Evaluation Of The Antibacterial Efficacy And The

Heavy metals have been known to possess antimicrobial properties against bacterial, fungal, and viral pathogens. Silver and copper in particular have been used for millennia to control bacterial and fungal contamination. Metal nanoparticles (aggregations of metal atoms 1-200 nm in size) have recently become the subject of intensive study for their increased antimicrobial properties due to their increased surface area and localized release of metal ions when attached to pathogens. In the current studies, metal and metalhalide nanoparticles including silver (Ag), silver bromide (AgBr), silver iodide (AgI), and copper iodide (CuI) nanoparticles were evaluated for their antibacterial efficacy against two common bacterial pathogens. All of the nanoparticles significantly reduced bacterial numbers within 24 hours of exposure and were more effective against the Gram-negative Pseudomonas aeruginosa than the Gram-positive Staphylococcus aureus. CuI nanoparticles were found to be highly effective, reducing both organisms by>4.43 log10 within 15 minutes at 60 ppm Cu. CuI nanoparticles were selected for further evaluation against a range of microorganisms to determine their broad spectrum efficacy. CuI nanoparticles formulated with different stabilizers (sodium dodecyl sulfate, SDS; PVP) were tested against representative Gram-positive and Gram-negative bacteria, Mycobacteria, a fungus (Candida albicans), and a non-enveloped virus (poliovirus). Both nanoparticles caused significant reductions in most of the Gram-negative bacteria within five minutes of exposure (>5.09-log10). The Gram-positive bacterial species were more sensitive to the CuI-SDS than the CuI-PVP nanoparticles. Likewise, C. albicans was also more sensitive to the CuI-SDS than the CuI-PVP nanoparticles. In contrast, the acid-fast Mycobacterium smegmatis was more resistant to the CuI-SDS than the CuI-PVP nanoparticle solutions (2.54-log10 vs. 3.80-log10 after 30 minutes). Poliovirus was more resistant than the other organisms tested except for Mycobacterium fortuitum. M. fortuitum was more resistant to both CuI nanoparticle solutions than any of the other organisms tested, requiring longer exposure times to achieve comparable reductions (~4.15 log10 after 24 hours). As an example of a real world antimicrobial application, polymer surface coatings with embedded CuI nanoparticles were investigated to determine their potential use as self-disinfecting surfaces. Brushed polyurethane, spincoated acrylic, and powder coated polyester-epoxy coatings containing various concentrations of CuI nanoparticles were tested for antibacterial efficacy against P. aeruginosa and S. aureus. Polyester-epoxy powder coatings were superior to the other coatings in terms of uniformity and stability under moist conditions and displayed antimicrobial properties against both organisms (>4.92 log10) after six hours at 0.25% Cu. Polyester-epoxy coatings were selected for more rigorous testing under adverse conditions. These surfaces were negatively impacted when tested under dry conditions with high organic content, with organic content appearing to have a greater impact on antimicrobial efficacy. At 0.25% Cu, the antibacterial activity of the powder coatings was not impacted by washing with several commercial cleaners; however, at concentrations of 0.05% Cu, antibacterial activity was reduced by multiple washings with water, Windex®, and Pine Sol®. Additionally, ultrasonic cleaning of the coatings appeared to decrease their antimicrobial efficacy. Despite this, CuI nanoparticles were found in all studies to have great potential as a new class of fast-acting, broad-spectrum antimicrobial.

The WHO Guidelines on Hand Hygiene in Health Care provide health-care workers (HCWs), hospital administrators and health authorities with a thorough review of evidence on hand hygiene in health care and specific recommendations to improve practices and reduce transmission of pathogenic microorganisms to patients and HCWs. The present Guidelines are intended to be implemented in any situation in which health care is delivered either to a patient or to a specific group in a population. Therefore, this concept applies to all settings where health care is permanently or occasionally performed, such as home care by birth attendants. Definitions of health-care settings are proposed in Appendix 1. These Guidelines and the associated WHO Multimodal Hand Hygiene Improvement Strategy and an Implementation Toolkit (http://www.who.int/gpsc/en/) are designed to offer health-care facilities in Member States a conceptual framework and practical tools for the application of recommendations in practice at the bedside. While ensuring consistency with the Guidelines recommendations, individual adaptation according to local regulations, settings, needs, and resources is desirable. This extensive review includes in one document sufficient technical information to support training materials and help plan implementation strategies. The document comprises six parts.

There has been emergence of multidrug resistance problem all over the world due to overuse or underuse of antibiotics. Most microbes including bacteria, fungi, protozoans and others have developed resistance to antibiotics, and therefore, this problem is now recognized to be of global concern. Ubiquitous occurrence of multidrug-resistant bacteria decreases effectiveness of current treatment, which results in thousands of deaths all over the world. Hence, investigations for new alternatives and novel strategies are urgently needed to address the problem of multidrug resistance. The antimicrobial potential of essential oils and metallic nanoparticles represent an effective solution for microbial resistance. Moreover, the use of essential oils in combination with metallic nanoparticles may exert synergistic antimicrobial effects and would be a novel approach. Essential oils (EOs) are volatile, natural, aromatic oily liquids that can be obtained from several parts of plants especially the aerial ones such as leaves and flowers. They are derived from complex metabolic pathways in order to protect plants from diverse pathogenic microorganisms. In fact, the bioactivity of EOs have been confirmed by several studies which have demonstrated their antibacterial, antiviral, anti-inflammatory, antifungal, antimutagenic, anticarcinogenic, and antioxidant properties. Nanotechnology is one of the most important and emerging technologies, which has brought about a technological revolution in the world. It has enormous applications in the field of medicine. Nanoparticles are very important tools in curing different diseases in general and microbial diseases in particular due to their significantly novel and improved chemical, physical and biological properties and high surface area-to-volume ratio. Among these, metal nanoparticles are known to play pivotal role in various biomedical applications. In this context, nanoparticles such as silver have shown their potential and could emerge as the new generation of antimicrobials. Silver nanoparticles have broad-spectrum biological activities and hence are used in many biomedical applications. The various biomedical applications of silver nanoparticles include treatment of wounds, burns, in water-disinfecting systems, in nanobased bone implantations, in dentistry for the development of dental materials and as antibacterial, antivirals, anti-protozoals, anti-arthropods and anticancerous agents. Apart from silver, noble metal nanoparticles like gold and platinum and other nanoparticles copper, oxides of different metals, etc. have been also the materials of choice for many scientists for their biological applications. The book will be of interest to chemists, microbiologists, biotechnologist, food technologists, nanotechnologists, pharmacologists, clinicians and those interested in nature cure. Students will find this book useful and reader friendly.

The first comprehensive, authoritative review of one of the most fundamental and important issues in infection control and patient safety, hand hygiene. Developed and presented by the world's leading scholar-clinicians, Hand Hygiene is an essential resource for all medical professionals. Developed and presented by the world leaders in this fundamental topic

Fully integrates World Health Organization (WHO) guidelines and policies Offers a global perspective in tackling hand hygiene issues in developed and developing countries Coverage of basic and highly complex clinical applications of hand hygiene practices Includes novel and unusual aspects and issues in hand hygiene such as religious and cultural aspects and patient participation Offers guidance at the individual, institutional, and organizational levels for national and worldwide hygiene promotion campaigns

Silver in healthcare has many different facets and since the early concepts of microbiology of the 1880's, has been developed from usage in surgical clips, staples, foil wound dressings and surgical implants, to the widespread and clinically effective antiseptic wound dressings, sutures, catheters, bone and dental implants, and cardiovascular devices of today. From the dawn of human civilisation, silver has had a role of water purification and even now has a role in hospital water systems for control of MRSA and legionnaires disease. Biotechnological advances in recent years have extended the antimicrobial properties of silver into production of hygiene textiles and use in domestic products. Important advances have been made in understanding mechanisms of antimicrobial action of silver, the central importance of ionisation patterns in the presence of body fluids and secretion, and the genetical and molecular profiles of silver resistance. This publication is a comprehensive account of the history of silver in medicine, its clinical benefits and wide advantages as a broad spectrum antimicrobial agent. It is clear from the extensive array of publications in recognised and unofficial press, that many misconceptions and misleading conceptions have been perpetuated, leading to errors in evaluation of the safety of the metal in occupational, domestic and therapeutic situations. The book is unique in that it is the only comprehensive presentation of the toxicology of silver and it identifies the major misconceptions in the safety of silver and interpretation of argyria and argyrosis as central features of silver toxicity. In this book, Dr Lansdown reviews the literature from a clinical and experimental viewpoint, with the benefit of his many years research on silver and experience gained in working with clinicians, healthcare product manufacturers and microbiologists. There is also discussion in the book on the relevance of antimicrobial resistance to silver and deficiencies in present day clinical practice in not evaluating incidences of resistance on a routine basis. The subject matter is presented in a readable fashion and includes reference to use of the metal in such practices as acupuncture and treatment of tropical diseases as practised in some parts of the world, each of which is accompanied by special clinical risk. It is also a collation of current views on the use and efficacy of silver as a broad spectrum antibiotic. The chapters which deal specifically with toxicological aspects of silver in clinical, occupational and environmental issues are central to the book's value. The book is aimed at clinicians, research scientists and product manufacturers and will provide ideas for new research and academic endeavour. It is also essential reading for research students with an interest in metal toxicity and its management in mammalian tissues.

It incorporates the changes that have occurred in endodontic theory and practice in terms of materials, concepts and protocols. The presentation of the concepts and techniques has also been revised.

Antimicrobial Nanoarchitectonics: From Synthesis to Applications brings together recent research in antimicrobial nanoparticles, specifically in the sustained and controlled delivery of antimicrobials. Particular attention is given to i) reducing the side effects of antibiotics, ii) increasing the pharmacological effect, and iii) improving aqueous solubility and chemical stability of different antimicrobials. In addition, antimicrobial nanoparticles in drug delivery are discussed extensively. The book also evaluates the pros and cons of using nanostructured biomaterials in the prevention and eradication of infections. It is an important reference resource for materials scientists and bioengineers who want to learn how nanomaterials are used in antimicrobial therapy. Provides readers with the information necessary to select the appropriate bionanomaterial to solve particular infection problems Includes case studies, showing how particular bionanomaterials have been used to cure infections Explains the central role that nanotechnology plays in modern antimicrobial therapy Evaluates the pros and cons of using nanostructured biomaterials in the prevention and eradication of infections

Historically, the first observation of a transmissible lytic agent that is specifically active against a bacterium (Bacillus anthracis) was by a Russian microbiologist Nikolay Gamaleya in 1898. At that time, however, it was too early to make a connection to another discovery made by Dmitri Ivanovsky in 1892 and Martinus Beijerinck in 1898 on a non-bacterial pathogen infecting tobacco plants. Thus the viral world was discovered in two of the three domains of life, and our current understanding is that viruses represent the most abundant biological entities on the planet. The potential of bacteriophages for infection treatment have been recognized after the discoveries by Frederick Twort and Felix d'Hérelle in 1915 and 1917. Subsequent phage therapy developments, however, have been overshadowed by the remarkable success of antibiotics in infection control and treatment, and phage therapy research and development persisted mostly in the former Soviet Union countries, Russia and Georgia, as well as in France and Poland. The dramatic rise of antibiotic resistance and especially of multi-drug resistance among human and animal bacterial pathogens, however, challenged the position of antibiotics as a single most important pillar for infection control and treatment. Thus there is a renewed interest in phage therapy as a possible additive/alternative therapy, especially for the infections that resist routine antibiotic treatment. The basis for the revival of phage

therapy is affected by a number of issues that need to be resolved before it can enter the arena, which is traditionally reserved for antibiotics. Probably the most important is the regulatory issue: How should phage therapy be regulated? Similarly to drugs? Then the co-evolving nature of phage-bacterial host relationship will be a major hurdle for the production of consistent phage formulae. Or should we resort to the phage products such as lysins and the corresponding engineered versions in order to have accurate and consistent delivery doses? We still have very limited knowledge about the pharmacodynamics of phage therapy. More data, obtained in animal models, are necessary to evaluate the phage therapy efficiency compared, for example, to antibiotics. Another aspect is the safety of phage therapy. How do phages interact with the immune system and to what costs, or benefits? What are the risks, in the course of phage therapy, of transduction of undesirable properties such as virulence or antibiotic resistance genes? How frequent is the development of bacterial host resistance during phage therapy? Understanding these and many other aspects of phage therapy, basic and applied, is the main subject of this Topic.

While there are many books available on methods of organic and biochemical analysis, the majority are either primarily concerned with the application of a particular technique (e.g. paper chromatography) or have been written for an audience of chemists or for biochemists work ing mainly with animaltissues. Thus, no simple guide to modern metho ds of plant analysis exists and the purpose of the present volume is to fill this gap. It is primarily intended for students in the plant sciences, who have a botanical or a general biological background. It should also be of value to students in biochemistry, pharmacognosy, food science and 'natural products' organic chemistry. Most books on chromatography, while admirably covering the needs of research workers, tend to overwhelm the student with long lists of solvent systems and spray reagents that can be applied to each class of organic constituent. The intention here is to simplify the situation by listing only a few specially recommended techniques that have wide currency in phytochemical laboratories. Sufficient details are provided to allow the student to use the techniques for themselves and most sections contain some introductory practical experiments which can be used in classwork.

New drugs are frequently entering into the market along with the existing drugs. The antibacterial agents can be discussed in five major classes, i.e. classification based on the type of action, source, spectrum of activity, chemical structure and function. Resistance of bacteria to antibiotics is an urgent problem of the humanity, which leads us to the lack of therapy for serious bacterial infections. Development of new antibiotics has almost ceased in the last decades – even when a new antibiotic is launched, very soon the resistance of bacteria appears. Industrial textiles exposed as awnings, screens, tents; upholstery used in large public areas such as hospitals, hotels and stations; fabrics for transports; protective clothing and personal protective equipment; bed sheets and blankets; textiles left wet between processing steps; intimate apparel, underwear, socks and sportswear, disinfection of air and water for white rooms, hospitals and operating theatres, food and pharma industries, water depuration, drinkable water supplying and air conditioning systems. Many clinicians recommend alternative approaches to using antimicrobial substances. Moreover, the majority of bioagents demonstrate on antibiotics for treatment of a wide range of diseases in human sectors. However, the misuse and mishandling of drugs lead to microbial, particularly bacterial, resistance as well as result in the difficulty of treating microbial diseases. Hence, the proposed book will give more precise information on novel antibacterial compound(s). Antimicrobial textiles have attracted a great deal of interest in recent years due to their potential for reducing the transmission of infection in medical and healthcare environments. Antimicrobial properties can also improve the performance and lifespan of consumer products, and so these fabrics are increasingly finding applications in the wider textile and apparel industry. This book provides systematic coverage of the technologies and materials required for developing these important textiles. In Part One, chapters address key issues and technologies in the creation of antimicrobial textile products. Topics covered include testing and regulation, microencapsulation, sol-gel coating and plasma technologies, nanotechnology and life cycle assessment. Part Two then reviews key antimicrobial agents, such as N-halamines, plant based compounds and photo-active chemicals. Finally, the chapters of Part Three offer detailed reviews of antimicrobial textiles for particular important applications, including medical devices, protective clothing and products with improved durability and longevity. Reviews key issues and technologies in the creation of antimicrobial textile products Offered a detailed overview of by antimicrobial agents and a wide range of important applications

Produced by an experienced editor and a distinguished and international team of contributors
Probiotic microorganisms are recognised as being beneficial for human health. Prebiotics are substrates that are used preferentially by the probiotic bacteria for their growth. A great deal of interest has been generated in recent years in identifying probiotic bacteria and prebiotics, their characterization, mechanisms of action and their role in the prevention and management of human health disorders. Together they are referred to as synbiotic. This book is in response to the need for more current and global scope of probiotics and prebiotics. It contains chapters written by internationally recognized authors. The book has been planned to meet the needs of the researchers, health professionals, government regulatory agencies and industries. This book will serve as a standard reference book in this important and fast-growing area of probiotics and prebiotics in human nutrition and health.
The clinical microbiology laboratory is often a sentinel for the detection of drug resistant strains of microorganisms. Standardized protocols require continual scrutiny to detect emerging phenotypic resistance patterns. The timely notification of clinicians with susceptibility results can initiate the alteration of antimicrobial chemotherapy and improve patient care. It is vital that microbiology laboratories stay current with standard and emerging methods and have a solid understanding of their function in the war on infectious diseases. Antimicrobial Susceptibility Testing Protocols clearly defines the role of the clinical microbiology laboratory in integrated patient care and provides a comprehensive, up-to-date procedural manual that can be used by a wide variety of laboratorians. The authors provide a comprehensive, up-to-date procedural manual including protocols for bioassay methods and molecular methods for bacterial strain typing. Divided into three sections, the text begins by introducing basic susceptibility disciplines including disk diffusion, macro and microbroth dilution, agar dilution, and the gradient method. It covers step-by-step protocols with an emphasis on optimizing the detection of resistant microorganisms. The second section describes specialized susceptibility protocols such as surveillance procedures for detection of antibiotic-resistant bacteria, serum bactericidal assays, time-kill curves, population analysis, and synergy testing. The final section is designed to be used as a reference resource. Chapters cover antibiotic development; design and use of an antibiogram; and the interactions of the clinical microbiology laboratory with the hospital pharmacy, and infectious disease and control. Unique in its scope, Antimicrobial Susceptibility Testing Protocols gives laboratory personnel an integrated resource for updated lab-based techniques and charts within the contextual role of clinical microbiology in modern medicine.
Handbook of Antimicrobial Coatings is the first comprehensive work on the developments being made in the emerging field of antimicrobial coatings. Crucial aspects associated with coating research are presented in the form of individual chapters. Particular close attention has been given to essential aspects necessary to understand the properties of novel materials. The book introduces the reader to progress being made in the field, followed by an outline of applications in different areas. Various methods and techniques of synthesis and characterization are detailed as individual chapters. Chapters provide insight into the ongoing research, current trends and technical challenges in this rapidly progressing field. The covered topics were chosen so that they can be easily understood by new scholars as well as advanced learners. No book has been written on this topic thus far with so much crucial information for materials scientists, engineers and technologists. Offers the first comprehensive work on developments being made in the emerging field of antimicrobial coatings Features updates written by leading experts in the field of anti-microbial coatings Includes discussions of coatings for novel materials Provides various methods and techniques of synthesis and characterization detailed in individual chapters

Antimicrobial Nanoarchitectonics
Silver in Healthcare
Antimicrobial Textiles
Antimicrobial Materials for Biomedical Applications
Topical Antimicrobials Testing and Evaluation, Second Edition
Research, Development and Evaluation : Proceedings of the International Conference on Antimicrobial Research (ICAR2010), Valladolid, Spain, 3-5 November 2010
Concepts, Compounds and the Alternatives of Antibacterials
Its Antimicrobial Efficacy and Safety in Use
Grossman's Endodontic Practice

Antibacterial Efficacy and Biological Evaluation of High-valence Silver Material
Antimicrobial Properties Of Metal And Metal-Halide Nanoparticles And Their Potential Applications

This book offers up-to-date information on all aspects of the use of lasers in endodontics, focusing especially on the various laser applications, including primary and permanent root canal therapies, retreatments, apical surgery and pulp therapy. Every laser technique used in endodontics is carefully described and illustrated, with detailed coverage of both conventional methods and more recent developments such as laser-activated irrigation and photon-induced photoacoustic streaming. In addition, a separate section addresses the basic science of laser dentistry, explaining the physics, describing laser–tissue interactions, and discussing different types of laser. Extensive reference is made to the international literature in order to provide the reader with a clear, evidence-based understanding of the merits of various approaches. In offering a balanced mix of descriptions of clinical applications, clinical data, scientific research and logical criticism, the book will serve as an excellent reference for a wide audience comprising general dentists as well as specialists.
Bioactive glasses(BG) are promising materials for bone healing due to their desirable properties such as osteoconductivity, biodegradability, angiogenic potential, and antibacterial activity. Ionic dissolution products from bioactive glasses increase pH u0301s medium reducing surrounding bacteria proliferation. Nevertheless, such antibacterial effect has been reported as restricted due to their insignificant anti-biofilm activity exhibited in previous studies.The aim of this systematic review was to assess the efficacy of antibacterial and anti-biofilm compounds embedded into bioactive glass composition to prevent or treat peri-implant infection during bone repairing applications.The question according to Population, Intervention, Control, Outcomes (PICO) was established as follows: u201cIn bioactive glass particles what is the effect of the embedding of antimicrobials compared to the non-embedding on bacterial and biofilm activity?u201d. The electronic search was performed including in vitro studies written in English, Portuguese, and Spanish published up to December 3, 2015, in the following databases: PubMed, LILACS, Scopus, Web of Science, and Science Direct.The first phase of the research yielded 525 abstracts. 81 studies exhibiting the incorporation of antibacterial compounds into BG structures were completely examined for inclusion in the final analysis and 49 studies were chosen to be scrutinized for qualitative analysis. The collected data was divided into 3 categories: bioactive glass non-embedding compounds (n:22), metallic ion doped BG u0301s (n:23) and organic compounds embedded into bioactive glass (n:4). As follows, this systematic review showed that BG without the incorporation of antibacterial compounds has an important antibacterial activity; however, Ag ions doping BG have the most efficient antibacterial activity among other embedded compounds.The size of BG particles determines its antibacterial activity, nm particles showed a higher antibacterial effect compared to micrometric particles. Surface BG modification converts this biomaterial into a promising antibacterial and antibiofilm delivery system as illustrated in fig 1.Only In vitro studies have been considered in this systematic review, therefore future in vivo studies and clinical trials are warranted to determine the most promising anti-biofilm agent incorporated into bioactive glass to counteract biofilm proliferation, promote bone regeneration, and have none toxic side effects in human tissues being a possible solution to treat and repair peri-implantitis defects.
Bacterial pathogens have been becoming the main problem in hospital and community-acquired infections. It is hard to treat the strains that are resistant to antibiotics, due to the causing recurrent and untreatable infections. In recent years, the combination treatments and the novel technologies have been preferred to overcome the emergence of antibacterial resistance of pathogens. In this book, examples of pathogenesis by clinical cases, control by antibiotics and bioactive antimicrobials, control by novel technologies with the collection of up-to-date researches and reviews are presented. This book can be useful for researchers interested in antibacterials, bioactive compounds, and novel technologies.
The clinical incidence of large-scale bone defects has increased over the past few decades to both an increasingly aging population and an associated rise in the number of traumatic injuries. These defects require surgical intervention and can be complicated by post-operative surgical site infections; while these infections were originally managed with intravenous antibiotics, overuse of antibiotic drugs in both livestock and hospital environments has contributed to the creation of antibiotic resistant pathogens such as methicillin resistant Staphylococcus aureus. In craniofacial applications, especially, the lack of a synthetic, biocompatible and osteoconductive graft material that could address infections via a non-pharmaceutical approach provided a niche for exploration. The objective of this study was to synthesize a novel glass series, characterize the series to determine whether it would be biologically feasible and if so, identify the antibacterial efficacy and cytocompatibility of the material. A novel Zn-based bioactive glass series was created, as Zn has proven antibacterial capacity in previous studies. Molten mixtures of SiO_2, Na_2O, SrO, CaO and ZnO with varying CaO and ZnO concentrations, from 0-30% Zn, were quenched in room temperature water and ground to dental cement standards of sub-45 microns. X-ray diffraction revealed broad humps for each composition indicating that each was an amorphous solid. Scanning electron microscopy, energy dispersive spectroscopy and particle size analyses validated that the particle size of each composition was 45 microns, containing a uniform distribution of both large and small particles of the appropriate elemental compositions. BET surface area analysis confirmed that the surface areas of the samples were between 0.4163 m^2/g and 0.6671 m^2/g from RC-Control to RC-3; similarity in surface areas implied that reactivity differences were likely attributable to other factors. Differential thermal analysis indicated that the glass transition temperature of the series dropped from 635 degrees C to 578 degrees C from RC-Control to RC-3, indicating an increase in reactivity with Zn concentration. This was validated by MAS-NMR where samples shifted from -77ppm for RC-Control, indicating a tendency towards Q1, to -72.1ppm for RC-3, indicating Q0 tendency. The reactivity of the samples was high enough to indicate potential as a bioactive material, and a cement was synthesized with glass powder, polyacrylic acid and DI water at a ratio of 1.3:1 and optimized to working times of ~5min for each glass composition. Co-culture of E. coli with glass powders and subsequent plating onto LB agar revealed that significant antibacterial efficacy was possible for 20% and 30% Zn samples, RC-2 and RC-3. This trend was corroborated when zones of inhibition were measured for cement disks in S. aureus plates. RC-3 had a notably greater antibacterial capacity, but despite this, in a mammalian cell environment with murine MC3T3 pre-osteoblastic cells, showed no cytotoxicity. The antibacterial capacity and cytocompatibility of the RC series is promising and further exploration of RC-3 as an antibacterial bone graft substitute should be conducted.
A range of factors must be considered when developing a topical antimicrobial for use in a healthcare personnel handwash, surgical scrub, or preoperative skin preparation. Antimicrobial effectiveness, low skin irritation, ease of use, and pleasing aesthetics are all essential if the product is to succeed. In addition, all facets of the product must comply with stringent regulatory requirements. With updated protocols and research, Topical Antimicrobials Testing and Evaluation, Second Edition comprehensively presents and reviews the latest techniques for testing antimicrobial

compounds for effectiveness and regulatory compliance. Topics include: The anatomical structure of the skin and skin microbiology relevant to product testing Use of antimicrobial products against specific microorganisms such as Staphylococcus and Streptococcus species Measurement of antimicrobial action of topical antimicrobials from experimental design, microbiological, biostatistical, and marketplace perspectives Various aspects of the topical antimicrobial products currently in common use in medical, food service, and consumer markets Statistical analysis and specific statistical designs for clinical trials Epistemological requirements in evaluating the effects of specific treatments Evaluation strategies and sample working protocols for hand and body soaps, food-handler antimicrobial products, and medical/healthcare industry antimicrobial products The book is designed to inform industry and academia on the requirements to get products approved by the FDA and to market while also providing critical insight on ways to best service expanding markets.

Aims to develop antimicrobial electrospun fibre mats from biopolymers and to evaluate their application in air filtration. The specific objectives were: to optimise the process parameters for electrospinning of PLA from a suitable solvent ; in order to produce mats with desired morphology ; to evaluate the performance of the membranes for mechanical and air filtration properties ; to incorporate AgNPs onto the membranes by using various methods, and to evaluate their antibacterial efficacy.

This reference examines laboratory techniques and FDA and industry perspectives on medical, food service, and consumer product applications of antimicrobials. It offers methods to conduct investigations of effectiveness that simulate use of consumer, food, and medical antimicrobials in real-world conditions and environments, validate neutralizing s

This book provides the field with a much-needed fundamental overview of the science, addressing the chemistry of a broad range of biomaterial types, and their applications in the biomedical industry.

This book presents a global view of the development and applications of technical textiles with the description of materials, structures, properties, characterizations, functions and relevant production technologies, case studies, challenges, and opportunities. Technical textile is a transformative research area, dealing with the creation and studies of new generations of textiles that hoist many new scientific and technological challenges that have never been encountered before. The book emphasizes more on the principles of textile science and technology to provide solutions to several engineering problems. All chapter topics are exclusive and selectively chosen and designed, and they are extensively explored by different authors having specific knowledge in each area.

Abstract: The use of ultrasound as an adjunct to conventional instrumentation procedures has been suggested to enhance the removal of bacteria and necrotic debris from infected root canals. The purpose of this in vivo, prospective, repeated-measures study was to evaluate the antibacterial efficacy, by means of microbial culture method, of a hand and rotary instrumentation technique plus one-minute of 15 mL/minute 6% NaOC1, and 30 seconds 15 mL/min 2% Chlorhexidine via ultrasonic irrigation using an ultrasonic irrigating needle connected to a MiniEndoTM piezoelectric ultrasonic system in the mesial roots of infected, necrotic, human mandibular molars. Thirty-five subjects participated in this study. Each experimental subject had four bacterial samples drawn during treatment. The canals were sampled prior to treatment (sample Si), after hand and rotary instrumentation (sample S2), after ultrasonic irrigation with 30 mL 6% NaOC1 (sample S3), and after ultrasonic irrigation with 15 mL 2% Chlorhexidine (sample S4). The samples were incubated anaerobically for 7 days at 37°C. The bacteria from each sample were quantified, and the mean and median CFU count and log10 CFU count were used for statistical analysis.

This edition is intended to provide better understanding of antibacterial drugs and their mechanism, the role of a few metal drug complexes as antibacterials, cross-checking of a few compounds and biomaterials against drug-resistant bacterial strains as well as a few alternative approaches using medicinal plant based formulations in the control of antibiotic-resistant bacteria. The information in this book provides clues for upcoming trends in treating antibiotic resistance problems with which one can explore new approaches in the treatment of common infections with drug-resistant strains.

The aim of this book is to disseminate the most recent research in science and technology against microbial pathogens presented at the first edition of the ICAR Conference Series (ICAR2010) held in Valladolid, Spain, in November 2010. This volume is a compilation of 86 chapters written by active researchers that offer information and experiences and afford critical insights into anti-microbe strategies in a general context marked by the threat posed by the increasing antimicrobial resistance of pathogenic microorganisms. OC AntiOCO is here taken in a wide sense as OC against cell cycle, adhesion, or communicationOCO, and when harmful for the human health (infectious diseases, chemotherapy etc.) and industry or economy (food, agriculture, water systems etc.) The book examines this interesting subject area from antimicrobial resistance (superbugs, emerging and re-emerging pathogens etc.), to the use of natural products or microbes against microbial pathogens, not forgetting antimicrobial chemistry, physics and material science. Readers will find in a single volume, up-to-date information of the current knowledge in antimicrobial research. The book is recommended for researchers from a broad range of academic disciplines that are contributing in the battle against harmful microorganisms, not only those more traditionally involved in this research area (microbiologists, biochemists, geneticists, clinicians etc.), but also experimental and theoretical/computational chemists, physicists or engineers."

The pharmacopoeias of most African countries are available and contain an impressive number of medicinal plants used for various therapeutic purposes. Many African scholars have distinguished themselves in the fields of organic chemistry, pharmacology, and pharmacognosy and other areas related to the study of plant medicinal plants. However, until now, there is no global standard book on the nature and specificity of chemicals isolated in African medicinal plants, as well as a

book bringing together and discussing the main bioactive metabolites of these plants. This book explores the essence of natural substances from African medicinal plants and their pharmacological potential. In light of possible academic use, this book also scans the bulk of African medicinal plants extract having promising pharmacological activities. The book contains data of biologically active plants of Africa, plant occurring compounds and synthesis pathways of secondary metabolites. This book explores the essence of natural substances from African medicinal plants and their pharmacological potential The authors are world reknowned African Scientists.

Honey Analysis - New Advances and Challenges discusses advances in honey research. Topics include the physicochemical characteristics of honey from stingless bees, the therapeutic properties of honey, melissopalynological analysis as an indicator of the botanical and geographical origin of honey, and methods for authenticating honey. Written by experts in the field, this book provides readers with an indispensable source of information, assisting them in future investigations of honey and beekeeping.

An Evaluation of the Relationship Between Application Method, Concentration, and Antimicrobial Efficacy of an Antimicrobial Finish After Accelerated Laundering
Science and Technology Against Microbial Pathogens
Clinical Endodontics
The Characterization of the Antibacterial Efficacy of an Electrically Activated Silver Ion-based Surface System
Bacterial Pathogenesis and Antibacterial Control
Antibacterial Agents
A Handbook for Medical Professionals
Evaluation of Surface Morphology, Antibacterial Efficacy and Biocompatibility of Dental Cements in Simulated Oral Environment
Undifferentiated Bovine Respiratory Disease
Lasers in Endodontics
Antibacterial Efficacy of 2% Chlorhexidine with Ultrasound Activation in the Root Canals of Necrotic Human Mandibular Molars

D-Day and operation OVERLORD are often regarded as one of the most important operation of all time. The stretch of beach along the Calvados coast is world famous for the part it played in turning around World War II on the 6th of June 1944, when British, Canadian and American troops broke through Nazi defenses. Normandy is indelibly marked by the .....

This book covers the latest research in biofilm, infection, and antimicrobial strategies in reducing and treating musculoskeletal, skin, transfusion, implant-related infections, etc. Topics covered include biofilms, small colony variants, antimicrobial biomaterials (antibiotics, antimicrobial peptides, hydrogels, bioinspired interfaces, immunotherapeutic approaches, and more), antimicrobial coatings, engineering and 3D printing, antimicrobial delivery vehicles, and perspectives on clinical impacts. Antibiotic resistance, which shifts the race toward bacteria, and strategies to reduce antibiotic resistance, are also briefly touched on. Combined with its companion volume, Racing for the Surface: Pathogenesis of Implant Infection and Advanced Antimicrobial Strategies, this book bridges the gaps between infection and tissue engineering, and is an ideal book for academic researchers, clinicians, industrial engineers and scientists, governmental representatives in national laboratories, and advanced undergraduate students and post-doctoral fellows who are interested in infection, microbiology, and biomaterials and devices.

Dental cements were used in conventional crown restorations for many decades before being utilized in cement-retained restorations in order to make a connection between the implant body and the crown. Cementation is the preferred restoration method because it eliminates unaesthetic components, aids in the obtainment of correct loading characteristics, and is usually less expensive than screw-retained counterparts. However, the use of dental cements has been a constant source of apprehension due to multiple reports indicating in vitro and in vivo cytotoxicity, and their ability to be contaminated by the oral microbiota. Because of this, residual dental cement is listed as a risk factor for peri-implant disease by the American Academy of Periodontology. Furthermore, since there is not a standard guiding dental cement selection, many clinicians approach it in a subjective manner. It has been established that cement selection is done base on preference, ease of use, and current trends on conventional restorations. Cement selection is further complicated by the lack of cements manufactured specifically for implant restorations. Current approaches for dental cement selection could, therefore, neglect the use of cement compositions that could aid in the success of the restoration. The goal of this study was to evaluate the biocompatibility and antimicrobial effects of various commercial dental cements in order to emphasize the impact dental cement composition can have in the oral environment.

Hospital related infections generally result from the combined effect of preexisting bacteria on the patient and invasive devices. This demonstrates the significance in improving these medical devices to increase the quality of life of the patients that require them. This study will attempt to evaluate the antibacterial efficacy of nanocopper particles and an electrical stimulus for the usage in medical device development and the hospital environment. For devices such as catheters, infections typically result from bacteria entering the body from the outside. This is accomplished by bacteria attaching themselves to the exterior of the device and producing biofilm which allows them to enter the body and cause an infection. The first and second studies positively demonstrate that the nanocopper and electrical stimulus work well in creating inhibition zones. However, the third test which focuses primarily on biofilm prevention presents negative results. In fact, it appears that the nanocopper has no effect on biofilm growth at all. The reasons for these mixed results could be due to a variety of reasons. For instance, when adding small particles to a very viscous solution, ensuring thorough dispersion proves very difficult without the proper tools which may have influenced the observed discrepancies. Another, possible conclusion could be due to the variability of thickness of the samples which can contribute to the high standard deviations. The results of this thesis indicate that with the proper materials and preparation, the application of nanocopper and direct current can potentially be applied towards the development of medical devices.

Scientific Background and Clinical Applications
Textiles for Advanced Applications
Occurrence and Evaluation of Antimicrobial Efficacy for Chemotherapy and Investigation of the Nature of Response to Treatment
Handbook of Antimicrobial Coatings

First Global Patient Safety Challenge : Clean Care is Safer Care
From Synthesis to Applications
Racing for the Surface
Pathogenesis of Implant Infection and Advanced Antimicrobial Strategies