

International Journal of Biomedical and Pharmaceutical Sciences

Abbreviation: Intl. J. Biomed. Pharma. Sci.

Print: ISSN 1752-3788

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Cover photo: A twig of *Clematis gouriana* Roxb. showing leaves with flowers. More details in Naika and Krishna, pp 69-72.

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Printed in Japan on acid-free paper.

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Martin P. Vazquez (Argentina) The Genetics and Genomics of *Trypanosoma cruzi* (pp 1-11)

ABSTRACT

Special Feature: *Trypanosoma cruzi* is a kinetoplastid parasite that causes Chagas disease. Trypanosomes are unusual organisms in many aspects of its genetics and molecular and cellular biology and considered a paradigm of the exception of the rule in the eukaryotic kingdom. The complete genome sequence of *T. cruzi* was published in 2005, thus, providing a major tool to the understanding of several of his unusual aspects. However, with so many different mechanisms between the parasite and its mammalian host there is still a lack of availability of effective antiparasitic drugs or disease treatments, specially in the chronic phase. This review highlights the fundamentals of the fascinating genetics and genomics of *T. cruzi* with emphasis in the differential mechanisms that could provide interesting therapeutic targets.

Ibrahim Hassan Garba (Nigeria), Donatien Gatsing (Cameroon) Malaria: Cause and Control (pp 12-19)

ABSTRACT

Invited Review: Malaria is an endemic tropical disease caused by the haemosporidian blood parasite of the genus *Plasmodium*. The human variant of this infection is caused by four members of this genus: *P. falciparum*, *P. vivax*, *P. ovale* and *P. malariae*, with *P. falciparum* malaria infection responsible for the most lethal form of the disease. The disease accounts for over 500 million acute clinical episodes annually and over 1 million deaths, particularly among children below the age of four years; with other debilitating effects in pregnant women. The economic impact of malaria infection has been put conservatively at over US\$1.8 billion annually and it is the eighth most important disease in terms of lost disability adjusted life years (DALYS). This review addresses the current state of knowledge on the epidemiology/epidemiological patterns, economic impacts of malaria on populations and communities, vector ecology and transmission dynamics, pathogenesis and pathogenic outcomes of this disease and global malaria eradication and control efforts. It also recommends the way forward in the unending battle between man, his environment and a determined parasite that has so far eluded the human quest to conquer and eradicate it.

Kevin C.J. Yuen (USA) Factors that Affect the Dosing Regimen of Growth Hormone Replacement Therapy in Adults with Growth Hormone Deficiency (pp 20-37)

ABSTRACT

Invited Review: Growth hormone (GH) deficiency in adulthood is now widely accepted as a distinct clinical syndrome with significant morbidities. These include abnormal body composition, reduced energy, affective disturbances, dyslipidaemia, and increased cardiovascular risk; all of which can either be improved or ameliorated with GH replacement. It is now over 10 years since recombinant GH has been approved by the United States Food and Drug Administration for use as replacement therapy in GH-deficient adults in the United States; whereas in Europe, it has been used for an even longer period of time. However, despite this widespread clinical experience, there is still a lack of consensus regarding the optimal approach to GH replacement in terms of dose initiation, titration and maintenance in GH-deficient adults. This is because the appropriate dose of GH replacement needs to be determined for each individual patient based on the patient's age, sex, concomitant medications, glucose tolerance, serum insulin-like growth factor I levels, and pregnancy to reduce the rates of adverse events. In this review, data of a retrospective analysis of the GH dosing practices within one institution over a 5-year period is presented to define GH dose requirements during the initiation, titration and maintenance phases of treatment, the frequency of dose adjustments, and the reasons necessitating dose adjustments in young and older GH-deficient adults. Based on these data, this review offers practical recommendations for practicing clinicians involved in managing GH-deficient adults on long-term GH replacement therapy.

Charalambos Antoniades (UK/Greece), Nikolaos Koumallos, Dimitris Tousoulis, Kyriakoula Marinou (Greece), Cheerag Shirodaria (UK), Christodoulos Stefanadis (Greece) Nitric Oxide-Releasing Aspirin in Atherothrombosis: A Remarkable Improvement of an Old Drug (pp 38-45)

ABSTRACT

Invited Review: Anti-platelet treatment is now a first line therapeutic strategy in coronary atherosclerosis, and it is prescribed in almost all the high-risk patients. However, despite the wide use of aspirin against atherothrombosis, its side effects and especially those from the gastrointestinal tract do not allow its use in patients at high risk for gastrointestinal bleeding. Therefore, a newly developed drug, the nitric oxide (NO)-releasing aspirin, provides new hope for eliminating the side effects of the classic aspirin. NO releasing aspirin is consisted of an aspirin moiety and an NO-donating complex, leading to the release of NO preventing the local gastrointestinal bleedings. Further to its effects in the gastrointestinal tract, NO-releasing aspirin seems to be superior to classic aspirin, by providing both the antithrombotic effect of aspirin and the beneficial anti-atherogenic, anti-apoptotic and anti-thrombotic effects of NO at a vascular level. NO-releasing aspirin releases NO in specific cellular compartments, mimicking the endogenous NO synthesis. Although this new promising type of aspirin provides the hope for a global anti-atherothrombotic effect in all the high-risk patients, its clinical usefulness is still under evaluation. Despite the existing encouraging reports from basic and the first clinical trials, the drug is still at phase II, and it is still premature to state with confidence that it may replace the classic and well studied aspirin, in the fight against atherothrombosis.

Fernando Granado-Lorencio, Begoña Olmedilla-Alonso, Carmen Herrero-Barbudo, Belén Pérez-Sacristán, Inmaculada Blanco-Navarro (Spain) *In Vitro* and *in Vivo* Bioavailability of Carotenoids and Tocopherols from Fruits and Vegetables: A Complementary Approach (pp 46-59)

ABSTRACT

Invited Review: Bioavailability is a critical feature in the assessment of the role of micronutrients in human health, and the approaches to this issue include *in vitro* and *in vivo* methods. Food- and host-related factors affect the bioavailability of carotenoids and tocopherols, and major challenges in the study of bioavailability include the release of these compounds from the food matrix, micellization, the measurement of the plasma response and the inter-individual variability. To evaluate bioaccessibility, *in vitro* gastrointestinal models have been used to assess stability, hydrolysis of carotenol esters and transfer efficiency of carotenoids (i.e. β -cryptoxanthin, lutein, β -carotene, lycopene) and tocopherols (i.e. α - and γ -tocopherol) from fruits and vegetables. *In vivo* (human) bioavailability has been studied mostly by assessing the responses in chylomicron fractions and serum produced by different dietary intervention protocols. Available *in vitro* data show that the stability of carotenoids and tocopherols is high, although micellization is a critical determinant of the bioaccessibility. In human studies, upon dietary intervention, changes in serum concentrations may be observed for some compounds (i.e. β -cryptoxanthin, lutein, γ -tocopherol), but not for others (α -tocopherol, β -carotene). Overall, the behaviour of these phytochemicals under *in vitro* gastrointestinal conditions does not fully explain the changes observed in *in vivo* studies. The results indicate that *in vitro* methods are useful for assessing food-related factors affecting bioavailability, although host-related factors, physiological processes and methodological constraints may limit the comparability and the "predictive value" of *in vitro* models. In this respect, the two approaches should be considered complementary, but not necessarily interchangeable.

Victor O. Oyetayo (Nigeria) Control of Gastroenteritis: The Probiotic Therapy Alternative in Nigeria (pp 60-64)

ABSTRACT

Invited Mini-Review: Microorganisms have been implicated as the major etiological agents of gastroenteritis. Some of these agents include *Shigella*, *Salmonella*, *C. difficile*, rotaviruses and enterotoxigenic *E. coli*. The prevention and treatment of gastroenteritis has been by the use of antibiotics. However, antibiotic therapy has been found to have some disadvantages, such as the development of resistant microbial strains after oral treatment, disruption of the gut microbial balance, and elimination of the beneficial microbial population in the gut and intestinal upset. Recently, probiotics have been found to be a suitable alternative to the use of antibiotics in the prevention and treatment of a diverse spectrum of gastrointestinal disorders such as infectious bacterial and viral diarrhoea, small bowel bacterial overgrowth, and inflammatory bowel disease. The use of probiotics in treating and preventing microbial gastroenteritis has the following advantages: a relatively low cost, unlikelihood to increase the incidence of antibiotic resistance strain that is common when antibiotics are applied, and multiple mechanisms of inhibiting intestinal pathogens. Application of probiotics will certainly be an effective means of controlling diarrhoea and fever associated with gastroenteritis that is common in Africa.

B. G. Harish, V. Krishna, R. Sharath, H. M. Kumara Swamy, H. Raja Naika, K. M. Mahadevan (India) Antibacterial Activity of Celapanin, a Sesquiterpene Isolated from the Leaves of *Celastrus paniculatus* Willd. (pp 65-68)

ABSTRACT

Original Research Paper: A sesquiterpene derivative celapanin was isolated from the acetone soluble fraction of an ethanol extract of *Celastrus paniculatus* leaves. The antibacterial activity of the crude ethanol extract and the isolated purified constituent celapanin was screened against 30 clinical strains isolated from different infectious sources which belonging to Gram-negative *Pseudomonas aeruginosa*, and *Klebsiella pneumonia*, and Gram-positive *Staphylococcus aureus*. The minimal inhibitory concentrations of the ethanol extract and the constituent celapanin were determined against AmericanTypeCellCulture and MicrobialTypeCellCulture strains. Concentrations higher than 100 µg/100 µL of the ethanol extract and 50 µg/100 µL of the constituent celapanin indicated that their effect was bacteriostatic. The agar wells loaded with celapanin and the ethanol extract exhibited a significant zone of inhibition against the clinical strains of *S. aureus* (22.18 ± 0.30 mm) isolated from the puss of old wound samples of infected patients. A moderate zone of inhibition was observed on the clinical strains of *K. pneumonia* (13.58 ± 0.22 mm) and *P. aeruginosa* (13.10 ± 0.29 mm). The antibacterial activity of celapanin was promising against Gram-positive *S. aureus*, comparative with the standard drug Ciprofloxacin (50 µg/100 µL).

H. Raja Naika, V. Krishna (India) Antimicrobial Activity of Extracts from the Leaves of *Clematis gouriana* Roxb. (pp 69-72)

ABSTRACT

Original Research Paper: *Clematis gouriana* (Ranunculaceae) is an endemic medicinal plant of Western Ghats, India used in the treatment of dermatopathy, blood diseases, leprosy, wound healing, viral fever, headache, and cardiac disorders. Powdered leaf material of *C. gouriana* was subjected to Soxhlet extraction using three solvents: petroleum ether, chloroform and methanol. The antimicrobial activity of extracts were screened against twenty-seven clinical isolates from different infectious sources belonging to Gram-negative *Pseudomonas aeruginosa*, and *Klebsiella pneumoniae*, and Gram-positive *Staphylococcus aureus* and five dermatitis fungi: *Trichophyton rubrum*, *T. tonsurans*, *Microsporum gypseum*, *M. audouini*, and *Candida albicans*. The minimal inhibitory concentrations (MIC) of the petroleum ether, chloroform and methanol extracts were determined as 525 µg/µl, 350 µg/µl and 100 µg/µl, respectively. The methanol extract showed a maximum inhibition zone on *S. aureus* (16.56 mm to 24.23 mm), *P. aeruginosa* (12.56 mm to 23.36 mm) and *K. pneumoniae* (14.30 mm to 22.40 mm), and their standard ATCC and MTCC strains by the agar well diffusion method. The antibacterial activity of the petroleum ether and chloroform extracts was not significant against the tested organisms. Among the five dermatitis fungi cultured the maximum zone of inhibition observed in the methanol extract was against the clinical strains of pathogenic fungi *T. rubrum* (13.36 mm) and *C. albicans* (9.96 mm). This study supports the traditional use of *Clematis gouriana* for the treatment of bacterial and fungal infections.

Jyothi M. Veigas, Mandayam S. Narayan, Kotamballi N. Chidambaramurthy, Bhagyalakshmi Neelwarne (India) Antioxidative Efficacies of Floral Petal Extracts of *Delonix Regia* Rafin. (pp 73-82)

ABSTRACT

Original Research Paper: The pigment extracts and the successive extracts prepared from dried flower petals of *Delonix regia* were evaluated for their ability to scavenge free radicals for the first time through *in vitro* chemical and biological models. Petals were found to contain 5.8 µg g⁻¹ of anthocyanin, 33.5 mg g⁻¹ of total phenolics and 694 µg g⁻¹ of total carotenoids of which 367 µg g⁻¹ was β-carotene. The different extracts were screened for DPPH[•] scavenging activity, total reduction capacity, OH[•] scavenging power, NO scavenging ability and anti-lipid peroxidation in brain cells, kidney cells and plasma *in vitro*. All the extracts, except for the hexane extract, showed over 90% quenching of DPPH[•] at 250 ppm. While hydroxyl radicals were effectively scavenged (>90%) at 25-100 ppm by all the extracts with the exception of crude pigment extract and the xanthophyll fraction, most of the extracts of *D. regia* were effective in countering the actions of free radicals and lipid peroxidation in the experimental models. The various antioxidant activities were compared with standard antioxidants such as BHA, BHT, gallic acid and ascorbic acid depending on the experimental model. The results of the present study have established that floral petals of *D. regia* are rich in pigments and potential anti-oxidants holding a great promise for food and pharmaceutical applications.