Regarding WNV, transmission is through the bite of the Culex mosquito, to birds and humans. Transmission may also occur by blood transfusion, organ transplantation or vertical transmission, and in some cases, sexually.

Most cases are asymptomatic, however, in symptomatic cases, the symptoms are similar to flu-like symptoms. More rarely, there may be central nervous system involvement and more severe complications, namily in WNV. In these cases, treatment is based on symptom relief, with the virus being detected in serum or cerebrospinal fluid through RT-PCR.

In addition to vaccination for some species, the most effective methods of preventing transmission in transfusion are correct donor selection, arbovirus screening in blood, and quarantining packed red cells.

Keywords: Arbovirus; Transfusion safety; Blood transfusion; Europe; West Nile Virus.

THE RELEVANCE OF ARBOVIRUS IN EUROPE, IMPLICATIONS IN SCIENCE TRANSFUSION

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Arthropod-borne viruses (arboviruses) are a group of several families of viruses, including Flaviviridae, Togaviridae, Bunyaviridae, and Reoviridae, that are transmitted to mammals by hematophagous arthropods, and can replicate in both. Vector-borne diseases, such as dengue (DENV), chikungunya (CHIKV), West Nile virus (WNV), Zika (ZIKV), among others, are transmitted most by mosquitoes, ticks, and flies.

In Europe, DENV, CHIKV and West Nile fever are the most prevalent. In 2002, the first cases of transfusion-transmitted WNV were detected, emphasizing the need to understand the impact on blood transfusion of arboviruses and their epidemiology. This has been challenging as climate changes, urbanization, migration and deforestation contribute to its evolution. Since these viruses can be transmitted through contaminated blood products, there is a risk associated with transfusions. In response to this concern, measures have been implemented to minimize the risk of transmission.

Arboviruses can cause significant human disease, and after crossing the blood-brain barrier, can directly infect and lead to the death of neurons.

The diagnosis of arbovirus infection is often performed by serological tests, enzyme-linked immunosorbent assay being the most used. These tests allow the detection of IgM and IgG antibodies in serum and cerebrospinal fluid.

When it comes to prevention, there are vaccines for DENV, but for ZIKV and CHIKV, vaccines are still under development. The most used treatment approach is symptomatic management, since there is no specific treatment for arboviruses. However, studies with biological drugs are being done.

Keywords: Arbovirus, blood transfusion, Europe, transmission, serological tests.

THE RELEVANCE OF ARBOVIRUS IN EUROPE, IMPLICATIONS IN SCIENCE TRANSFUSION

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Arbovirus, transmitted by arthropod vectors such as mosquitoes and ticks, are viruses that present considerable risks to transfusion safety because of their short viremia and the possibility of unexpected outbreaks. Include various RNA viruses like Chikungunya, Dengue, Zika and West Nile. Arthropod-borne viruses represent a major global health concern, once are expanding geographically causing diseases in humans. Symptoms can cause potentially fatal hemorrhagic and neurological syndromes.

Environmental factors such as temperature and rainfall influence transmission, with outbreaks becoming more common due to the increase in travel, trade, urbanization, and human expansion into enzootic areas. Non-vector transmission of arboviruses occurs through bodily fluids like blood and semen.

Blood transfusion entails risks of transmitting infectious agents, determining viremia in blood donors is essential for evaluating transfusion risks, but it is challenged by factors like asymptomatic infections and low viral concentrations. Serological tests diagnose infections by detecting specific antibodies, while nucleic acid testing such as polymerase chain reaction can screen donors by detecting viral load, not fully guarantee transfusion safety. Vaccination programs in endemic regions have reduced disease incidence and could become a strategy in Europe. However, no specific antiviral treatments for arboviruses and outbreaks can result in significant disease burdens.

In Europe, public health responses rely on vector monitoring, case reporting and blood donations screening of all travelers returning from endemic regions. The spread is not only a public health issue but also a challenge for transfusion science, highlighting the need for initiative-taking safety measures and further research.

Keywords: Arboviruses; Arthropods; Blood Transfusion; Viremia; Transfusion Safety.

THE RELEVANCE OF ARBOVIRUS IN EUROPE, IMPLICATIONS IN SCIENCE TRANSFUSION

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Arbovirus refers to a group of diseases caused by viruses transmitted through arthropods, such as mosquitoes and ticks. In some cases, sandflies and other insects may also play a role. These viruses can infect both humans and animals, with transmission primarily occurring through the bite of infected vectors. In humans, effects can vary from asymptomatic infections and mild flu-like symptoms to severe, life-threatening conditions.

The distribution of arboviruses is primarily associated with the presence of their transmitting vectors, particularly mosquitoes. As a result, tropical and subtropical regions, where mosquitoes are plentiful, are the most affected areas. However, due to climate change, increased international travel, emigration and uncontrolled urbanization have led to the emergence and re-emergence of arboviruses, especially in Europe.

Following the high number of asymptomatic infections and elevated viremia, blood donors may transmit these viruses through transfusion. This issue is intensified by a lack of resources for pre-donation screening combined with the recent rise in disease-carrying vectors in Europe, which corresponds to increased cases transmitted through blood and blood component transfusions. Also, vertical transmission, autochthonous cases, and the faculty of viruses to survive various processing and storage methods used for different blood components worsen outcomes in Transfusion Science.

The recent increase of arboviruses poses significant threat in Europe. Therefore, it is crucial to implement new preventive strategies, through risk assessment, to minimize the risk of transfusion transmission from this emerging agent.

Keywords: Arbovirus, Blood transfusion, Europe, Emerging diseases, Transfusion safety.

THE RELEVANCE OF ARBOVIRUS IN EUROPE, IMPLICATIONS IN SCIENCE TRANSFUSION

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Arthropod-borne viruses are pathogens primarily transmitted by arthropods such as mosquitoes, ticks and sandflies, representing a threat of great relevance to global public health. The geographic expansion of Aedes aegypti, Aedes albopictus mosquitoes (vectors of arboviruses like Zika, Chikungunya, Dengue and West Nile virus) has increased the risk of transmission in new areas, including Europe, which raises important implications for transfusion sciences, influencing blood safety and availability.

Transmission of arboviruses through transfusion of blood and blood components is, nowadays, a growing concern, particularly for those who are immunocompromised. Therefore, early laboratory diagnosis and donor screening are crucial to identify infections and implement control measures, although the prevalence of asymptomatic infections can make it challenging. The main donor screening methods include multiplexed real-time polymerase chain reaction , serological and non-serological antigen rapid testing techniques and nucleic acid testing, considered the most effective measure to ensure transfusion safety, with some limitations.

Implementing epidemiological surveillance programs and monitoring vector populations is essential to preventing the spread of arboviruses. In addition, public awareness about the dangers of arbovirus infection and individual protection measures can also help mitigate the risk of transmission.

The increasing prevalence of arboviruses in Europe highlights the need for continued research and development of new strategies to ensure high safety levels in science transfusion.

Keywords: Arbovirus; geographic expansion; infection; vector; transfusion science.

THE RELEVANCE OF ARBOVIRUS IN EUROPE, IMPLICATIONS IN SCIENCE TRANSFUSION

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The term arbovirus (arthropod-borne virus) includes several families of viruses that are spread by arthropod vectors, most commonly mosquitoes and ticks. Over the years, this public health concern has increased in Europe due to climate change, urbanization and increased global travel, which allow the dissemination and establishment of invasive mosquito species, such as Aedes and Culex.

The risk of transmission through total blood or blood component transfusion is low compared to the transmission of arboviruses through mosquito bites, but it can still occur.The risk associated with transfusion persists due to the window period in infected individuals, asymptomatic cases and endemic regions. Another problem is the constant mutations and emergence of new variants of pathogens for which there are no detection tests yet.

Infections by the arbovirus are mostly asymptomatic or with nonspecific symptoms such as fever. Even though, the virus can cause more severe symptoms like hemorrhagic fever, neuroinvasive diseases and debilitating arthralgia. Usually, this type of infection produces lifelong immunity.

Conventionally, serological methods, such as direct enzyme-linked immunosorbent assays aimed at detecting the virus and indirect ones that help at recognizing antibodies produced during viral infection, as well as lateral flow assays are gold-standard for the diagnosis.

There are currently no specific therapies for arbovirus infections, but there are drugs available that can help relieve symptoms.

The main strategies for the control of the vector include programs that help the early recognition and monitoring of arbovirus activity and protection measures.

Keywords: Arbovirus; Vector; Blood transfusion; Climate change; Europe.

OTOTOXICITY CAUSED BY DRUGS, ITS RELATIONSHIP WITH MTDNA AND WAYS TO CONTROL

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Hearing loss often impairs people's well-being. It is usually impossible to reverse. That's why it's necessary to know the possible factors that cause it, in order to slow this loss.
Ototoxic drugs are an important factor in inducing hearing loss, causing damage or impairment of the function of hair cells, which play a critical role in transducing sound into electrical stimuli. Ototoxic drugs are mainly antibiotics from the aminoglycoside family, antineoplastics and less often, non-steroidal anti-inflammatory drugs.
Various clinical situations can lead to greater susceptibility to hearing loss induced by these drugs, as well as multiple polymorphisms in the mitochondrial rRNA and nuclear genome.
The aim of this study was to understand how ototoxic drugs act, leading to hearing loss, and to investigate the otoprotective strategies that have already been proposed and those that are in the development phase, as well as their implications.
We used 24 articles of Pubmed, based on in vivo studies and systematic reviews with keywords: “ototoxicity drugs”, “mtDNA” and “otoprotective strategies”.
The analysis of different studies revealed that the physiopathological mechanisms underlying ototoxic drugs are mostly associated with mechanisms of apoptosis and necrosis of hair cells. Despite constant research into the use of otoprotective substances, such as antioxidants, or into the potential of genetic therapies to prevent and mitigate ototoxicity, there are few clinical trials.

Keywords: ototoxicity drugs, mtDNA, otoprotective strategies.

PHARMACOGENOMICS AND NUTRITION

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Introduction: Pharmacogenomics studies how genetic variations influence the response to drugs. In the case of nutrigenetics, it investigates how these variations affect the response to nutrients from food. This study seeks to understand whether genetics can influence changes in weight, appetite and the treatment of pathologies.

Methodology: A search was carried out in the PubMed database using the keywords: “Pharmacogenomics”, “Overweight”, “Obesity” and “Nutrition”. A total of x scientific articles was selected, of which 5 remained after reading the titles and x after reading the abstracts. Based on the eligibility criteria, x articles were included.

Results: 34 genes have been identified that influence food preferences. However, current methods for developing personalized diets have significant shortcomings. The heritability of BMI is 47-90%, but only 6% of this variation is attributed to genetic factors. IL1B polymorphisms were associated with a 1.72 times greater likelihood of failure to eradicate H. pylori, while the MDR1 polymorphism showed no association with eradication failure.

Discussion: The integration of pharmacogenomics and nutrigenetics presents obstacles due to the genetic diversity that affects body mass index and dietary patterns. Methodological constraints underline the importance of progress in nutrigenetics for creating more efficient personalized diets.

Conclusion: The study of personalized diets involves mutations that affect the assimilation of metabolites. Genetic polymorphisms associated with failure to eradicate H. pylori have been identified. In short, genetic nutrition shows promise for preventing and treating diseases caused by genetic errors.

Keywords: Pharmacogenomics, Overweight, Obesity, Nutrition.

INFLUENCE OF ANTIDEPRESSANTS ON APPETITE AND METABOLISM

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Introduction: Antidepressants are drugs used to treat psychological illnesses such as depression or anxiety, which affect around 350 million people worldwide. Like any other medication, they can cause side effects such as loss of appetite or weight gain.
Objectives: To characterise the influence of antidepressants on appetite and metabolism.
Methodology: Our research was based on PubMed®, with seven articles collected between 2006 and 2024.
Results: Depressive disorder is associated with a marked decrease in quality of life and social functioning. Antidepressant therapy may be associated with weight changes. The likelihood and amount of weight gain or loss may vary depending on the type of antidepressant: ADTs or tricyclics (TCAs) (mirtazapine, doxepin, amiltriptyline and paroxetine) these usually result in weight gain through anticholinergic activity. On the other hand, ADTs (bupropine and fluoxetine), selective serotonin reuptake inhibitors (SSRIs) lead to weight loss rather than weight gain. SSRIs decrease carbohydrate intake because they increase serotonin levels. Although it has been reported that initially there was minimal weight loss and lack of appetite, there was weight gain after completing 1 year of treatment with ADTs.
Conclusion: Most antidepressants have various adverse effects, and depending on the type of antidepressant treatment, this can affect weight in the long term.

Keywords: Antidepressants, appetite, ADTs, TCAs.

ULCERATIVE COLITIS - MEDICATIONS, SUPPLEMENTS AND DIET

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Introduction: Ulcerative colitis is a chronic inflammatory disease that affects the colon and rectum, by continuous inflammation of the most superficial layer of the intestinal mucosa, causing ulcerative lesions and significant discomfort, mainly affecting people between the ages of 15 and 35. Treatment includes medications, dietary changes and dietary supplements.

Objective: This study aims to explore the impact of interventions on disease control, evaluating the effectiveness of medications and the influence of diet and supplements on inflammation and symptoms control, identifying the most effective interventions to control the disease and improve quality of patients' lives.

Methodology: Authors used PubMed® and Google Scholar® to find five articles, published between 2012 and 2023, for the research and to know the use of medications, such as Infliximab and immunosuppressants, specific diets and supplements like probiotics, vitamin D and omega-3 in patients with ulcerative colitis.

Results: The medications demonstrated effectiveness in reducing inflammation and preventing worsening of symptoms; Food supplements, especially probiotics and omega-3, have also shown effectiveness in reducing inflammation, as has diet, avoid eating raw eggs, insoluble fiber, fat, and processed foods, incorporate lean proteins and non-cruciferous vegetables. Everything ensures quality of life for patients.

Conclusion: The combination of medications, supplementation and diet is crucial for effective control of ulcerative colitis. Personalized multidisciplinary treatment can improve disease control and quality of life, reducing dependence on medications and their adverse effects. Early diagnosis and appropriate treatment are crucial to improving quality of life and avoiding complications such as toxic megacolon or colorectal cancer.

Keywords: Ulcerative colitis, inflammatory disease, colon, Infliximab.

THE IMPACT OF OBESITY ON DRUG PHARMACOKINETICS

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Introduction: Obesity is a pathological condition characterized by an abnormal and excessive accumulation of fat tissue, typically associated with an elevated Body Mass Index (BMI), which affects the pharmacokinetics of medications.
Objectives: This work aims to explore the impact of obesity on drug pharmacokinetics.
Methodology: The scientific research for this work was based on the websites ®PubMed and ®ScienceDirect, using information taken from 4 articles between 1999-2023 using the keywords “Obesity”, “Medications”, “Pharmacokinetics”, “Absorption” and “Dosage”.
Results : Obesity causes various pathophysiological modifications that significantly affect the pharmacokinetics of medications. Among these changes are increased blood flow and gastrointestinal transit, as well as alterations in body composition, hepatomegaly, and impairment of liver and kidney function. These physiological differences impact drug absorption and bioavailability, as well as their distribution and elimination in the body.
Lipophilic medications tend to accumulate in adipose tissue, increasing the risk of overdose in obese individuals, which can lead to prolonged effects and adverse reactions. Variations in body composition among obese patients make it difficult to predict drug responses, making rigorous monitoring and personalized dose adjustments essential to ensure the efficacy and safety of treatments.
Conclusion: Due to the pathophysiological changes associated with obesity, it is essential to carefully adjust and continuously evaluate doses to ensure the efficacy and safety of treatments, avoiding overdoses or underdoses and minimizing the risk of toxicity.

Keywords: Obesity; Drugs; Pharmacokinetics; Absorption; Dosage.

EFFECT OF VITAMIN K ON EFFECTIVENESS OF WARFARIN

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Introduction: Vitamin K is a fat-soluble vitamin that is important in the activation of coagulation factors. Warfarin is an anticoagulant from the class of vitamin K antagonists (VKAs).
Objective: To analyze the interaction between vitamin K and the efficacy of warfarin during treatment.
Methods: PubMed, Scielo, Google Scholar information relating to Nutrient-Drug Interaction.
Results: Vitamin K intake can impact the efficiency of VKAs as it is essential for the coagulation process. When it is reduced or exceeded, the INR fluctuates, which makes warfarin treatment less effective or increases the risk of complications such as severe bleeding (insufficient intake) or blood clots (excessive intake). The daily recommendations for vitamin K from the age of 19 are 90µg (women) and 120µg (men). The major sources of this vitamin are found in green leafy vegetables (spinach, cabbage, broccoli), oils and fats derived from vegetable oils (fast food, processed products).
Conclusion: A balanced and consistent intake of vitamin K can significantly contribute to the efficacy and safety of anticoagulant treatment with warfarin, avoiding fluctuations in INR.

Keywords: Vitamin K, warfarin, anticoagulants, INR, coagulation.

INFLUENCE OF CORTICOSTEROIDS AND ANTIPSYCHOTICS ON APPETITE AND LIPID AND GLUCOSE METABOLISM

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Introduction: Corticosteroids are drugs used to combat inflammatory and autoimmune diseases. Meanwhile, antipsychotics, especially atypical antipsychotics because they are related to metabolic changes, are used to treat psychotic symptoms.
Aim: Understand whether the use of corticosteroids and antipsychotics affects appetite and the metabolism of lipids and glucose.
Methods: The information was obtained from 4 scientific articles taken from PubMed®. These articles were published between 2017 and 2023.
Results: These two groups of drugs lead to similar metabolic changes, such as increased appetite, which leads to weight gain and induces insulin resistance and dyslipidemia. However, they have different mechanisms of action, side effects and periods of use. Although these drugs are used to treat certain diseases, they can also lead to the appearance of others. For example, corticosteroids increase the risk of cardiovascular disease, while antipsychotics increase the risk of type 2 diabetes.
Conclusion: We can therefore conclude that these are drugs which, despite treating different problems, have similar metabolic consequences. They should thus be dosed way appropriately depending on the stage of the disease.

Keywords: corticosteroids; antipsychotics; metabolic; appetite; weight gain.

IMPACT OF MEDICINES ON THE INTESTINAL MICROBIOTA

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Introduction: The gut microbiota is essential for human health, and certain drugs can affect its composition and diversity, influencing the absorption of nutrients and the body's responses to therapies. This paper explores the gut microbiota, its interactions with drugs and the importance of these interactions in the clinical context, highlighting some groups of drugs that alter the gut microbiota.

Methods: Two articles published in 2020 and 2023 were collected from Google Scholar® and PubMed®, and after a critical analysis, the most pertinent information was chosen.

Results: Proton pump inhibitors increased oral bacteria in the gut, while metformin increased short-chain fatty acid-producing bacteria. It has also been shown that NSAIDs can modify the taxonomic structure of bacteria in the gut, which can cause adverse effects on the gastrointestinal system, such as abdominal discomfort and diarrhea. In addition, the change in microbiota can affect the absorption of nutrients due to the importance of intestinal bacteria in the correct digestion of some foods and in the synthesis of vitamins.

Conclusion: The impact of drugs on the intestinal microbiota is extremely complex, as it directly affects the absorption of nutrients and overall health. It is important to take into account the interactions between drugs and the microbiota, especially in polymedicated patients. Understanding these impacts is essential so that methods can be developed for treatments aimed at the good performance of the drug and the good state of the microbiota.

Keywords: Drugs; Microbiota; Intestinal; Interaction; Health.

THE EFFECT OF ANTIPSYCHOTIC MEDICATION ON APPETITE CONTROL

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Introduction: Schizophrenia is a chronic psychotic illness that is associated with a long-term reduced quality of life for affected individuals. There are two generations ofantipsychotic drugs, the first-generation antipsychotic (FGAs) drugs are dopaminereceptor antagonists, they are also known as typical antipsychotics and the second-generation antipsychotics (SGAs) are serotonin-dopamine antagonists, they are knownas atypical antipsychotics. FGAs are highly associated with significant extrapyramidalside effects whilst SGAs are more related to substantial weight gain and metabolic alterations.
Objective: Understand the effects of antipsychotic drugs on appetite.
Methods: Research was carried out in scientific databases such as PubMed® and the National Institute of Health, and six articles published between 2019 and 2024 were selected for this work.
Results: All antipsychotic drugs (APDs) may cause some weight gain; however, olanzapine and clozapine have more severe weight gain side effects. APDs disrupt the brain's neurotransmitter systems, including dopamine receptors, histamine, and serotonin, which control appetite and energy balance. Hormones like leptin and ghrelin are affected by APDs, which can lead to disrupted hunger signals and contribute to weight gain. The treatment induces rapid weight gain in the first few weeks. Risk factors for weight gain include female gender, younger age, and lower body mass index (BMI) before treatment.
Conclusion: Antipsychotic drugs, while effective for treating psychiatric disorders, pose significant risks for metabolic health. Weight gain and appetite control are major concerns, and because of that it is essential to monitor them closely during the treatment.

Keywords: weight, antipsychotic medication, appetite control, effects.

ROLE OF ANTIOXIDANTS IN PREVENTING CARDIOVASCULAR DISEASES

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Currently, cardiovascular diseases are one of the main causes of low quality of life and mortality in developed countries.

The research developed for this work deduced that antioxidants establish a direct relationship with the improvement of cardiovascular diseases. Using the PubMed® platform, we found two relevant articles from 2015 and 2024, resulting from the search using the keywords: "(antioxidants) AND (cardiovascular diseases) AND (polyphenols)".

After analyzing the respective articles, it was concluded that oxidative stress is a biological process that produces reactive oxygen species (ROS). These species can oxidize various molecules in the human body, including nucleic acids, proteins, and lipids. To effectively counteract these effects, the body utilizes antioxidants, which can come from within (endogenous) or acquired from our diet (exogenous).

Antioxidants, especially the polyphenol group, differ in their absorption site, with some being absorbed in the gastrointestinal tract, while others in the intestine or other parts of the digestive tract. Although polyphenols have different absorption sites, they have great advantages in preventing cardiovascular diseases. Flavonoids, which are part of this group, act as potent antioxidants, as they reduce the oxidation of LDL cholesterol and reduce platelet aggregation.

In short, obtaining antioxidants exogenously, for example, through the ingestion of red fruits, ends up reducing the risk of developing cardiac pathologies by around 15% in individuals who regularly consume these fruits.

Keywords: antioxidants, polyphenol, cardiovascular diseases.

EFFECTS OF GRAPEFRUIT N DRUGS PHARMACOKINETICS

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Introduction: The effects of grapefruit and grapefruit juice in pharmacokinetics are well known, and it can interact with over 85 medications. These interactions can lead to major changes in the bioavailability and metabolism of drugs. Practical implications of grapefruit juice-drug interactions are reviewed in this abstract.

Methodology: Our research was based on six articles from PubMed®, Harvard Medical School and FDA dated 2012-2021.

Results: Affected drugs possess three essential characteristics: they have an oral route of administration, they have very low (< 10%) to intermediate (> 30%–70%) intrinsic oral bioavailability, and they are metabolized by CYP3A4.

The primary mechanism of the grapefruit juice-drug interaction is inhibition of CYP3A4, a mechanism that reduces drug metabolism, resulting in higher amounts of unmetabolized drug in circulation. Additional mechanisms of grapefruit juice-drug interactions include inhibition of P-glycoprotein (P-gp) which allows for greater absorption of oral medications into systemic circulation. The interaction between grapefruit and organic anion transporting polypeptides (OATPs) lead to an inhibition of this protein, decreasing the drug uptake transport.

Conclusion: The effect of grapefruit juice on drug metabolism is a particular concern for the elderly and those who take multiple medications or change medications frequently. Therefore, it is important to consult a nutritionist to discuss other alternatives. Grapefruit juice can cause problems with these enzymes and transporters, causing too high or too low drug in the body.

Keywords: Grapefruit; Drugs; CYP3A4; P-glycoprotein; OATPs.

THE INFLUENCE OF THE PILL ON APPETITE AND METABOLISM

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Introduction: The contraceptive pill, a hormonal method of daily intake, contains two hormones similar to those produced by the ovaries, estrogen and progesterone. Appetite is controlled mainly by hormones and the nervous system, being influenced by psychological, physical and social factors. The metabolism, which includes the processes of catabolism and anabolism, is responsible for the management of energy resources and materials of the body, playing a central role in maintaining homeostasis.
Objective: Understand the influence of the pill on appetite and metabolism.
Methodology: We searched websites like Pubmed® and AJOL with our keywords to access information on this subject. We used a total of three articles, published between 2007 and 2014.
Results: Estrogen has metabolic effects on adipose tissue, increasing the body's predisposition to store fat and reducing postprandial lipid oxidation. While progesterone causes an increase in appetite and permanent weight gain.
The use of pills, which have in their composition progestins revealed the ability to increase the levels of insulin fasting and resistance to it.
Conclusion: The effects of oral contraceptives on appetite, metabolism and weight are complex and depend on several individual factors. What works or causes effects in a woman may not be generalizable. Biological variability and the influence of external factors such as diet and lifestyle should be considered.

Keywords: Pill; Appetite; Metabolism; Estrogen; Progesterone.

WATER POLLUTION AND CONTAMINATION

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Water pollution and contamination have a significant impact on people's lives, affecting public health, the economy and social well-being.

The general objective of this work was to raise awareness, suggest possible solutions and enlighten the population about the impacts that water pollution and contamination can have on the environment and, consequently, on public health.

The methodology adopted was a literature review on the subject and the application of a questionnaire to the general population.

Based on data collected from a questionnaire administered to 103 individuals, it was observed that there is an increased awareness among the population regarding the importance of drinking water when it comes to defining what constitutes good quality water.

About the diseases caused by water contamination, it was possible to observe that the population is aware, since 74.8% of people considered diarrhea and 74% of people considered E. coli infections to be diseases derived from contamination.

With regard to the main causes of water pollution, the results ended up being dispersed, with the lowest percentage being agriculture and the highest percentage 80% being the discharge of waste.

This work has demonstrated the importance and impact that water pollution and contamination have on populations and public health, we believe that in addition to obtaining data on knowledge, we are also motivating interest in this subject and promoting knowledge.

Keywords: Pollution; Contamination; Water; Public Health; knowledge.

INFLUENCE OF FOREST FIRES ON WATER QUALITY

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Wildfires have a profound and lasting impact on water quality, with consequences for human health, ecosystems, and the economy. It is essential to adopt measures to prevent and fight fires, as well as to implement sustainable management practices for natural resources. The objective of this work was to assess the population's knowledge on the subject, as well as to make known the influence of fires on water quality. In carrying out this work, a literature review was carried out and a questionnaire was applied to the population. The results showed that 88.9% of the population surveyed indicated that the way in which wildfires affect water quality is through the amount of sediments, nutrients, and pollutants. In the impact that wildfires have on soils and water resources, 92.6% mentioned soil erosion, leading to pollution of water bodies as the main impact. It was also mentioned by 89.3% that the way in which wildfires can complicate water treatment for consumption is the increase in dissolved organic matter, making it difficult to filter. In conclusion, wildfires pose a growing threat to water resources, impairing water quality and impacting various ecosystems. In addition, the release of ashes and toxic chemicals contaminates rivers and lakes, affecting biodiversity and human health. To avoid such consequences, it is essential to invest in fire prevention and fighting, as well as in the recovery of affected areas, protecting water resources for future generations.

Keywords: Water; Wildfires; Quality.

NITRATES, HEALTH IMPACT AND FOOD RELATIONSHIP

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Introduction: Nitrate is an inorganic compound found in soil, water and plants. Widely used as a fertilizer in agriculture. It is also a persistent contaminant in food, particularly vegetables and processed meats. Although beneficial in some cases, excessive nitrate consumption can pose health risks.

Objective: To investigate nitrate and nitrite contamination in vegetables and cereal-based foods across different regions, assess health risks, agricultural practices, and methods to detect and reduce contamination, ensuring food safety.

Methodology: A literature review was conducted using the scientific databases Pubmed, Science Direct, Scopus, B-on, and Web of Science, with the keywords “Food contamination AND Nitrate AND Vegetables.” Of 105, initially analyzed, 25 published in the last eight years were included.

Results and Discussion: Research shows, nitrate exposure from vegetables is typically within acceptable limits, though vegetarians may face higher risks. Leafy vegetables like spinach, lettuce, and arugula often exceed nitrate limits, especially in regions with intensive fertilizer use. Chronic exposure to nitrates, particularly through water and vegetables, is linked to health risks like gastrointestinal cancer and methemoglobinemia in children. However, most populations maintained intake within safe levels. Innovative methods, including nanosensors and sustainable agricultural practices, have successfully reduced nitrate levels.

Conclusion: Nitrate is widespread in the environment and chronic exposure, poses health risks, monitoring nitrate levels and implementing sustainable agricultural practices and effective detection methods are essential to minimize risks and ensure food safety.

Keywords: Nitrates; Contamination; Vegetables; Health; Food; Risk.

FUMONISIN B1:CHARACTERIZATION, IMPACT ON HEALTH AND FOOD RELATIONSHIP

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Introduction: Fumonisin B1 (FB1) is a mycotoxin produced by the fungus Fusarium verticillioides and is the most common and most toxic of the fumonisins.
Objective: To characterize FB1, its impact on health and its food relationship.
Methodology: A scientific review performed in Pubmed and ScienceDirect databases over a 6-year periodo between 2019 and 2024. The keywords “Food Contamination”; “Fumonisin B1” and “children” were selected.
Results and Discussion: FB1 has a genotoxic effect, as it causes oxidative stress, and a carcinogenic effect, since it is correlated with the incidence of esophageal cancer, liver cancer and neural tube defects.
Despite being found in various food products, the food most frequently contaminated by FB1 is corn and its derivatives, such as flour, cornstarch, popcorn, oil, cornflakes and tortillas. The production of fumonisins can occur in the period before harvest or during storage, when conditions are not suitable. Heat treatment by extrusion reduces contamination by 50 to 60%. Studies indicate that the use of some probiotics and herbal extracts can reduce or prevent the negative effects of fumonisin, aquilegia vulgaris L. extract, which has been shown to have a protective effect against oxidative stress and FB1-induced cytotoxicity.
Conclusion: Considering that exposure is a threat to food safety, increasing knowledge about the nature, origin and contamination mechanisms of this toxin and its impact on human health is essential to enable more effective intervention in the prevention and control of infections.

Keywords: food contaminants; food sources of fumonisin; fumonisin b1; fumonisin’s health effects; mycotoxins.

PATULIN AND IT'S IMPACT ON HEALTH

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Introduction: Patulin is a food contaminant produced by fungi such as Byssochlamys, Aspergillus and Penicillium and is commonly present in moldy food materials.
Objectives: The objective is to characterize patulin, its impact on health, and its relation with food.
Methodology: A search was carried out in a PubMed database, using the keywords: “Patulin”, “Toxicity”, “Food”, “Detoxification”, “Intoxication” and “Children”. 431 scientific articles were chosen, of which 54 remained after reading the title, and subsequently 45 after reading the abstracts. After reading all of the articles' full texts, and taking into account the eligibility criteria, 26 articles were then used to write this review.
Results/ Discussion: Patulin is a food contaminant produced by several species of fungi and is generally present in moldy foods, mainly in fruits, cereal and cheese. The biggest risk to human exposure to Patulin comes from fruit, because of the high amounts of sugar and water, making Patulin more bioactive. Growing toxicologic evidence suggests that human and animal exposure to patulin produces nephrotoxicity, hepatotoxicity, neurotoxicity, gastric and dermal toxicity, which is concerning. The International Research Association on cancer classifies patulin as a group 3 substance, which means it has the potential to cause cancer, but currently there is no scientific evidence that can confirm its carcinogenic effects. Some signs of acute toxicity are: anxiety, dyspnea, edema, ulceration, pulmonary congestion, hyperemia, gastrointestinal tract distension, intestinal inflammation, epithelial cell degeneration, intestinal hemorrhage, and seizures.
Conclusion: This review fulfilled all of the objectives.

Keywords: Patulin, Toxicity, Food, Intoxication, Children.

THE RISKS OF ARSENIC IN CHILDREN'S NUTRITION AND ITS IMPACT ON HEALTH

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Introduction: Arsenic is a highly toxic element present in the environment, the ingestion of which, even in small quantities, can cause serious health problems.
Objective: To assess the presence and effects of arsenic in food consumed by children and adolescents, analysing its impact on the health and development in pediatric age group.
Methodology: A search was carried out in Pubmed and ScienceDirect databases using the keywords 'inorganic arsenic', 'food contamination' and 'children' between 2018 and 2024.
Results/Discussion: Exposure to arsenic in foods such as rice, milk, shellfish and fish poses a significant health risk, especially in contaminated regions. Contamination occurs mainly through water and food. Although cooking rice can reduce contamination, the quality of the water used must be assessed, as it may be contaminated. Regarding the negative impact on children's health, the toxic effects of this exposure can result in low birth weight, delayed growth, metabolic changes and increased susceptibility to infections. This contamination represents a serious public health issue and rigorous quality analyses must be implemented to guarantee the absence of this compound in food.
Conclusion: The vulnerability of the pediatric population requires public health policies, strict regulations and risk education, as well as cultivation methods that minimize arsenic absorption and guarantee consumer safety.

Keywords: food contamination; children; inorganic arsenic.

DIETARY CADMIUM EXPOSURE AND ITS RISKS IN THE PEDIATRIC POPULATION

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Introduction: Cadmium (Cd) is a non-essential heavy metal ranked as the third most toxic trace metal by the Agency for Toxic Substances and Disease Registry. Like other heavy metals, Cd is nonbiodegradable, remaining in the environment indefinitely. Chronic exposure to Cd is becoming a significant public health concern. Human activities, including industrial emissions and mining, are major contributors to Cd pollution, leading to elevated levels in the environment. The tolerable intake levels for Cd, as recommended by organizations such as JECFA and EFSA, are important benchmarks for evaluating dietary Cd exposure.

Objective: To provide insights into Cd contamination, the health impacts of its toxicity on the pediatric population, and the main sources of exposure.

Methodology: A scientific literature review was carried out using the databases PubMed, Web of Science and the Portal Regional da BVS. Articles from the past five years, excluding animal studies, were considered, resulting in the selection of 39 articles.

Results: The most common dietary sources of Cd is contaminated food like rice, wheat, potatoes and leafy green vegetables provenient from polluted soils and also meat, guts and seafood.

This element damages the urinary system the most, but can also damage the hepatic, respiratory, gastrointestinal, nervous, cardiovascular, reproductive and musculoskeletal systems. Current scientific evidence is still insufficient to establish clear relationships between cadmium exposure and the health complications it is suspected of causing.

Conclusion: The study's objective was achieved. Further research is needed to better understand the risks and potential impacts of cadmium exposure.

Keywords: Cadmium, pediatric population, children, dietary exposure, toxicity.

AFLATOXIN M1 AND HEALTH IMPACTS

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Introduction: Aflatoxin M1 (AFM1) is a mycotoxin produced by fungi such as Aspergillus flavus and A. parasiticus. It is synthesised through the hepatic metabolisation of aflatoxin B1 (AFB1), which is commonly found in maize, peanuts, nuts and oilseeds. Objective: Understand the impact of this compound on health. Methodology: PRISMA. The search was carried out in the 'Science Direct' database, using the keyword 'Aflatoxin M1', over the last 5 years (2020-2024). A total of 894 articles were retrieved, of which 84 were selected by title, 48 articles after full reading, and 43 were finalized. Results: AFM1 can be present mainly in milk and dairy products, but also in breast milk. This contamination can occur due to the consumption of foods that are more prone to the appearance of AFB1, which is subsequently metabolised into AFM1 and can be passed on to newborns through breastfeeding. Climatic conditions and inappropriate storage influence the growth and proliferation of fungi, particularly in the storage of animal feed, which will contaminate it and lead to the appearance of AFM1 in milk for human consumption. Discussion: Due to the characteristics of AFM1 and its presence in widely consumed foods, the likelihood of exposure to the toxin is high and can have serious consequences for public health, such as liver carcinoma, aflatoxicosis, neurotoxicity and destruction of the intestinal barrier or even death.Conclusion: It was therefore concluded that consumption and prevention must be controlled.

Keywords: Aflatoxin M1; Health Impacts; children.

METHYLMERCURY CONTAMINATION: THE IMPACT ON HEALTH

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Introduction: Methylmercury (MeHg) is a global environmental contaminant. It accumulates in aquatic and agricultural ecosystems, eventually reaching the human system through the food chain.
Objective: Inform about the impact on health and in which foods it is commonly found.
Methodology: A literature review was conducted in the electronic databases PubMed and Scopus with the keywords “Methylmercury” and “Food Poisoning”, obtaining 86 articles published in the last 5 years. After reading the titles, abstracts, and complete articles a total of 25 were selected, based on their relevance to the topic.
Results/Discussion: The exposure to MeHg is caused by the consumption of contaminated fish, seafood and rice, which can lead to neurological alterations, including cognitive and motor dysfunction, cardiovascular problems, disorders of the immune and reproductive systems, and can also be toxic to organs such as the kidneys. In pregnant women, MeHg can penetrate the placental barrier and compromise the embryo’s neurodevelopment, leading to consequences in brain function and behavior. There are many symptoms, examples being numbness, joint pain, inability to hold the head, difficulty speaking, paresthesia, visual and auditory disturbances, ataxia, convulsions, hypoesthesia, cramps, disturbance in locomotion or even death.
Conclusion: Early epidemiological studies should be conducted, specially in regions where fish is the main protein source, since they can be important in preventing and minimizing MeHg exposure. Further studies are needed to better comprehend the protector effect of certain foods and nutrients.

Keywords: Methylmercury, MeHg, Food Poisoning, Contamination, Toxicity.

FOOD CONTAMINATION BY OCHRATOXIN A: HEALTH RISKS AND TOXICOLOGICAL IMPACTS

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Introduction: Ochratoxin A (OTA) is a toxic mycotoxin produced by fungi like Aspergillus and Penicillium, commonly found in foods such as cereals, dried fruits, legumes, spices, coffee, milk, and dairy products, especially when the products are stored in conditions of inadequate humidity or when harvested after heavy rain.

Objectives: This review examines potential health risks associated with OTA, particularly for pediatric populations.

Methodology: A literature review was conducted using PubMed, Web of Science, and ScienceDirect databases, focusing on publications from the last 5 years concerning OTA contamination and its toxicological effects.

Results and Discussion: OTA is known for its nephrotoxic effects in humans. It binds strongly to albumin, leading to rapid absorption and distribution but has a long serum half-life of about 35 days due to slow metabolism. This allows OTA to bioaccumulate in the food chain after consuming contaminated products. OTA's high plasma protein binding results in tubular secretion and reabsorption in the kidneys, causing its accumulation in renal tissues and delaying excretion. These factors raise concerns about OTA's long-term health impacts, especially for children. Other effects such as immunotoxicity, neurotoxicity and teratogenicity have been observed in laboratory animals.

Conclusion: Given the updated understanding of OTA's toxicity and its prolonged presence in the body, continuous monitoring and reevaluation of OTA safety levels are essential to protect consumer health.

Keywords: Ochratoxin A; Toxicology; Nephrotoxicity.

THE IMPACT OF LEAD POISONING ON HUMAN HEALTH

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Introduction: Lead is a heavy, poisonous metal that is rapidly absorbed by the body through inhalation and ingestion, affecting different organs. Lead poisoning can be acute (intense exposure over a short period of time) or chronic (prolonged low-level exposure), the latter being more common.
Objective: The aim of this literature review is to understand the sources, symptoms and long-term effects of lead poisoning and its importance for human health.
Methods: A bibliographic review was conducted in the PubMed database. The words “lead” AND “intoxication” were used as descriptors. Articles published in Portuguese and English in the last 5 years were selected as filters.
Discussion: Sources of lead exposure can be commercial products such as spices, illegal game meat and canned food. Water can also be a source, especially from private wells. Prolonged exposure to lead can result in constipation, fever, cramps and abdominal pain, irritability, muscle pain, headache, anorexia, impaired respiratory function, reduced fertility in men, hypertension, blood disorders, damage to the brain and central nervous system, memory loss, severe kidney failure, reduced intelligence quotient (IQ), behavioral changes, reduced educational level and delayed development.
Conclusion: With this work, we were able to meet our objective. When a person is diagnosed with high levels of lead in the blood, it is crucial to carry out regular follow-ups to monitor the effects.

Keywords: Lead; Intoxication.

BLADDER CANCER: FROM DIAGNOSIS TO TREATMENT

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Bladder cancer ranks as the tenth most common cancer type and has disparate geographic distribution, with higher incidence rates observed in developed regions. Bladder cancer´s aggressiveness is defined by the degree of invasiveness into the wall (stage) and its tumor cellular grade (low or high), depending on histological alterations. Staging is based on the TNM system. 70-75% of patients have non-muscle invasive bladder cancer (NMIBC), 20-25% have muscle invasive bladder cancer (MIBC) and 5% present metastatic disease.

NMIBC and MIBC types are heterogeneous with unique pathological, molecular characteristics, and overall survival rates. Urothelial carcinoma represents the most prevalent histological subtype, representing 90% of bladder carcinomas. Tobacco smoking emerges as the main risk factor, followed by genetic susceptibility.

The diagnosis of bladder cancer is mostly based on urine or tissue analysis to detect malignant cells. The diagnosis gold standard methods are cystoscopy and urinary cytology. Circulating tumor DNA studies showed promising results when it comes to diagnosis; however its specificity, sensibility, and the applicability in clinical situations, still need to be investigated. Nowadays, efforts to identify new cellular markers are being done.

The treatment of bladder cancer involves multiple approaches, including chemotherapy, radiotherapy, immunotherapy and surgery. One of the most used therapeutics is *Bacillus* Calmette-Guérin (BCG), which has been used for over 50 years; however its mechanism of action is still not clear. Recently, a new therapy was approved by the Food and Drug Administration (FDA) for BCG-unresponsive cases and combines the use of an IL-15 agonist with BCG.

Keywords: Bladder cancer, diagnosis, ctDNA, treatment, BCG.

Discipline: Morphology and Histotechnology

Professor: Diana Martins

Degree: Biomedical Laboratory Sciences

A 56

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OESOPHAGEAL CANCER: DIAGNOSIS, PROGNOSIS AND THERAPY

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Oesophageal cancer is one of the deadliest diseases in the world, with an increased incidence in the West in recent decades. More than 95% of oesophageal tumors are caused by oesophageal squamous cell carcinoma (OSCC) and oesophageal adenocarcinoma (OAC), which are the two main subtypes of this cancer. Despite sharing the same anatomical location, they are pathologically and epidemiologically distinct diseases. In the early stages, there are no symptoms. They become evident in advanced stages, where signs of obstruction occur. Age, diet, demographics, smoking, alcohol consumption, sex, obesity, Barrett's esophagus, and gastroesophageal reflux disease are factors that can contribute to the development of oesophageal cancer.

Oesophageal squamous cell carcinoma arises from various cellular changes, including basal cell hyperplasia, dysplasia (which can range from low to high grade), and carcinoma in situ.

Oesophageal adenocarcinoma (OAC) has a diverse array of mutations. The most common are point mutations, especially in genes that function as tumor suppressors. However, structural changes play a more important role in this pathology. Amplifications and deletions are also frequently observed.

Diagnosis is typically performed using endoscopy and biopsy, and this cancer is associated with a poor prognosis.

There are several treatment options that depend on the patient's characteristics and the TNM stage. Among them, chemotherapy, radiotherapy, and surgical resection, which can be used single or together.

Keywords: Oesophageal cancer, Oesophageal squamous cell carcinoma, Oesophageal adenocarcinoma, Barrett's esophagus.

NANOTECHNOLOGY IN CANCER: MYTH OR REALITY?

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Even though there were major advances in cancer diagnosis and therapy, the approaches in early detection and in effective therapies, in this group of diseases, are still somewhat limited. Thus, nanotechnology, whose scientific work is in the nanoscale, aims to create revolutionary nanoscopic materials and devices with distinctive properties that will potentially revolutionize cancer detection and treatment. These inventions aim to improve imaging exams and drug delivery systems hence enhancing the precision of targeting cells while reducing drug toxicity to healthy cells.

For cancer diagnosis, nanoparticles are being utilized to capture cancer-associated proteins, exosomes, circulating tumor DNA, and cells. However, the effectiveness of biomarkers is limited by their low concentrations in body fluids, as well as variability in abundance and timing among patients.

As is well known, lack of specificity, cytotoxicity, short half-life, poor solubility, occurrence of multi-drug resistance and stem-like cell growth are some of the issues associated with traditional chemotherapy. To overcome this disadvantage nanotechnology developed nanomaterial-based chemotherapy, targeted therapy (active and passive), further therapy examples such as molecular, photodynamic (PDT), photothermal (PTT) and chemo dynamic (CDT), which are being used in clinical trials to treat cancer. Additionally, there is evidence that molecular therapy, apoptosis regulations, immunotherapy, signal modification therapy, nucleic-acid-based therapy, and anti-angiogenesis therapy can be options for oncologic treatment. Furthermore, some nanomaterials can present a high surface-to-volume ratio which can assemble biomolecules or residues, enhancing specificity in targeted therapy, which leads to an increase in treatment efficacy and simultaneously reducing its toxicity to healthy cells.

Keywords: Nanotechnology, Targeted Therapy, Biomarkers, Cancer Diagnosis, Drug Delivery.

PHEOCHROMOCYTOMA: FROM DIAGNOSTIC TO TREATMENT

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Pheochromocytoma is a neuroendocrine neoplasm of the suprarenal glands, characterized by proliferation of chromaffin cells resulting in excessive production of catecholamines. The neoplasm is rare and often benign, but about 10% are malignant and capable of metastasizing to other regions of the body.

Most of the cases are sporadic, however 30-40% are associated with inherited syndromes allowing early diagnosis and proper follow-up.

This pathology consists in hypersecretion of epinephrine and norepinephrine caused by dysregulation of catecholamines production. These hormones bind with alpha and beta adrenergic receptors with different affinities, inducing symptomatology.

Main clinical features include episodic headaches, tachycardia, sweating and episodic hypertension (90% of the cases). Due to these nonspecific symptoms, most diagnoses are established post-mortem.

Pheochromocytoma can be diagnosed by testing for high levels of catecholamines in blood or urine, breaking down products like metanephrine in urine and ultrasound or CT scan to identify the location. No histologic feature or single biomarker can reliably predict malignancy, for that is used the Adrenal Gland Scaled Score (PASS) which provides a prognosis based on histologic features.

Treatment is surgical whenever possible since it can decrease blood pressure. Preoperative therapy prevents hypertension and arrhythmia crisis during surgery, avoiding hypotension after adrenalectomy. While in a postoperative phase, drugs are used to regulate blood pressure. In specific cases, alternative treatments such as chemotherapy may also be used.

In conclusion, clinical history, awareness of clinical manifestations and diagnostic steps are essential for early diagnosis and successful treatment.

Keywords: Pheochromocytoma; Hypertension; Catecholamines; Suprarenal glands.

PENILE CARCINOMA: CHALLENGES AND THERAPEUTIC OPPORTUNITIES

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Penile carcinoma is a relatively uncommon malignancy that can be classified according to its histological subtype, the most frequent being penile squamous cell carcinoma (PSCC), HPV-associated or non HPV-associated, accounting for approximately 95% all penile malignancies. Several conditions, such as chronic inflammation, viral infections (HPV and HIV) and phimosis can often enhance this pathology. The HPV-associated PSCC oncogenic mechanism primarily relies on oncoprotein E6 and E7 expression, following infection of epithelial mucosa and integration of HPV viral DNA into the human genome. The overexpression of these oncoproteins plays a significant role in the degradation of p53 and inhibition of retinoblastoma protein, both tumor suppressors, ultimately leading to dysregulations in the cellular cycle and accumulation of tumor-causing mutations. Nevertheless, the non HPV-associated PSCC mechanism has not yet been well described. Physical examination and imaging tests are the principal methods used in case of suspicion, however, up until today, biopsy is the only procedure to definitively diagnose this pathology. Nevertheless, the diagnosis must be complemented by inguinal lymph node evaluation for tumor staging, alongside HPV status and Ki-67 expression to provide an accurate prognosis. Organ-sparing surgery is the primary treatment for penile cancer, although chemo, radio and immunotherapy using immune checkpoint blockade can be used as neoadjuvant or alternative therapies. In addition, pembrolizumab is commonly recommended as the second-line treatment. Even though penile carcinoma does not have a very high prevalence worldwide and therapies are still in development, preventive measures such as HPV vaccination play a key role in decreasing incident rates.

Keywords: penile carcinoma; HPV; combination therapy; tumor-suppressor proteins; squamous cell carcinoma.

BONE CANCER: FROM DIAGNOSTIC TO METASTASIS

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Primary bone cancer is a type of cancer that originates from cells involved in the formation of bone. Despite being rare, it can occasionally develop in non-bone tissue. The most common primary bone tumors include osteosarcoma, Ewing's sarcoma and chondrosarcoma. These malignant tumors represent less than 1% of all tumors diagnosed each year.

Secondary bone cancers are common complications of various tumor types, typically arising from breast and prostate cancers. Metastases refers to bone lesions created by cancer cells that have spread from other organs through the bloodstream and established themselves in the bones.

There are three types of lesions in bone metastasis: osteolytic, osteoblastic, and mixed. During bone metastasis, tumor cells disrupt normal bone homeostasis, releasing factors that alter bone formation by osteoblasts and increase the resorption of mineralized bone by osteoclasts.

Diagnosing bone tumors remains complex and biopsy continues the gold standard. Biochemical examinations, analysis of morphological, immunohistochemistry and molecular results coupled with imaging technologies, enables a thorough investigation. The use of immunohistochemical markers is essential for a definitive diagnosis.

Patient’s reduced mobility is associated with severe pain and microfractures. Bone metastases result in significant skeletal morbidity, deteriorating quality of life and serving as an unfavorable prognostic factor.

The treatment of patients with bone metastasis is primarily palliative, focusing on pain relief. Decisions regarding treatment are based on the location of the metastasis and the patient's medical history.

Keywords: Bone Cancer, Diagnosis, Metastasis, Treatment.

CENTRAL NERVOUS SYSTEM TUMORS: NEW APPROACHES

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A brain tumor is an abnormal benign or malignant growth that causes an increase in intracranial pressure and can damage healthy brain tissue. They can be primary (origin on the brain) or secondary (metastasis) and classified according to several parameters such as location, degree of the lesion or genetic alterations and it can influence the symptoms, prognostic or treatment. The neurologic dysfunction happens due to the invasion and destruction of the cerebral tissue by the tumor or due to cerebral edema, which translates into increased intracranial pressure.

Age, male genre, irradiation and genetic background are the main risk factors for the tumor development.

The diagnosis results of the complementarity between the physical exam, to evaluate the symptoms and the imagiological exam. The technological advance in the area of the imagiological diagnosis, allows us to have several non-invasive methods such as computed tomography, magnetic resonance (MRI), positron emission tomography (PET) and single photon emission computed tomography (SPECT), providing an accurate and less invasive diagnosis of tumors and their aggressiveness.

Treatment is realized through surgery (primary treatment), which can be combined with chemotherapy or radiotherapy (secondary treatment). The therapy for glioblastoma consists of the use of devices that send electrical signals to induce cancer cells to enter a quiescent state or die.

These types of tumors are usually detected on caucasian men at the age of 70, and on children less than 8 years old. By monitoring the symptoms and lifestyle, a better prognosis can be achieved.

Keywords: brain tumor, genetic alterations, neurologic dysfunction, lesion degree, imagiological diagnosis.

TRIPLE NEGATIVE BREAST CANCER MICROBIOME

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Breast Tumors can be classified according to their molecular composition. Triple Negative Breast Cancer (TNBC) is an aggressive subtype with worse prognosis and higher rates of reoccurrence, being essentially characterized by the absence of estrogen (ER), progesterone (PR) and HER2 protein receptors.

Globally, breast cancer is the second most incident cancer in women, and the mortality rate differs according to its subtype. It is estimated that about 10 to 15% of breast cancer cases are TNBC type, being more common in women under the age of 35, due to early diagnosis.

The microbiome consists of various microorganisms that inhabit our body and are essential for good physiological functioning. In the case of TNBC, dysbiosis can occur either proximally in the breast microbiome or even distal in the gut microbiome, through processes such as the release of carcinogenic metabolites, maintenance of pro-inflammatory environments, and promotion of epigenetic changes in the genome. The microbiome also plays an essential role in mediating metastases and the effectiveness of treatments.

Diagnostics are based on imaging tests, biopsies, and pathological and immunohistochemical analyses. However, the subclassification of the tumor depends on genetic tests.

Given the aggressive nature of this tumor, there is no specific treatment for this subtype. The main therapeutic options are chemotherapy, radiotherapy,
immunohemotherapy, and surgery. Targeted therapies may also be needed for patients with specific mutations, namely *BRCA1* and *BRCA2*.

As the microbiome affects carcinogenesis and the effectiveness of treatments, understanding it becomes essential for the discovery of possible therapeutic targets.

Keywords: Breast Cancer; Triple Negative; Microbiome; Dysbiosis.

MICROBIOME IN PANCREATIC CARCINOMA - THERAPEUTIC OPPORTUNITIES

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Pancreatic carcinoma, particularly Pancreatic Ductal Adenocarcinoma (PDAC), is a highly aggressive malignancy, affecting around 1,800 individuals annually in Portugal. Diagnosis often occurs at advanced stages due to late-emerging symptoms, resulting in a challenging prognosis. The lack of specific screening methods and the cancer's resistance to chemotherapy further complicate treatment. Recent studies indicate that intrapancreatic microbial profiles may correlate with tumor carcinogenesis, suggesting that microbial dysbiosis contributes to persistent tissue inflammation, impaired immune surveillance, and altered cellular processes within the tumor microenvironment.

The microbiome, a complex community of microorganisms including bacteria, viruses, fungi, and other microbes resides in and on the human body and plays a crucial role in health and disease. Recognizing the microbiota as a significant factor in carcinoma development paves the way for identifying new diagnostic markers and therapies. Advanced laboratory techniques, such as 16S rRNA gene sequencing, metagenomics, and metabolomics, enable the identification and quantification of specific bacteria across various samples, allowing for the potential use of microbial profiles as non-invasive biomarkers.

Microbiome-targeted therapies including probiotics, prebiotics, and fecal microbiota transplantation aim to modulate gut and tumor microbiota, enhancing the efficacy of conventional treatments like chemotherapy and immunotherapy. Growing evidence suggests that specific microbial profiles may significantly influence patient outcomes and treatment success.

Emerging insights into the microbiome's role in pancreatic carcinoma present promising therapeutic opportunities that could improve patient survival rates and quality of life.

Keywords: Pancreatic Carcinoma, Microbiome, Therapy, Biomarker, Treatment.

HEAD AND NECK TUMOURS: TREATMENT CHALLENGES

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Head and neck cancer is the sixth most prevalent type of cancer globally. This cancer consists of a heterogeneity of tumors arising from the anatomic sites that compose the upper aerodigestive tract. Squamous cell carcinoma is the most common cancer in head and neck tumors.

It can be characterized histopathologically by the level of atypia and cellular differentiation. Preventive measures like vaccination and reduced exposure to environmental etiologic agents, can also be done to minimize the risk of development.

Treatment includes surgery, radiation, chemotherapy, and drug administration which depends on the type and characteristics of tumors. Thus, immune profiling and specific molecular characterization, suggest that incorporating prognostic and predictive biomarkers into clinical practice may overcome the barriers to targeted therapies and prolong patient survival.

Resistance to chemotherapy and radiotherapy can be acquired, so it is important to focus on effective targeted therapies using VEGF and EGFR inhibitors like sorafenib and cetuximab.

Small molecular inhibitors in other pathways like PI3K are being investigated to promote anticancer effects in tumors like cetuximab-resistant oral squamous cell carcinoma. Alterations in tumor suppressor genes such as TP53 are also related to the progression and prognosis of disease.

It is necessary to increase research on other signaling pathways, as the outcomes of current targeted therapies are still far from optimal. This type of cancer is currently the subject of extensive research, and there remains significant potential to improve both clinical outcomes and patients' quality of life.

Keywords: head and neck cancer; therapies; drugs; biomarkers.

THE IMPACT OF VIRTUAL AND AUGMENTED REALITY ON VESTIBULAR REHABILITATION

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Introduction: Virtual reality offers an interactive real-time experience, utilizing multiple sensory channels such as vision, hearing, and touch. This technology has emerged as an effective therapeutic tool for neurological patients, allowing for dynamic simulations that engage sensory, motor, and cognitive aspects. With a highly immersive and three-dimensional environment, healthcare professionals can test a variety of stimuli, providing more precise control compared to traditional vestibular rehabilitation methods. Patients face sensory challenges in a safe and comfortable space, where they perform repetitive exercises to restore balance. The use of virtual reality cannot only enhance treatment efficiency, but also motivate patients during therapy. Objective: To assess the efficiency of virtual reality as a therapeutic tool in vestibular rehabilitation, evaluating its impact on improving postural stability, reducing the sensation of vertigo, and increasing patient engagement during the recovery process. Methodology: A literature review was conducted, performing a search for scientific articles on Google Scholar, from which 4 out of 7 articles were selected. Conclusion: In conclusion, the integration of virtual reality in vestibular rehabilitation represents a promising advancement in therapeutic practices, enhancing patient engagement and improving treatment outcomes. This innovative approach not only provides a safe environment for recovery but also allows for customized therapy, increasing the effectiveness of exercises and promoting a more motivating and effective rehabilitation experience.

Keywords: Virtual reality, augmented reality, vestibular rehabilitation, balance.

EAC CLASSIFYING WITH MACHINE LEARNING FROM OTOSCOPY IMAGERY

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Introduction: In today's data classification landscape, machine learning-based methods achieve the best solutions. As a subset of Artificial Intelligence, machine learning relies on data and algorithms to mimic human learning processes. By processing vast amounts of data, machine learning techniques can outperform human solutions by uncovering patterns that may elude human observers. Integral to data science, machine learning trains algorithms to classify or predict outcomes based on input data, whether labelled or unlabeled, resulting in precise estimations of data patterns. As technology continues to advance in machine-learned fields, the healthcare sector can leverage these methods to classify samples with less error and attention to detail than the human eye.

Objective: deployment of deep learning algorithms, such as convolutional neural networks, for classifying EAC otoscopy images.

Metodology: Experimenting with differente aritificial neural networks, particullary focusing in the ResNet18. Create a script that uses Machine Learning to classify otoscopies. Furthermore, extent experiments by exploring dataset pre-processing techniques, data augmentation methods, among others.

Results: The network had a good capacity to classify the samples from the 2 classes “normal” and “AOM”, however there’s dificulties to classify samples from the “AOE” class, something expected due to low class representiveness in the dataset.

Conclusion: This essay concludes that it’s already possilble to automatize health related procedures such as classifying otoscopy imagery using Artificial Intelligence’s digital tools.

Keywords: Artificial Intelligent; Machine Learning; Deep Learning; Otoscopy; Otitis.

TELEAUDIOLOGY: DIAGNOSIS AND HEARING ADJUSTMENTS IN THE DIGITAL ERA

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Introduction: Advances in technology have led to developments in the health sector, making it possible to carry out consultations, examinations and monitoring remotely.
The field of Audiology has been no exception, and a new branch of audiology has emerged, called 'Teleaudiology'.
Objective: investigate the use of teleaudiology for remote monitoring and adjustment of hearing devices, including the role of mobile applications in supporting users of hearing aids and cochlear implants.
Methodology: In order to carry out this investigation into what teleaudiology is and the activities it involves, detailed research was carried out in order to acquire reliable information on the subject.
Results: After the research, it was possible to see that teleaudiology is an area of audiology that uses distance communication techniques for diagnostic consultations and hearing rehabilitation and although it has disadvantages, such as reduced personal interaction and limited access to digital media, it is important for informing patients about tests and clarifying doubts, as well as enabling constant monitoring during the hearing rehabilitation process, which improves the user's progress in the rehabilitation process. It can also be seen that several companies that produce hearing aids and cochlear implants offer mobile applications that are very important for controlling the prostheses and providing support to their users.
Conclusion: Teleaudiology has proved to be very important and it needs to continue to evolve so that its disadvantages can be overcome and the needs of users can be better met.

Keywords: Teleaudiology, Audiology, Hearing aids, Cochlear implants, Applications.

Discipline: Information Technology and Artificial Intelligence

Professor: António Carvalho Santos

Degree: Audiology

A 68

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DIAGNOSIS AND AUDITORY MONITORING IN THE DIGITAL AGE: THE POWER OF TELEAUDIOLOGY

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Introduction: The development of emerging technologies, such as artificial intelligence (AI), can improve the accuracy of remote diagnoses and personalized treatments. Teleaudiology is one of these areas that allows hearing services and care to be provided using telecommunication technologies. These services can be provided safely and reliably, increasing accessibility and patient involvement by reducing costs and travel time. Consequently, challenges remain, such as controlling ambient noise, especially when tests are carried out in the absence of an appropriate acoustic examination cabin. These adversities must be addressed as teleaudiology continues to grow, in order to innovate and improve access to hearing care. Continuous training of professionals and patient awareness of the benefits of teleaudiology can improve the acceptance and effectiveness of this model. In short, teleaudiology shows promise for expanding healthcare worldwide in order to reduce the number of people suffering from hearing loss. Objective: Given the advances in technology, the aim of this paper is to demonstrate the power of teleaudiology in hearing diagnosis and monitoring. Methodologies: A systematic review was carried out using Google Scholar, artificial intelligence websites and health websites as search engines. The articles consulted were published in the last fifteen years, and after detailed analysis only thirteen articles were selected.

Keywords: Hearing diagnosis, Artificial intelligence, Hearing monitoring, Hearing loss and Teleaudiology.

MACHINE LEARNING IN AUDIOLOGY

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Introduction: Machine learning in audiology is the application of artificial intelligence (AI) algorithms, contributing to the assessment of patients and the personalization treatment plans through complex data analysis, improving the effectiveness of hearing diagnoses treatments.
Objective: To comprehend the importance of machine learning in the context of Audiology, as it is a promising tool in this field. Its application is extremely important for improving and making diagnoses more effective, especially in terms of treatment and better hearing intervention. Also to learn about and describe the basic processes of AI and machine learning applications in hearing aids and to better understand the link between artificial intelligence and machine learning.
Methodology: A search was carried out in the Google Scholar database, using the search engines: “Machine learning in the context of audiology” and “Artificial intelligence” in Portuguese and English.
Results: Machine learning in audiology improves diagnosis and treatment by classifying types of hearing loss and detecting patterns early on. Algorithms filter out noise to improve speech recognition in noisy environments and allow personalized hearing aid fittings. Data analysis predicts hearing progress, while sensors monitor rehabilitation and recommend personalized therapies. Predictive models also help with prevention and education.
Conclusion: Machine Learning and Artificial Intelligence represent a significant evolution in audiology, offering advances in early, efficient diagnosis and personalized treatment of an individual's hearing loss, thus contributing to patients' quality of life.

Keywords: Artificial Intelligence, Audiology, Machine Learning.

HOW TELEHEALTH WORKS?

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Introduction: Health is an essential component of human survival and access to it is crucial. However, there are a number of people who, because they are located in remote places or have physical impediments, are unable to travel to a hospital or clinic.
To overcome this barrier, telehealth has emerged. It is based on the technological development of today's society and takes advantage of this evolution to promote remote access. It also enables coordination, integration and continuity of medical care without the need to travel in person.
In Audiology, teleconsultation is often used to better monitor the patient. There are currently several tools that facilitate this process, such as Interacoustics' Remote Audiology Systems (RAS) mobile systems, which allow audiological services to be carried out remotely with different diagnostic options. As well as Phonak's advanced eAudiology tools with innovative remote access software.
Aim: The aim of this paper is to explain how the evolution of telehealth is a viable option that facilitates access to health care, giving more relevance to Audiology.
Method: This study was based on a literature review of scientific articles and audiological websites. The keywords used were: “health”, “telehealth” and “telehealth in audiology”.
Conclusion: Telehealth takes advantage of technology to provide health care remotely, facilitating consultations and diagnoses in remote locations or for people with limitations, ensuring continuity in follow-up.

Keywords: Health, telehealth, audiology.

EVOLUTION OF ASSISTIVE TECHNOLOGIES FOR

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Introduction: Hearing loss affects social, emotional, and behavioral well-being, leading people to seek devices that improve their quality of life. For mild to moderate hearing loss, hearing aids enhance sound clarity, while more severe losses may require implants. Over time, hearing devices have become more discreet and customizable, with models such as behind-the-ear and in-the-ear options suited to different degrees of hearing impairment. Advances include noise reduction, sound amplification, smartphone connectivity, and resistance to water and dust.
Objective: Analyze how advancements in assistive technologies benefit people with hearing impairments.
Results: Hearing devices have evolved from analog models with basic amplification to digital ones with features that filter noise and adapt to the environment. Recently, technologies like Bluetooth connectivity and artificial intelligence have enabled automatic adjustments. The development of cochlear implants has revolutionized the treatment of severe hearing loss, promoting digital and social inclusion. Bone conduction and brainstem implants are also alternatives for cases where the auditory nerve is absent or damaged.
Conclusion: The evolution of auditory technologies is essential for the inclusion and improved quality of life for people with hearing loss. Despite advancements, challenges such as high costs and the need for training to facilitate adaptation still limit accessibility, making ongoing development crucial to meeting users' needs.

Keywords: Evolution, Hearing Aids, Implants, Technology.

PACKAGING AND FILLING OF OINTMENTS

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An ointment is a stable pharmaceutical preparation, of soft consistency, consisting of by one or more active substances and by monophasic excipients with lipophilic characteristics or hydrophilic. Packaging and filling of ointments represent fundamental steps in the manufacturing process. Packaging requires an appropriate choice of packaging materials, which protect the product from external influences such as light, air and humidity, in order to extend its shelf life and effectiveness. Products that are packaged in volumetric machines are packaged in packages such as tubes, jars or blisters through a container passing through a hole and releases it into the packaging. This equipment may suffer from adhesion viscous products or ice resulting in uneven filling of packages. The ointment manufacturing process is periodic or continuous. If it is periodic, it can be made up of one, two or three stages, depending on the number of devices used in the process. The equipment used to fill ointments includes filling machines, labeling, mixing and sealing machines. There must be quality control of all products, such as inspection visual, chemical analysis, microbiological analysis and stability tests. With regard to packaging and labeling, standards must always be complied with labeling ensuring consumer safety. The filling and packaging process is essential for the completion of a ointment and all other pharmaceutical instructions, to ensure your safety and effectiveness.

Keywords: Packaging; filling; ointments; effectiveness; safety.

EVANESCENT CREAMS

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Evanescent creams have gained a lot of prominence in the cosmetics field, as they provide immediate and intense hydration to the skin, without leaving any greasiness behind. These O/W emulsions, also known as diadermines, have emollient properties that favor rapid absorption, allowing them to penetrate the lipid barrier more easily. With a light non-sticky texture, they are prized for promoting intense hydration, largely thanks to the hyaluronic acid present. The benefits include deep and intense hydration, as well as leaving the skin with a soft and velvety touch, adapting to different skin types. The main ingredients are hyaluronic acid, aloe vera, silicones, sweet almond oil, stearic acid and reflective pigments. They are prepared by heating the liquid and oil phases separately, mixing them and stirring until they reach room temperature. There are a variety of evanescent creams available on the market, including options for the face, body and eye area, each with particular characteristics aimed at moisturizing, protecting and caring for the skin. For proper application, it's essential to cleanse and dry the area, apply a moderate amount and spread gently in circular movements, allowing the product to be fully absorbed before applying other products. Measures such as using sunscreen, carrying out allergy tests and storing the product correctly are fundamental to preventing problems and ensuring that the product is safe.

Keywords: Hydration; hyaluronic acid; evancescent creams; skin.

PHARMACEUTICAL IMPLANTS

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Pharmaceutical implants are solid, sterile and innovative pharmaceutical forms in the treatment of some illnesses such as cardiovascular, psychiatric, oncology and endocrine diseases. These devices are prepared from different polymers, biodegradable and non-biodegradable which cause drug release to take place in specific places in the body and in a controlled manner over a prolonged period. This pharmaceutical form has more than one active principle and they present adequate size and form accordingly with the route that is going to be used to be applied in the organism, which can be done through an cirurgical incision (subdermal implants, orthopedics) or through an injection (intravenous implants, intramuscular, transdermal) being used in several clinical situations such as contraception, in the chronic pain controlled, hormonal therapy, treatment of psychological illnesses, oncology and dependency control. These implants are a powerful tool in modern medicine, because due to its possibility to release drugs in a continuous and controles way, reduce the collateral effects and the constantly taking medication. However, the choice of this method must be taken in consideration because it's about a procedure that promotes high initial costs, presente difficulties in its remotion and can provoke allergic or sensitivity reactions as it is an invasive procedure. With the continue evolution of the materials and the release techniques, the future of pharmaceutical implants looks promising, with the possibility to attend to a even more wide range of therapeutic needs.

Keywords: Polymers; pharmaceutical implants; cirurgical incision; injection.

IMPORTANCE OF PH IN INJECTABLE SOLUTIONS

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The pH of injectable solutions is a crucial element in maintaining the safety, efficacy and stability of this galenic form when administered directly. Injectable solutions can be acidic (pH < 6), alkaline (pH > 8) or neutral (6 ≤ pH ≤ 8). For a solution to be administered safely, the following factors must be taken into account: compatibility with body tissues, stability of the formulation, solubility, compatibility with blood and bioavailability of the drug. Buffer systems are very important and essential, as they ensure pH stability and, consequently, the safety of injectable solutions. The importance of buffering can be understood by several factors, such as: maintaining the right pH, drug stability, patient safety, preventing precipitation and complex formation, and compatibility with body fluids. Solutions have different pHs, for example morphine is acidic, insulin is neutral and aminophylline has an alkaline pH. The most likely adverse reactions when the pH is not appropriate are: haemolysis, pain at the time of administration, allergic reactions and inflammation, tissue necrosis and embolism. In conclusion, it is essential to maintain an adequate pH in injectable solutions in order to ensure their safety, tolerance and efficacy in treatment.

Keywords: Solution for injection; pH; buffer systems; safety; efficacy.

GALENIC FORMULATIONS TO THE TREATMENT OF DERMATOLOGICAL CONDITIONS - ACNE

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Acne is a dermatological condition caused by excessive sebum production and pore obstruction due to dead skin cells and bacteria's. Acne products are usually topical, protecting the skin without causing many adverse reactions. Their principal action is to reduce the accumulation of substances produced by the sebaceous glands and keratin to prevent infection. The treatment of this pathology begins with epidermal cleansing to eliminate existing impurities. For this, gels that are colloidal solutions and lotions that are liquid emulsions are widely used. There is also a need to promote skin cell renewal, which can be achieved with creams with an exfoliating action called keratolytics, preventing the accumulation of keratin. The acne skin, even producing a lot of sebum, needs a good hydration that can be achievable using a hydration cream that origins from an emulsion with a semi-solid consistency, water/oil emulsion (W/O) presenting a higher accomplishment on substance liberation , or oil/water emulsion (O/W) with a more often production which promotes water retention. It should be noted that there are oral forms that help in this treatment. In conclusion, this study demonstrated to us the various pharmaceutical forms and their action in the treatment of acne, focusing on the elimination of excess oil and water retention, as well as the necessary care to maintain clean, hydrated and healthy skin.

Keywords: Acne; skin; galenic formulations; pharmaceutical forms.

MICROEMULSIONS

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Microemulsions are potentially instable systems from the thermodynamic point of view, transparent at optic level, isotropic and low viscosity, constituted by nanometric size droplets (diameter between 10 and 100 nm) dispersed in a continuous phase of an immiscible solvent with the disperse phase. These are made up of water, an oil, a tensioactive agent/surfactant and a lot of times a co-surfactant (alcohol), they can be classified depending on the phases that constitute them. In a lot of aspects, microemulsions are versions is small scale of emulsions, despite being more stable, and have different applications, that extend form transdermic skin absorption systems to other formulations for oral, nasal, and ocular use, etc. With regards to the advantages, the main ones to point out are the ability of a controlled release, the absorption efficiency and the possibility of different formulations. On the other hand, we can point out as disadvantages the possibility of toxicity due to the high quantities of surfactants and the possibility of causing skin irritation were the microemulsion was applied. To conclude, microemulsions, is a similar way to emulsions, are biphasic systems constituted by two immiscible phases, whose pharmacological applications are diverse and in the most diverse formulations, and have grown exponentially in the field of therapeutic utilization, presenting advantages such as the increase of bioavailability and, of course, the versatility of the formulation, but also disadvantages that we haven't managed to get around, like the toxicity due to the high quantities of surfactants used to increase the stability, and the possibility of causing a skin irritation.

Keywords: Microemulsions; Emulsions; Surfactants; Applications; Toxicity.

PLASTICS FOR USE IN PHARMACIES

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The use of plastics in the pharmaceutical field is of great relevance due to their unique properties, such as lightness, durability, flexibility, and chemical resistance, which ensures the safety and efficacy of medications. These materials are widely used in drug packaging, offering protection against light, oxygen and moisture, as well as in the manufacturing of medical devices such as syringes, catheters, and drug delivery systems. Moreover, plastics have applications in nanotechnology and biopolymers, improving treatment efficacy and reducing side effects. Plastics offer several advantages, including cost reduction, safety, resistance to chemical reactions, and ease of molding, making them ideal for dosage control packaging and sterile medical devices. However, improper disposal of these materials leads to environmental impacts, such as the accumulation of plastic waste. The pharmaceutical industry is increasingly focused on developing biodegradable plastics and adopting a circular economy to minimize these ecosystem damages. Innovation in biopolymers and recycling programs is essential to reduce the environmental footprint of plastics without compromising public health. Thus, although indispensable, plastics require sustainable solutions to ensure they continue to be used responsibly and in an environmentally friendly way.

Keywords: Drug packaging; biodegradable plastics; sustainable solutions.

COLLOIDAL SOLUTIONS

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Colloidal solutions are systems containing particles dispersed in a continuous medium, with intermediate sizes between 1 and 1000 nm. They stand out for having properties that place them between true solutions and suspensions. The Tyndall effect, which consists of the scattering of light by colloidal particles, is one of the many important properties of colloidal solutions. Colloidal stability is influenced by factors such as the electrical charge on the surface of the particles, hydration and Brownian motion, which prevent sedimentation and keep the particles dispersed. However, changes in pH, the addition of electrolytes and temperature can destabilize the solution, leading to coagulation or sedimentation. There are different types of colloidal solutions, such as aerosols, emulsions, foams, gels and suns, which are arranged according to the physical state of the dispersed and dispersing phases and are widely used in the cosmetics industry, in the production of paints and pigments and in water treatment. In biomedicine, they are essential for the development of controlled drug delivery systems, enabling efficient and localized drug release. Despite their advantages, high stability and large surface area for adsorption, colloidal solutions face challenges related to sensitivity to external changes and the difficulty of controlling particle size.

Even so, its role is crucial in various industrial and scientific applications, with potential for future innovations, especially in biotechnology and nanotechnology.

Keywords: Colloidal solutions; stability; Tyndall effect; industrial applications; biomedicine.

PYROGENIC TEST IN MEDICINES

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Pyrogenic tests on medicines are essential for ensuring the safety of medicines, since they detect compounds that cause fever after intravenous or inhalation administration.The principal test are “Rabbit Pyrogenic Test”(RPT), “Bacterial Endotoxins Test ”(BET) and the “Monocyte Activation Test”(MAT). The RPT uses adult rabbits to measure temperature before and after intradermal or intravenous administration. The test is considered positive when there is an increase in temperature. The advantages are the detection of various pyrogens, low interspecific variability and high sensitivity. The disadvantages are low reproducibility and lack of precise quantitative results. BET is an alternative in vitro endotoxin test, which has 3 techniques:gelation, turbidimetry and chromogenic. BET offers advantages such as the reduction of animal use, an increase of the sensitivity and rate of detecting endotoxic and non-endotoxic pyrogens. The disadvantages include practical limitations due to a small range of biologically relevant pyrogens, chemical interferences in the samples and the need of additional validation due to nanoparticles. MAT quantifies the cytokines released by human monocytes, with the following steps: mononuclear cells, incubation with the sample, cytokine production and quantification, and control groups. The reagent may be a comparative endotoxin or from a reference batch. It has advantages like a better prediction of the pyrogenic activity in Humans and a detection of endotoxic and non-endotoxic pyrogenic without animal abuse. The disadvantages include a decrease of sensitivity and longer duration in comparison to BET.

Keywords: Pyrogenic; endotoxin; RPT; BET; MAT.

TYPE OF AMPOULES IN PACKAGING

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The packaging of medicines is a fundamental and necessary step so that medicines reach their recipients in the best possible conditions, safely, reliably, and without ever compromising their quality or function. In this work, the focus was on packaging made in ampoules, which are containers that can guarantee the integrity of their contents, safely, and that are ready to be used. There are several types of ampoules, but a general characteristic is that they usually contain solutions, such as injectables, analgesics, among others. The ampoules can then be made of glass or plastic, where each of these has its benefits, which helps in choosing the type of ampoule to use. For example, glass ampoules, can guarantee high resistance to high temperatures, and are highly inert, which would help to avoid reactions with the drugs. Plastic ampoules, unlike glass ones, can be lighter and less likely to break, due to the type of material it is made of. There is also another type of ampoule that is widely used, because unlike ampoules, which are normally single-dose, ampoule bottles can contain multiple doses, and can also often contain powders, in addition to solutions. It is these characteristics and others, such as the type of administration route to be used, the nature of the medicine, the dose to be administered, that will lead to choosing the type of ampoule to use, and its appropriate size.

Keywords: Packaging; ampoules; ampoule bottle; quality; safety.