mLAC
ಶೀಲಂ ಪರಮ ಭೂಷಣಂ
Excellence in Education
Since 1972

Supported by
Star Scheme and CTEP

Department of Biotechnology
Ministry of Science & Technology
Government of India

Maharani Lakshmi Ammanni College For Women, Autonomous

IISc Post, Malleswaram, Bengaluru-12.

Lecture Series on

Mendeleev's Groups & Periods
Nature to Nurture

Organized by
Samagatha
Science Association, mLAC
Venue:
KNV Sastri Auditorium, mLAC

This publication contains the proceedings of the conference “Mendeleev's groups and periods- Nature to Nurture” conducted by Samagatha-Science Association, mLAC in commemoration of the 150th Year of the Periodic Table.

Editors:

Dr. S. Saraswati
Dept. of Biotechnology,mLAC

Dr. Sushil Kumar Middha
Dept. of Biotechnology,mLAC

Ms. Usha Talambedu
Dept. of Biochemistry,mLAC

Mr. Shravan Kumar
Dept. of Chemistry, mLAC

Maharani Lakshmi Ammanni College for Women Autonomous
18th Cross, Science Post, Bengaluru-560012.
Tel: 080-23349311
E-mail: mlacw@mlacw.org
Website: mlacw.edu.in

Supported by:
Star Scheme, Department of Biotechnology, GoI
CTEP, Department of Biotechnology, GoI

ISBN: 978-93-5391-423-3

P35Transition metal (Platinum) for the treatment of cancer

Chandana M S, Madhurima, Monisha T

Maharani Lakshmi Ammanni College for Women, Bangalore

Transition metals have an important place within medicinal biochemistry. Research has shown significant progress in utilization of transition metal complexes as drugs to treat several human diseases like lymphomas, infection control, anti-inflammatory, diabetes, and neurological disorders. Transition metals exhibit different oxidation states and can interact with a number of negatively charged molecules. Platinum compounds are a mainstay of cancer chemotherapy, with over 50% of patients receiving platinum. But there is a great need for improvement. Major features of the cisplatin mechanism of action involve cancer cell entry. The year 2018 marks 40 years since the U. S FDA approved the first platinum-based cancer drug. Cisplatin, here, we look at how these drugs work and version across the globe.

P36Transition metal complexes in cosmetics and drugs

Ramya A S, Gagana H, Kavitha S

Maharani Lakshmi Ammanni College for Women, Bangalore

Inorganic compounds partially transition metals have played on important role in the development of metals based drugs and in some cosmetics formulations.In this review cursory cook at the application of these metalcomplex in the areas of pharmacy,microbiology and cosmetology has been expanded to provide insight of the contribution of inorganic chemistry towards drugs and cosmetic delivery.

P34Therapeutic Application Of Transitional Metals

Aishwarya, Ghouthami, Sindhu and Jayashree N S*
Maharani Lakshmi Ammanni College for Women Autonomous, Bengaluru-560012, Karnataka, India.
*Corresponding author: biochemistry@mlacw.org

Transition metal complexes play an important role as therapeutic agents . There complexes display a wide range of physiological activities such as anti-inflammatory, anti-fungal, anti-bacterial, anti-viral, anti-cancer and antipyretic activities. They have opened a new arena a treatment with promising outcomes for various medical conditions .Transitional metal complexes are used in the treatment of Carcinoma , Diabetes, and several other Neurological disorders . Metal complexes are used as carbon monoxide releasing molecules (CORM'S). Platinum complexes are widely used as anti-cancer agent's .Nanoparticles containing silver are finding its uses in anti-microbial products such as gels, soaps etc. The transitional metal complexes are promising agents combating against various diseases which are a potential threat to the human community.

References

1. Abhay Nanda Srivasta , Netra Pal Singh ,Chandra Kiran Shriwastaw , "Antibacterial , Antifungal Activities", Arabian journal of Chemistry , 2016 , 48-61.
2. ShaziaRafique , Muhammad Idrees , Anwar Nasim , Haji Akbar and Amin Athar , "Transition Metal Complexes as potential therapeutic agents" ,Academic Journals ,Vol.5(2),2010 , 38-45.
3. ShobhaG ,Vinutha Moses and Ananda S ,'Biological Synthesis of Copper nanoparticles and its impact" , International Journal of Pharmaceutical Science Invention , Vol.3 ,2014,28-38.
4. Jon L ,Hobman and Lisa C .Crossman, "Bacterial antimicrobial metal complex resistance" , journal of medical microbiology, 2014 , 471-497.

Schedule for Thursday, 17.10.2019

Registration	**9.00 am – 10.30 am**
Inauguration	**10.30 am – 11.00 am**
Prof. Gopalpur Nagendrappa **Head of the PG Chemistry Dept, Jain University** **Title: Periodic Table of Chemical Elements**	**11.00 am – 11. 50 am**
Tea Break	**11.50 am – 12.10 pm**
Dr. Keshav Bulbule **Technical Consultant for Ministry of Electronics and IT** **Title: Smart Metals By Urban Mining and Environmental Protection**	**12.10 pm- 1.00 pm**
Lunch	**1.00 pm – 2.00 pm**
Quiz prelims	**2.00 pm- 2.30 pm**
poster presentation	**2.30 pm- 3.30 pm**
Quiz Final	**3.30 pm – 4.30 pm**
Valedictory	**4.30 pm onwards**

Schedule for Friday, 18.10.2019

Inauguration	**2.00-3.00pm**
Talk by Bharat Ratna Prof.C.N.R.Rao	**3.05-3.50pm**
Talk by Dr. Indumati Rao	**3.55-4.30pm**

List of Poster Presentations

Original

P01 Synthesis and Biological Applications of Pd, Pt, Zn and HgTransition Metal Complexes

P02Effect of Silver in inhibition of Biofilm formation by *P.aeruginosa*

P03Anti inhibitory property of copper complex of Salicycladimine against *Staphylococcus aureus*-An *In-Silico* study

P04Antibiofilm property of transition metal complexes on glucosyl transferases from *Streptococcus mutans* - An *In-Silico* study.

P05Investigating "Bright metals" as Anti-Cancerous agents – an *in-silico*mechanism based approach

P06 Synthesis of transition metal cadmium-cysteine complex using thermophilic bacteria

Reviews

P07Applications of Transition Metal Complexes

P08Potential antimicrobial properties offered by transition metal complexes

P09Studies on Preparation and Biocompatibility assay of Porous Titanium-Niobium Alloy and its use in orthopedic Implants

P10A Review on Transitional metal complexes as Therapeutic Drugs for Neurological Disorders.

P11Vanadium: its potential role in the fight against diabetes mellitus.

P12Metal Ion Complexes in Pregnancy, Boon or Bane?

P13 Aging ironically

found to be biologically active and function by interacting with some target proteins related with diabetes mellitus. Zinc complexes like ZnCl2 was found to exert in vivo anti diabetic effects with low bioavailability. There are several factors that improve bioavailability like low molecular weight, neutral charge, moderate stability and non-toxicity in the presence of many proteins and other bio molecules. Thereby highly potent Zinc (II) complexes with different coordination modes were used and experimentally proved in diabetic rats for a better in vivo anti diabetic activity(2). A wide variety of zinc (II) complexes are found to be effective with different coordination modes, for example Zn(O4), Zn(S2O2), Bis(picolinato) Zn(3). Peripheral neuropathy is a common complication of diabetes and may appear as the first manifestation of the disease. Zinc complexes also have a prominent role in treating diabetic neuropathy. The areas to be targeted in future studies should deal with the effect of zinc complexes on long term toxicity including side effects of target molecule, in vivo biological action with good pharmacokinetic property and coordination complex for peripheral neuropathy.

Keywords: Anti diabetic, transition metal, zinc complexes, coordination mode

References:

1. Sakurai, H.; Kojima, Y.; Yoshikawa, Y.; Kawabe, K.; Yasui, H. Antidiabetic vanadium(IV) and zinc(II) complexes. Coord. Chem. Rev., 2002, 226, 187-198.
2. Sakurai, H.; Yoshikawa, Y.; Yasui, H. Current state for the development of metallopharmaceutics and anti-diabetic metal complexes. *Chem. Soc. Rev.,* **2008**, *37*, 2383-2392.
3. Yoshikawa, Y.; Kawabe, K.; Tadokoro, M.; Suzuki, Y.; Yanagihara,N.; Nakayama, A.; Sakurai, H.; Kojima, Y. New zinc(II) complexes with tetradentate amino acid derivatives: Structure characterization, solution chemistry, and in vitro insulinomimetic activity. Bull. Chem. Soc. Jpn., 2002, 75, 2423-2432.

mortality rates are frequently reported. Curcumin, due to its poor absorption, rapid elimination and metabolism has to be complexed to increase its bioavailability. To improve its anti-cancer effects, Cu^{2+}–curcumin (CD) complexes are synthesized and investigated experimentally. Further, Curcumin- Copper Nanoparticles Complex was encapsulated into a polystyrene-co-maleic acid (SMA) micelle to enhance its stability. SMA–CD demonstrated dose-dependent cytotoxicity and abolished TNBC tumor growth in vivo. A single dose of SMA–CD at 10 mg/kg reduced the tumor growth by 2.1-fold while a dose of 20 mg/kg completely stopped the tumor growth for the duration of the study.

References:

1. Greish, Khaled &PittalÃ , Valeria &Taurin, Sebastien &Taha, Safa& Bahman, Fatemah&Mathur, Aanchal&Jasim, Anfal& Hassan, Fatima & El-Deeb, Ibrahim & Fredericks, Salim & Rashid-Doubell, Fiza. (2018).
2. Curcumin-Copper Complex Nanoparticles for the Management of Triple-Negative Breast Cancer. Nanomaterials. 8. 10.3390/nano8110884.
3. Kamble, Sonali&Utage, Bhimashankar&Mogle, Pratima&Kamble, Rahul &Hese, Shrikant&Dawane, Bhaskar&Gacche, Rajesh. (2015).
4. Evaluation of Curcumin Capped Copper Nanoparticles as Possible Inhibitors of Human Breast Cancer Cells and Angiogenesis: a Comparative Study with Native Curcumin. AAPS PharmSciTech. 17. 10.1208/s12249-015-0435-5.

P33Zinc complexes as a versatile metallopharmaceutical transitional metal for diabetes mellitus - A next generation therapy

Madhushree.R, Priyanka M, Dharini , Shashikala KB,Shashikala A*
Maharani Lakshmi Ammanni College for Women, Bangalore
*Corresponding author: shashi_4014@rediffmail.com

Diabetes is India's fastest growing disease with 72 million cases which is expected to nearly double by 2025. The increase in diabetes is due to lifestyle changes impacting all age groups. Drugs have limited effectiveness and are associated with serious side effects. Considerable attention is being paid to the metal-drug interactions. Metals and their organic based complexes are being used clinically for various ailments. Transition metal complexes are areas of interest in the research field for the treatment of diabetes mellitus (1). Zinc was

promising future outlook on advanced Ti and Ni complex production for biomedical and surgical implants .

Keywords: Titanium, cobalt, nickel, vanadium, biocompatibility, muscular skeletal implants,

References:

1. Orvig,C; Thompson , K.H;Battell,M;McNeill, J. H. Metal Ions in Biological Systems : Vanadium and its role in lifeline Metal ions in Biological systems,Sigel, H.; Sigel, A.;Eds.; Marcel Dekker: New York, 1995; Vol.31,p 575.
2. Doctrow, S.R.; Huffman, K.; Marcus, C. B.; Mulesh, W.; Bruce, A.; Baudry, M.; Malfroy, B. Adv. Pharmacol.1997, 38, 247-269.
3. https://www.intechopen.com/books/biomedical- engineering-from-theory- to-application/orthopedic-modular-implants-based-on-shape-memory-
4. Fabi DW, Levine BR. Porous Coatings on metallic implants materials. ASM Handbook,Volume23: Materails for medical devices. 2012:307-319.

P32Curcumin-copper nanoparticles complex for the treatment of breast cancer

Sanjana.S ,Yamini J, **,** Rthnamala B.S and Gowri Neelima*
Department of Biotechnology, Maharani Lakshmi Ammanni College for women
*Corresponding author: mgowrineelima@gmail.com

Copper being a transition metal with an exception in its electronic configuration, [Ar] 4s1 3d10 also exhibits complex compound formation with various ligands.Copper in its nano form is widely used due to its extremely small size and high surface area to volume ratio and can be synthesized using numerous methods. Curcumin, is a yellow phytocompound extracted from the root and rhizome of *Curcuma longa* (Turmeric). It is known for its antineoplastic movement against various tumors, including breast malignancies. Triple negative breast cancer (TNBC) is a subtype of breast cancer that lacks the expression of the estrogen receptor, progesterone receptor and epidermal growth factor receptor-2. While TNBC may initially be responsive to chemotherapy, recurrence and subsequent high

P31Transition complexes as promising and potential Biomedical and surgical implants – An overview

Sri LakshmiTR, Priyanka.S ,Ruqeeyabanu.M, Renuka Srihari*
Maharani Lakshmi Ammanni College for Women

*Corresponding author: rsh1_thesis@rediffmail.com

Applications of Titanium (Ti), Nickel, Cobalt and Vanadium complexes is receiving increased attention from various manufacturing sectors including the medical devices sector. It is possible that advanced synthesis techniques of these complexes could replace the conventional methods because of associated advantages that include optimal yield, flexibility, reduced processing costs, reduced waste, and the opportunity to more easily prepare complex or custom-shaped surgical implants. The emerging advanced approaches of automation are receiving particular attention from the implant fabrication industry as they could overcome some of the difficulties associated with traditional implant techniques such as metal casting. Using advanced protocols, it is also possible to produce more complex porous structures with improved mechanical performance, potentially matching the modulus of elasticity of local bone. The most common complex, titanium (II), titanium (III) and titanium (IV) is a popular photo catalyst and is used in the manufacture of white pigments. Other complexes like Vanadate (III) (IV) (V) ion is effective upon oral administration, and obvious strategy to enhance the pharmacokinetic characteristics and the efficacy of insulin-mimetic response is complexation of vandate with suitable biological compatible ligands. Ni (II) and Co (II) traces the pharmacological applications.

Titanium, cobalt and Nickel can be complexes with iron, aluminium, vanadium, and molybdenum, among other elements, to produce strong, lightweight alloys for aerospace (jet engines, missiles, and spacecraft), military, industrial processes (chemicals and petrochemicals, desalination plants, pulp, and paper), automotive, agriculture (farming), medical prostheses, orthopaedic implants, dental and endodontic instruments and files, dental implants, sporting goods, jewellery, mobile phones and other applications. The impact on the biocompatibility of Titanium, Vanadium to complex with Oxygen, Nickel and chromium increases the economic and engineering potential of Titanium for the manufacture of muscular-skeletal implants.

Given that biocompatibility and host bone response are critical determinants of clinical performance of Titanium and nickel complexes, there *in vitro* and *in vivo***studies records a**

mLAC
Excellence in Education
Since 1972

MESSAGE FROM CHAIRMAN

I am very happy to see that SAMAGATHA 2019 is organizing two events at mLAC, to celebrate the 150th Anniversary of the pioneering effort of the Russian scientist Dmitri Mendeleev in constructing the Periodic Table of the elements of matter. Since then many of the early blanks in the Table have been filled, and other new elements found, often resulting in Nobel Awards. I wish these events – supported by the DBT-STAR College Programme – all success, and hope they will be memorable, both the tutorial lectures on the 17th and the two stellar lectures by Prof. CNR Rao and Dr. Indumati Rao on the 18th. And I wish all the young students who will gather at mLAC for these events an exciting and fulfilling future in coming years!

16 October 2019

Roddam Narasimha
Chairman, Board of Trustees
mLAC, Bangalore

MESSAGE FROM MANAGING TRUSTEE

It is a moment of pride and achievement that Science Association-"Samagatha", mLAC under the banner of Star College, DBT, Government of India has organized this event to commemorate 150th year of Periodic Table.

This event is a true representation of dedication and commitment of our organizers and students towards achieving great laurels in the field of science and technology.

It's a privilege to have Bharat Ratna Prof. CNR Rao sharing his knowledge and experiences along with other eminent scientists igniting the young minds to achieve the impossible. Wishing you all good luck happy learning.

Mr. K.Jairaj

Managing Trustee

mLAC, Bangalore.

in most pharmacopoeias, while new chelating agents continue to be sought. Mainly, the drugs used as the chemotherapeutic agents whose functions to kill cells, and drugs acting by a pharmacodynamics mechanism whose action must be essentially reversible or short lived.

Cisplatin [$PtCl_2$ $(NH_3)_2$]is cited for treatment of germ-cell cancers, gestational trophoblastic tomors, and epithelial ovarian cancer and small cell lung cancer as well as palliation of bladder, cervical, nasopharyngeal, oesophageal, head and neck cancers. Typical doses range from 20 mg/m^2 to 100 mg/m^2

The insulin-like properties of vanadium, vanadate ions spurred research into the clinical use of vanadium compounds as insulin mimics. A mechanism for vanadium is substitution of vanadate for phosphate in the transition state structure of protein tyrosine phosphatases (PTP). Relevant species in solution are vanadate, and vanadyl (VO^{2+}). Clinical trials have focussed to date on sodium orthovanadate and bioxovandium complexes.

Gold salts have a long history of use in rheumatoid arthritis. The nonsteroidal anti-inflammatory drugs (NSAIDS) such as indomethacin. The mechanism of action is postulate occur through thiolate exchange reaction. An interesting feature of gold metabolism is the production of [Au $(CN)_2$] as a metabolite of the gold-thiol compounds.

Rhodium metal complex being an anticancer agent is also used as radiosenstisers and dental alloys. Parasitic diseases represent a major world health problem with very limited therapeutic options. The use of metal complexes as chemotherapeutic agents against these ailments appears a very attractive alternative.

References:

1. Farrell, N.P. Transition metal complex as drugs and chemotherapeutic agents; james, B. R; Ugo, R., Ed.; Reidelklumer academic press Dordrecht, 1989; vol. 11.
2. Farrell, N. P. The uses of inorganic chemistry in medicine; The royal society of chemistry; Cambridge, 1999
3. Orvig, C;Abrams, M,J. Chem. Rev. 1999, 99, 2201-2204

of highly active drugs with minimized side effects which could add significantly to the current clinical research and practice .

Keywords : metal complexes -Lead , Cadmium , Copper , cosmetics , therapeutic agents , metal coordination , toxological effect , hazard , bio active compounds.

P29Spectrum of colours by transition metal complexes and their electronic configuration-an introduction

Supriya.K.L, Niveditha.B.K and Megha G.D,Anupama,
Maharani Lakshmi Ammanni College for Women(Autonomous), Bangalore-560012
*Corresponding author:mathematics@mlacw.org

The transition metals are d-block elements. These metals have unique property of having more than one oxidation states because of their partially filled d-orbitals. When such metals bond to neutral or charged non metals species called ligands, they form transition metal complexes.

The d-orbitals of free transition metals and their ions are degenerate. But when they form co-ordination complexes, the d-orbitals of these metals interact with electron clouds of ligands such that the energy levels become non-degenerate. The way energy levels split and their spacing depend on geometry of complexes, nature of ligands, number of ligand groups attached- ligand octahedral form or 4-ligand tetrahedral form, and oxidation state of central metal atom.

The emission of spectrum of colours by transition metals Chromium, Iron, Cobalt, Nickel and Copper and their complexes with different ligand groups are studied. Number of ligand groups attached- like 6- ligand octahedral form or 4-ligand tetrahedral form

P30Application of transition metal complexes as drugs and chemotherapeutic agents

Sreelakshmi.B, Priyanka. S, Sowmya.a, Vani K.M*.
Department of Biochemistry, Maharani Lakshmi Ammanni College for women
*Corresponding author:biochemistry@mlacw.org

The medical uses and application of transition metals and their complexes are increasing clinical and commercial importance. A list of clinically used chelating agents may be found

MESSAGE FROM THE PRINCIPAL

The elements of the periodic table are the building blocks of life .The Russian chemist Dmitri Mendeleev organized them according to the 'periodicities' of their behaviour, resulting in an important breakthrough in chemistry, the Periodic Table. This year is the 150th anniversary of this landmark event and has been declared the "International Year of the Periodic Table of Chemical Elements (IYPT2019)" by the United Nations General Assembly and UNESCO.

I am extremely happy that "Samagatha" the Science Association of our college is conducting a lecture series to commemorate this momentous event by organizing a lecture series on "Mendeleev's Groups and Periods- Nature to Nurture". I am sure students will benefit immensely from the knowledge and expertise of the distinguished speakers led by Bharat Ratna Prof. C.N.R. Rao. My best wishes for this event and hope it stimulates and ignites the young minds

Prof. Sushama Bavle

Principal and Acting Director

mLAC

MESSAGE FROM DBT

Department of BioTechnology, Government of India

सत्यमेव जयते

I on behalf of Department of Biotechnology, Government of India and STAR College Scheme, congratulate Departments of Life science and Physical sciences of mLAC, Bangalore for organising the National Symposium "Medeleev's Groups and periods-Nature and Nurture". I am pleased to inform that Secretary DBT has nominated mLAC, one of the **Star Status College** under the south zone to advance the popularization activities under the aegis of CTEP programme. The purpose of the popularization series is to create awareness among the masses and popularise biotechnology and allied areas among the students. The main mission of this event is to celebrate the 150th anniversary of the periodic table of chemical elements and to recognize the importance of basics of chemistry and new advances on the periodic table of chemicals in every walk of life for the development of human mankind.

The Department since 1986 has been facilitating biotechnology research and capacity building, creation of scientific infrastructure across the country and networking across the country and world. The department lays emphasis on biotech products and technologies in agriculture, food and nutrition, health and environment sectors. The department has also made exceptional efforts to contribute to Swasth Bharath, Swatch Bharath, Startup India, Make in India and Digital India launched by Hon'ble Prime minister through various programmes of the department.

Dr. Garima Gupta
Scientist 'E'
DBT, Govt. of India

In the present study, we give a comprehensive review on the recent developments in the use of transition metal organic frameworks as sensors for detection and degradation of pollutants, particularly contaminants in water using LTMOF-based photocatalysis under light irradiation.

Keywords: transition metal organic frameworks, environmental toxic agents, photocatalysis, purification of water

P28Application of transition metal complexes in drugs and cosmetics

Preethu.M , Mandara.D , Lakshmi.K , Kamala.A
B.Voc, Maharani Lakshmi Ammanni College for Women, Bangalore-12
*Corresponding author:kamalabc14@gmail.com

Inorganic compounds particularly transition metals have played an important role in the development of new metal based drugs and in some cosmetics formulation. The application of metal complexes in the areas of pharmacy, microbiology , and cosmetology has been expatiated to provide an insight of the contribution of inorganic chemistry towards drugs and cosmetic delivery. The transition metals commonly found in cosmetics are lead and cadmium. The most widely used cosmetics among Indian women is lipstick .The lipstick analysed using atomic absorption spectroscopy found to contain lead (Pb) and cadmium (Cd). The Cd concentration in most of the lipsticks was above the threshold for impurities , indicating a potential toxicological effect for lipstick users . The hazard quotient for Cd in almost all the lipstick samples are above one , indicating adverse non carcinogenic health risk exposure to Cd via , the lipstick s ingestion. Thus , the continuous usage of these brands of lipsticks can pose a high risk of Cd on human health .Therefore , quality control is recommended to check lipstick products into the country .

The most commonly used metal in drugs or medicines – Copper.The fundamental role of copper and the recognition of its complexes as important bioactive compounds in vitro and in vivo aroused an ever increasing interest in these agents as potential drugs for therapeutic intervention in various diseases .The large amount of information available for their bioinorganic properties and mode of action in several biological systems, combined with the new opportunities offered by the techniques of medicinal chemistry, is creating an exciting scenario for the development of a novel generation

References:

1. Tang J, Zhang M, Yin HY, Jing J, Xie D, Xu P, Zhang JL. A photoactivatable Znsalen complex for super-resolution imaging of mitochondria in living cells.ChemCommun(Camb). 2016 Oct 4;52(77):11583-6. doi: 10.1039/c6cc06531g. Epub 2016 Sep 7. PubMed PMID: 27605151.
2. Dickinson BC, Chang CJ. A targetable fluorescent probe for imaging hydrogen peroxide in the mitochondria of living cells. J Am Chem Soc. 2008 Jul 30;130(30):9638-9. doi: 10.1021/ja802355u. Epub 2008 Jul 8. Erratum in: J Am ChemSoc. 2008 Aug 27;130(34):11561. PubMed PMID: 18605728; PubMed Central PMCID: PMC2810491
3. Zhao W. Lighting up H2O2: the molecule that is a "necessary evil" in the cell. AngewChemInt Ed Engl. 2009;48(17):3022-4. doi: 10.1002/anie.200805651. PubMed PMID: 19165849.

P27Transition metal organic frameworks- An emerging trend in detection and degradation of environmental pollutants

Likitha A, Bavitha N, Shwetha G, AfshanIzzath Mab*

Department of Chemistry, Maharani Lakshmi Ammanni college for women
*Corresponding author: afshanizzath@gmail.com

Hazardous chemical and bacterial species are omnipresent in the environment in the present day and pose a serious threat to health and environment. Hence, the detection and degradation of these is of ultimate importance. As of late, luminescent transition metal organic frameworks (or LTMOFs) have generated considerable interest as an excellent candidate for sensor-based applications. Their properties such as low framework density, high functional groups, open metal sites for interaction, tailorable pore size, high sensitivity and selectivity as well as real-time monitoring along with their inherent or triggered luminescent properties make them a versatile competitor to traditional methods of detection and degradation of environmental toxic agents. The bio-degradability, non-toxicity and affordable diverse functionality of luminescent transition metal organic frameworks is an added advantage.

MESSAGE FROM THE CONVENOR

The organization of the elements into the Periodic Table by the Russian chemist Dmitri Mendeleev in 1869 was a significant landmark in chemistry. This year marks the 150th anniversary of the Periodic Table and has been designated as the International Year of the Periodic Table (IYPT) by UNESCO. This occasion is being commemorated by the Science departments of mLAC through a lecture series on “Mendeleev’s Groups and Periods- Nature to Nurture” organized by Samagatha-Science Association, mLAC.

The organizers hope that the lectures would give a fresh perspective to a familiar topic and stimulate young minds to pursue newer vistas in science. The poster presentation will provide a platform for budding scientists to interact with peers and gain experience. I hope the participants will find the event a fruitful and enjoyable experience.

Dr. Nagalaxmi B.N.
Head, Dept. of Chemistry
mLAC
Convenor

VISUALIZING THE DREAM

Samagatha-2019 visualized Dmitri Mendeleev's vision of the extended applicability of Periodic Table. Our theme, "Mendeleev's Groups and Periods-Nature to Nurture" for the Lecture Series will indeed update the participants about the nurturing potential of the Periodic Table to nature. This programme will exhibit the hidden aspects of the Periodic Table and its extrapolation to Biologic table.

Dr.Jolitha A.B.
Coordinator, PG Biotechnology
mLAC
Organizing Secretary

2. Abirami N, Arulmozhi R, Sivakami M. 2015.Role of metal complexes in the treatment of diabetes mellitus.India. Recent Advances in Diabetes Treatment.www.avidscience.com

P26ZnSalen: lysosomal hydrogen peroxide sensors

Nikitha Bajare[1]., DeepikaBasawapura Umesh[1], Meghana Mandgadee[1].Vadiraju[1] and TalambeduUsha*
Department of Biochemistry, Maharani Lakshmi Ammanni college for women
*Corresponding author: ushatalambedu@gmail.com

Luminiscent metal complex are used as bioprobes for imaging molecular events. The advent of rapid developments in fluorescence microscopy techniques, luminescent transition metal complexes became an emerging class of fluorescent tags in molecular imaging. The chemical properties of metals like tunable charge, versatile coordination sphere, geometry, potential Lewis acids and redox centers, photophysical properties makes the transition metal complexes as versatile and reliable tools for biological imaging. First row transition elements can be used to produce fluorescent probes with low cytotoxicity, however they exhibit smaller stokes shifts and lifetime. Transition metal complexes can exist in coordination with various metalloenzymes in the body because of their completely filled electronic configuration they can exihibit characteristic fluroscence. The second and third row transition metals such as Ir(III), Ru(II), Os(II), Re(I), Pt(II), Pd(II), Ag(I), Au(I) and lanthanide-based complexes, are well characterized as sensors for bioimaging applications. There has been considerably very less studies on first row transition elements and amongst them zinc complexes, that emerged as promising fluorescent probes, became powerful tools to detect cellular and molecular events or bioanalytes in biological processes, Hydrogen peroxide is a major reactive oxygen species and produces oxidative stress. Imaging of this hydrogen peroxide in lysozyme acts as powerful tool to probe various cellular events. Zn complexes fluroscent probes both one or two photon imaging in life cells. The probing is very efficient due to its good chemo and photo stability, low cytotoxicity, high cellular selectivity and its ability to bind to cyano groups.

Keywords: ZnSalen, Luminescent,fluorescent probes, cell imaging, Lysosomes, Hydrogen peroxide

P25Transition metal complexes: a way forward in biological applications

Maina, Narmadha C.K, Sujee.S and Vijayadeep.C*
Department of Microbiology, Maharani Lakshmi Ammanni College For Women, Bangaluru-560012, Karnataka, India
*Corresponding author:microbiology@mlacw.org

Transition metals occupy the major portion of the periodic table located in the middle part and comprising of d and f block elements. Many of these metals are arranged as co-ordination complexes possessing the main metal in the core surrounded by ligand molecules. These complexes have an exceptional tendency to assemble and dissemble into new molecules which makes them widely used in several biological applications. They display quick and good levels of toxicity even at reduced concentrations in prokaryotic cells.

The present review study focuses on the significant applications of a few transition metal complexes, aiming at modifiable target site in case of microbes that have attained multi drug resistance.

Several drug components include metals like Zn, Cd, Cuetc which have been used as drug targeting molecules in eukaryotic systems. But they pose a disadvantage of non-target toxicity. In this context, silver (Ag: 47) being a transition metal from the d block group can form a complex with Zn, Cd, Cu etc thus reducing toxicity against eukaryotic cell , in the process also favouring the prokaryotic target cell permeability. Similarly Vanadium facilitates support towards anti-diabetic mechanisms since it prevents β cell destruction thereby allowing the production of insulin. It also increases the direct conversion of glucose into glycogen.

Key words: Transition metal complex, Silver activity, Vanadium, Antidiabetic, drug targeting.

References:

1. Cervantes J, Reyes A, Castillo E, Rivas G, Rivera O, Salinas E, Martinez M, Flores S, Martinez J, Molina A, Gonzalez M, Zarate X, Cárdenas M, Gonzalez C, Ramirez J. 2017.Synergistic Antimicrobial Effects of Silver/Transition-metal Combinatorial Treatments.

INVITED TALKS

Celebrating International Year of Periodic Table

International Year of the Periodic Table of Elements

Prof. Gopalpur Nagendrappa

Head of the PG Chemistry Dept, Jain University

Ever since the study of modern chemistry began in the eighteenth century, attempts have been made by scientists from time to time to classify the elements known to them to understand their interrelationships and to make learning chemistry easier. However, a table of elements published by Dmitri Mendeleev in 1869 was accepted, because it embodied several rigorous scientific characteristics. It was based on listing the elements (about 63 then) in increasing order of their atomic weights in such a way that elements with similar physical and chemical properties occurred in the same column at regular intervals. A remarkable feature of this table was that Mendeleev left a number of gaps that would be filled by elements discovered subsequently. He was also able to predict the physical and chemical properties of these yet to be discovered elements and their compounds. This caught the attention of the scientific community and was accepted as an idea of great significance in studying and understanding chemistry as well as its advancement. There have been continuous modifications made to this table, but its basic structure remains the same. We are celebrating the 150^{th} anniversary of the publication of its first version in 1869. Some aspects of the discovery and development of the Periodic Table and its author's life are part of this presentation.

P24Trendmark Applications Of Iridium And Titanium Complexes In Present Era

Smrithi Suresh, VishwaPriya C, Neha C S, Vijayadeep C*

Department of Microbiology, Maharani Lakshmi Ammanni College For Women, Bangaluru-560012, Karnataka, India
*Corresponding author:microbiology@mlacw.org

The Transition metals are unique, that they can have an incomplete inner subshell allowing valence electrons in a shell other than the outer shell (1). They can form many compounds with different oxidation states. They are paramagnetic in nature. They exhibit a unique property to form coloured compounds, due to d-d electronic transitions. Transition metal complexes are composed of a central transition metal atom linked to one or more ligand molecules. Iridium (Ir: 77) and Titanium (Ti: 22) are among the d block elements of transition metals. These metals form complexes in a manner suitable to hold several applications (2). The present review signifies the role of Iridium and Titanium complexes. For example, Iridium is commonly used as an isotope in high dosage brachytherapy that is treatment of cancer, particularly prostate cancer. It also finds its role in photodynamic therapy, to destroy cancer cells by using Iridium in association with albumin. Similarly Titanium is used in development of an ultrathin artificial muscle for soft robotics. It is also used as a photocatalyst to prepare antibacterial surface for water treatment.

Keywords: Transition metal complex, Iridium, Titanium, brachytherapy, Photodynamic therapy, artificial muscle, Photocatalyst.

References:

1. Han.C.,Lalley. J.,Namboodiri. D., Croomer. K., and Nadagouda M.N.2016. Titanium dioxide-based antibacterial surfaces for water treatment. Current Opinion in Chemical Engineering.11:46-51
2. "Artificial muscles bloom, dance, and wave." 22 August 2019.The Korea Advanced Institute of Science and Technology (KAIST). ScienceDaily.

P23The Transition Metal Complexes: The Potential Therapeutic "Bramhasthra" Of 21st Century

Madhushree.D, Madhushree.N,Meghana K.L, Suja K.S,Aruna H.K*

Department of Zoology, Maharani Lakshmi AmmanniCollege ForWomen, Bangaluru-560012, Karnataka, India
*Corresponding author:arunahk67@gmail.com

Transition metals occupy an important place in medicinal biochemistry. In recent times, there has been a lot of progress in their use as drugs to treat diseases like cancer, infections, diabetes etc. Transition metals can interact with a number of negatively charged molecules as they exhibit different oxidation states. Metal based drugs using transition metals like Pt, Au, Cu and Ru complexes can be used in the treatment of cancer (2,3). Ag and Mn complexes can be used as an anti infective agents while V, Zn, Cr complexes can be used in the treatment of diabetes (4). There is a vast difference in mode of action of metal complexes when compared to non metals. Metal complexes have properties which are employed in designing new drugs in spite of their limitations and side effects as they have potential to be used as chemotherapeutic agents

Key words: Transition metals complexes, anti-cancer, anti-inflammatoryanti-diabetic, therapeutic agents.

References

1. Fighting Cancer with Transition Metal Complexes: From Naked DNA to Protein and Chromatin Targeting Strategies. Palermo, G.; Magistrato, A.; Riedel, T.; von Erlach, T.; Davey, C.A.; Dyson, P.J.; Rothlisberger, U. Chem. Med. Chem. 2016, 11, 1199–1210.
2. Cisplatin in cancer therapy: Molecular mechanisms of action Dasari, S.; Tchounwou, P.B.. Eur. J. Pharmacol.2014, 740, 364–378
3. Thioredoxin reductase: A target for gold compounds acting as potential anticancer drugs Bindoli, A.; Rigobello, M.P.; Scutari, G.; Gabbiani, C.; Casini, A.; Messori, L.. Coord. Chem. Rev. 2009, 253, 1692–1707.
4. Global prevalence of diabetes: estimates for the year 2000 an projections for 2003 Wild S, Roglic G, Green A, Sicree R, King H. Diabetes Care. 2004; 27(5): 1047-1053

Celebrating International Year of Periodic Table

'Smart Metals by Urban Mining and Environmental Protection'

Dr. Keshav A. Bulbule
Technical Consultant
Centre for Materials for Electronics Technology (C-MET) Hyderabad
and
E-Parisaraa, India's first approved E-waste Recycler, Bangalore

Electronic Waste popularly known as E-waste contains valuable metals together with hazardous materials which are considered both as an attractive secondary source and an environmental contaminant respectively. E-waste represents rapidly growing disposal problem worldwide. Global survey done revealed that India's ranks 4th in generating E-waste.

For the last few decades, E-waste generated in India and other developing countries has been managed by informal recyclers who try to recover mainly copper, silver and gold by practicing unscientific primitive methods.These informal recyclers burn Printed Circuit Boards (PCBs) in open areas leading to the release of toxic, carcinogenic substances like Dioxins and Furans besides many other hazardous gases. They handle highly corrosive acids to recover precious metals without taking any safety measures. The remnants disposed carelessly have polluted soil, water and air irreversibly.

Though in India, E-waste Rules are in place since Oct.2016, even today, 95% of E-waste is reaching informal recyclers. To address the issue of environmental degradationand to recover valuable metals or 'smart metals' present E-waste to put them back in to cycle a collaborative research project was initiated.

Ministry of Electronics and Information Technology (MeitY) Govt. of India, New Delhi, under the banner *'Swachh Digital'* initiated a mission mode project of national importance in 2014. The project is also supported by KITBT, Govt. of Karnataka. This prestigious project has been jointly carried out by C-MET Hyderabad and E-Parisaraa, Bangalore-India's first approved E-waste Recycler. The technology now almost ready helps in recovering metals like Cu, Ag,Au, Nd, Pm, Pr,Pt, Pd, Ta, from PCBs. Perhaps first time in India, by recycling of spent Lithium Ion Batteries, recovery of metals like Li, Al, Cu, Ni, Mn, has been successfully carried out. This type of recovering metals from End-of Life (EOL) variety of electronic gadgets and from Lithium Ion Batteries available right on the surface and more in urban areas is now popularly known as Urban Mining/Surfacemining/ Surface mining. Scientific Urban Mining besides converting E- waste in to wealth,ensures, total environmental protection helps conserve natural primary resources also generates employment.

POSTER PRESENTATIONS

tolerance to biotic and abiotic stresses. It also forms the source of nutrients for mankind. These transition metals are available to plants through soil and in order to accumulate in plant cells, metals must be mobilized and absorbed from the soil, sequestered in the root and then loaded into the xylem and transported to the aerial parts of the plant, and finally must be distributed among the leaf cells. Plants have developed various means to induct these metals from soil.

In order to meet the requirement of human considerable efforts has been made to increase the uptake of transition metal like zinc, copper, iron and molybdenum by the supply of fertilizers, developing crop varieties. In the current scenario it is essential to contemplate plant microbiome or plant associated microbes as the bioavailability of metals in the soil is highly dynamic, reflecting a variety of physical, chemical and biological factors.

Keywords: Biological processes, microbiome, sequester, transition metal.

References:

1. Elisa Andresen, Edgar Peiter& Hendrik Küpper. 2018. Trace metal metabolism in plants. *Journal of Experimental Botany.* 69(5): 909–954.
2. Giovanni DalCorsa, Anna Manara, SilviaPiasentin&AntollenaFurini. 2014. Nutrient metal elements in plants. *Metllomics:Integrated Biometal Science.* 6. 10.1039/c4mt00173g.
3. Manuel González-Guerrero, Viviana Escudero, ÁngelaSaéz, &Manuel Tejada-Jiménez. 2016. Transition Metal Transport in Plants and Associated Endosymbionts: Arbuscular Mycorrhizal Fungi and Rhizobia. Frontiers in Plant Science. 7: 1088.
4. Schneider M, Keiblinger KM, Paumann M, Soja G, Mentler A, Golestani-Fard A, Retzmann A, Prohaska T, Zechmeister-Boltenstern S, Wenzel W, et al.2019. Fungicide application increased copper-bioavailability and impaired nitrogen fixation through reduced root nodule formation on alfalfa. *Ecotoxicology*. 28(6):599-611.

dihydroplastoquinone to high-potential ETC, consisting of Rieske [2Fe–2S] protein and Cytf. Each PSI monomer encompasses three [4Fe–4S] clusters which progress the electrons from the P680 reaction centre to [2Fe–2S] ferredoxin (Fd). Fd mediate photoreduction of NADP+ to NADPH via Fd:NADP(H) reductase. Beside photosynthesis, [2Fe–2S] Fd functions in nitrogen and sulphur assimilation and carbon assimilation regulation. In PSII, Manganese cluster catalyses water oxidation in Oxygen Evolving Complex. The catalytic conversion of CO2 and H2O into HCO3 ions by carbonic anhydrase is significantly dependent on Zinc.

Furthermore; Zinc-finger proteins regulating transcription through site-specific interactions play vital role in photosynthesis. Nevertheless, availability of transition metals determines utility of specific metalloproteins.

Keywords: Chloroplasts, Copper, Iron, Manganese, Metalloproteins, Photosynthesis, Zinc.

References:

1. Solomon, E.I. and Hadt, R.G. (2011) Recent advances in understanding blue copper proteins. *Coord. Chem. Rev.***255:** 774–789.
2. Balk, J. and Pilon, M. (2011) Ancient and essential: the assembly of iron–sulfur clusters in plants. *Trends Plant Sci.***16:** 218–226.
3. Yruela, I. (2013) Transition metals in plant photosynthesis. *Metallomics***DOI: 10.1039/c3mt00086a.**
4. Nouet, C., Motte, P. and Hanikenne, M. (2011) Chloroplastic and mitochondrial metal homeostasis. *Trends in Plant Sci*. **16(7):** 395-405.

P22Induction Of Transition Metals In Plants For Its Biological Processes

MadhuShalini, Chaitra M., Jayalakshmi G. & M. ReemaKumari*
Department of Botany, Maharani Lakshmi AmmanniCollege ForWomen, Bangaluru-560012, Karnataka, India
*Corrosponding author:botany@mlacw.org

A number of transition metals are essential for the plants for their growth, development and reproduction. These are involved in the biological processes like photosynthesis, respiration,

P01Synthesis and Biological Applications of Pd, Pt, Zn and Hg Transition Metal Complexes

Nagesh Khadri M J*,Mahima Joythi, Zabiulla and Shaukath Ara Khanum
Department of Chemistry, Yuvaraja's University of Mysore, Mysore, Karnataka.
*Corresponding author:nageshkhadri.1995@gmail.com

The medicinal uses and applications of metals and metal complexes are of increasing clinical and commercial importance. In particularly, Schiff bases derived from an amino and carbonyl compound are an important class of ligands that coordinate to metal ions via azomethine nitrogen and have been studied extensively. The development in the field of bio-inorganic chemistry has increased the interest in Schiff base complexes, since it has been recognized that many of these complexes may serve as models for biologically important species. The interaction of transition metal ions with biological molecules provides one of the most fascinating areas of coordination chemistry. On the basis of the literature survey, it was known that Pd, Pt, Zn, Hg transition metal complexes show a diverse biological activity. Thus the complexes of this metal along with the Schiff base derived ligand were decided for the synthesis and were tested for antimicrobial activity. The synthesized complexes were primarily evaluated for antimicrobial activity against gram-positive and gram-negative bacteria. Remarkably, all the title complexes with platinum and palladium metal were found to be active, while complexes with zinc metal ion exhibited least activity against almost all the strains.

Keywords: Schiff bases complexes, azomethine, antimicrobial activity and Pd, Pt, Zn, Hg transition metal complexes

References

1. Sharma, V. Kumar, R. Kharb, S. Kumar, P. Chander Sharma, D. Pal Pathak, Imidazole derivatives as potential therapeutic agents, Curr. Pharm. Des. 22 (2016) 3265–3301.

2. K. Konaté, J.F. Mavoungou, A.N. Lepengué, R.R.R. Aworet-Samseny, A. Hilou, A. Souza, M.H. Dicko, B. M'Batchi, Antibacterial activity against β- lactamase producing Methicillin and Ampicillin-resistants Staphylococcus aureus: fractional Inhibitory Concentration Index (FICI) determination, Ann. Clin. Microbiol. Antimicrob. 11 (2012) 1–12.
3. Lazarević, T., Rilak, A., & Bugarčić, Ž. D. (2017). *Platinum, palladium, gold and ruthenium complexes as anticancer agents: Current clinical uses, cytotoxicity studies and future perspectives. European Journal of Medicinal Chemistry, 142, 8–31.* doi:10.1016/j.ejmech.2017.04.007
4. G. Ayyannan, M. Mohanraj, G. Raja, N. Bhuvanesh, R. Nandhakumar, C. Jayabalakrishnan, Design, synthesis, structure and biological evaluation of new palladium(II) hydrazone complexes, Inorg. Chim. Acta 453 (2016) 562e573.

P02Effect of Silver in inhibition of Biofilm formation by *P.aeruginosa*

Bindu Madhava.S[1], Bhargavi.G*
East west First Grade College,Vishwaneedam post, Magadi Road, Bengaluru-560091.
*Corresponding author: bindumadhava.bm@gmail.com

Insoluble Silver is non toxic and has no harmful effect in Humans but known to have antibacterial effects. *P.aeruginosa*is a potential respiratory tarct pathogen and has known to produce Biofilm that enables it to become multi drug resistant. Present investigation involved agar well diffusion assay and crystal violet Biofilm inhibition assay of different concentrations(5ug, 10ug, 15ug, 20ug, 25ug and 30ug) of silver powder added with saline against *P.aeruginosa*. Results of agar well diffusion showed mild cytotoxicity against *P.aeruginosa*with a maximum Zone of Inhibition of 10 mm at a concentration of 30ug and a concentration of all ranges have showed efficient Biofilm inhibition of about 40% with the highest concentration when compared to silver untreated control which was further analyzed using Phase contrast imaging. Hence, Insoluble silver ions can be a potential antibacterial agents and their effect in Biofilm inhibition also help in development of eminent anti-virulence therapies in low concentrations.

arrangement and it exhibit various oxidation states and can interact with a number of negatively charged molecules. This action of transition metals has in progress the development of metal base drugs with hopeful pharmacological uses and may proffer unique beneficial opportunity and show notable beneficial success of anticancer drugs such as oxaliplatin, carboplatin, cisplatin and metallodrugs have also shown hopeful results in the treatment of diseases other than cancer also. They have been developed to treat/cure a variety of diabetes such as ailments, ulcer, rheumatoid arthritis, cardiovascular and inflammatory diseases etc.

Keywords: Anticancer effect, Transition metal, Biological Activity, Pharmacology, Electronic Structure.

P21Insights Into Imperative Roles Of Transition Metals In Photosynthesis By Primary Producers

Hemashree K.and Priyanka Singla*
Department of Botany, Maharani Lakshmi AmmanniCollege ForWomen, Bangaluru-560012, Karnataka, India
*Corresponding author:priyankabot@gmail.com

Transition metals, corresponding to d-block of the modern periodic table, are the elements having ability to form stable cations with partially filled d subshells (IUPAC). Transition metal comprising metalloproteins constitute essential cofactors in photosynthesis and respiration electron transport chains (ETCs) where their redox potentials are crucial for key cellular functions. Thus we aim to review the functionality of four transition metals: copper (Cu), iron (Fe), manganese (Mn), zinc (Zn) in plant photosynthesis. Cu2+ is a constituent of plastocyanin (Pc) - an electron carrier in thylakoid lumen of chloroplasts mediating electron transport between cytochrome b6f and photosystem I (PSI). Cyt b6f reduces Cu2+ of Pc to Cu+, which subsequently transfers an electron to the photoexcited PSI.

Photochemical energy conversion competence of PSII is dependent on Fe constituting cofactors like non-heme Fe and cytochrome b559. Within Cytb6f, 1e- is transferred from

solid fumigants, toxic pesticides and rodenticides. They have recently generated interest with increasing number of cases like suicides and pesticide ingestion deaths accounting for one-third of all such deaths worldwide. Phosphine gas (PH3) causes shock, cardiac arrhythmias, and gastrointestinal (GIT) disturbances. Specific therapy includes early gastric lavage with potassium permanganate and palliative care. The lack of specific antidote results in high mortality.

This review study aims to highlight a recent study of antidotal action of gold complexes on phosphine toxicity. An invertebrate model using Galleria mellonella larvae when subjected to phosphine exposure became immobile and the administration of Au (I) complexes auro-sodium bisthiosulfate (AuTS), aurothioglucose (AuTG), and sodium aurothiomalate (AuTM) prior to phosphine exposure resulted in a drastic reduction in the recovery time. Positive results were seen in therapeutic antidotes. Subsequent tests with these complexes to phosphine exposed mice showed positive results.

References

1. Garrett, K. K., Frawley,, K.L., Totoni S.C., Bae, Y., Peterson, J., and Pearce, L. L.(2019) Antidotal Action of Some Gold(I) Complexes toward Phosphine Toxicity .Chem. Res. Toxicol. 32, 1310−1316
2. Singh, Y., Joshi,S. C., Satyawali, V., and Gupta, A., (2014) Acute aluminium phosphide poisoning, what is new? The Egyptian Society of Internal Medicine. 26:99–103

P20Modern Armament In Medicine - A Review On Transition Metal Complex

Chaithra. H.C, Ashwini.G, Shirisha.A and Rakshitha.B.K*

Department of Chemistry, Maharani Lakshmi AmmanniCollege ForWomen, Bangaluru-560012, Karnataka, India

*Corrosponding author:chemistry@mlacw.org

The transition metals has an incomplete d sub shell i.e. Fe (II), Fe (III), Mn (II) etc and due to their instability in structure it has variable oxidation number as well as unstable electronic configuration which modulate the changeable redox system present in the biological

References:

1. Sophie Moreau-Marquis, Bruce A.Stanton and George A.O'Toole; Aug2009; *Pseudomonas aeruginosa* Biofilm formation in the cystic fibrosis airway; Dept. of Physiology, Hanover. PMCID- PMC2542406.
2. R Salomoni, P Leo, AF Montemor, BG Rinaldi and MFA Rodrigues; Jun. 2017; Antibacterial effect of Silver nanoparticles in *Pseudomonas aeruginosa;* Sao Paulo, SP, Brazil. PMCID-PMC5499936.
3. Woo Kyung Jung *et al.,* Feb. 2018; Antibacterial activity and Mechanism Of Action of the silver ion in *Staphylococcus aureus* and *E.coli.* Seoul National University, Seoul, Korea. PMCID-PMC2292600.

P03Anti inhibitory property of copper complex of Salicycladimine against *Staphylococcus aureus*-An *In-Silico* study

Vinutha B, Sahana H V, Nayana N E, AvijitMaity and Hemavathy E*

Maharani Lakshmi Ammanicollege for Women Autonomous, Bengaluru-560012.

*Corresponding author: hemavathykmbrm@gmail.com

There is an increasing challenge globally in the treatment of bacterial diseases due to development of drug resistance to different antibiotics and side effects associated with the drugs[1-2]. The use of various metals in treatment and preservation methods has been an ancient process. Vessels made of copper and silver were used by Persians kings for water purification and preservation[3]. Transition metals such as cobalt, copper, nickel and zinc have been found to be of use against various diseases. In the study carried out to compare the efficiency of the ligand n, n'- bis (salicyladimine) -1, 4- phenylenediamine and its copper complex (CuSO4 .5H2O with n, n' – bis (salicyladimine) -1, 4 –phenylenediamine) on *Serratiamarcescens, Micrococcus luteus, Proteus vulgaris, Proteus mirabilis, Bacillus cereus, Bacillus subtilis, Klebsiella pneumoniae, Escherichia coli, Shigellaflexneri, Lactococcuslactis, Enterobacter cloacae, Staphylococcus aureus* ,it was concluded that the metal complexes of the ligand inhibited the growth of bacteria when compared to ligands.

Salicyladimine has gained reputable interest due to the asymmetrical hydrogen bond existing between its nitrogen and oxygen atoms, unusual configuration, ability to be structurally labile

and sensitivity to molecular environments[4]. Since earlier work showed the antibacterial property of the Salicyladimine and its metal complex, a study was carried to identify the mode of action of the ligand and its metal complexes on *Staphylococcus aureus*using *in silico* approach.

References

1. Chu, D. T., Plattner, J. J., & Katz, L. (1996). New directions in antibacterial research. Journal of Medicinal Chemistry, 39(20), 3853-3874
2. Desai, N. C., Bhatt, N., Somani, H., & Trivedi, A. (2013). Synthesis, antimicrobial and cytotoxic activities of some novel thiazole clubbed 1, 3, 4-oxadiazoles. European journal of medicinal chemistry, 67, 54-59.
3. Alexander, J. W. (2009). History of the medical use of silver. Surgical infections, 10(3), 289-292.
4. Omotola O. A, Louis H ,Oluwatomosin F. O , Adejoke T. H , Magu T. O &Aderemi T. A.(2018). Antimicrobial study of some transition metal complexes of rhodanine and salicyladimine, Asian Journal of Basic and Applied Sciences, 5(1), 15-24

P04Antibiofilm property of transition metal complexes on glucosyl transferases from *Streptococcus mutans* - An *In-Silico* study.

Jositta George, NidhiDwivedi , Reshma K, AvijitMaity and Hemavathy E*
Maharani Lakshmi Ammanni College for Women Autonomous, Bengaluru-560012.
*Corresponding author: hemavathykmbrm@gmail.com

According to the world oral health report 2019 released by the world health organization million of people around the globe continue to suffer from poor oral health. The causal organism *Sreptococcusmutans*is a facultatively anaerobic, gram positive bacteria commonly found in the human oral cavity and closely associated with dental caries. Caries formation is initiated when glucan, sticky glucose polymer forms a biofilm on teeth trapping oral bacteria, food debris and salivary components. It is synthesized by Glucosyl transferasesan extra

imaging which is actually because of their radiochemical properties helps in detecting various cell defects through fluorescent microscopy. It is because Rhenium has metal centres and polypyridyl ligand architectures which developed as structures and site-specific reversible DNA binding agents. The Rhenium complex trans-[{Re_6Q_8}$(TBP)_4(VB)_2$] has found its application towards the production formation of cluster complexes of Rhenium which have the ability to incorporateinto the matrix of the electroluminescent polymer poly(*N*-vinylcarbazole). The cluster polymer hybrid formed in the reaction taken has the combined properties of both components and is used successfully in the formation of the polymer light emitting diode (PLED).Another important Re-GNP conjugates functionalists with the thio-ester termination can be attached to gold nanoparticles to yield water soluble visibly luminescent clusters of Rhenium. The present work gives a comparative study of the various Rhenium complexes we will like to find their deep insight of their applications and also letting us know the mechanisms of various functional complexes of Rhenium.

References

1. Zhang Y, Chan JW, Moretti A, Uhrich KE,Designing polymers with sugar-based advantages for bioactive delivery applications,2015
2. Cationic rhenium complexes ligated with N-heterocyclic carbenes – an overview; Claudia Hillea and Fritz E. Kuhn,2016.
3. Olga A. Efremova, Konstantin A. Brylev, OlenaKozlova, Polymerisable octahedral rhenium cluster complexes as precursors for photo/electroluminescent polymers,2014.

P19An Aura of Antidotal Action Of Gold ComplexesTowards Phosphine Toxicity-A Review Study

Greeshma. S, Soujanya.N, Nayana.B.Kagal, VineethaShenoy*
Department of Microbiology, mLAC, Bangalore, 18th Cross, Malleswaram, Bangalore

Gold (Aurum- Au) is a natural transition metal in group 11 with an atomic number 79. It is an ancient metal with a commodity status of high value than other metals. There are several applications of gold complexes in various fields like cancer therapy, food control, an antiparasitic agent etc. Several metal phosphides like Aluminium phosphide (AIP) are cheap

could be used in lubricating machines.The effect of zinc dialkyldithiophosphate (ZDDP) addition as antioxidation agent in commercialized corn oil process as a barrier to commercialized corn oil. The introduction of ZDDP into the corn oil could resolve the oxidation problem since ZDDP is an effective antioxidant. The capability of ZDDP exhibits both primary and secondary antioxidant is desirable in biolubricant oil in order to suppress the oxidation process.

Keywords: Oxidation state, redox reactions, oxidative stress, antioxidants, zincdialkyldithiophosphate.

References:

1. JA Howard, Y Ohkatsu, JHB Chenier; metal complexes as antioxidants.I.The reaction of zinc dialkyldithiophosphate and related compounds with peroxy radicals; Canadian Journal of Chemistry;51(10);1543-1553;1973.
2. Muhamad Azwar bin Azhari, Muhammad AsyrafFathe'li, NurSyawalAidill Aziz, Muhammad SyahirMohdNadzri and YuslizaYusuf;A review on addition of zincdialkyldithiophosphate in vegetable oil as physical properties improver;ARPN journal of engineeing and applied sciences;1819-6608;2015.
3. Muhamad AzwarAzhari, Quratul Nadia Suffian and Nur Rashid Mat Nuri;The effect of zincdialkyldithiophosphate addition to cornoil in supression of oxidation as enhancement for biolubricants:areview;ARPN Journal of Engineering and Applied Sciences;1819-6608;2014.

P18Octahedral rhenium complexes and their applications- A Review

L Jhanavi Reddy, SettyYogeshwariSomashekhar, Pooja P, Sumanjali K*
Department of Chemistry, mLAC, Bangalore, 18th Cross, Malleswaram, Bangalore

Rhenium which is one of the rarest elements found in the Earth's crust is highly known for its refractory property. One of the most recent interesting feature of Rhenium are it's Octahedral complexes which has found a wide applications for itself in our daily lives not only biologically but industrially also. Re(I) complexes have found their applications in cellular

cellular enzyme expressed by *S. mutans*. Glucosyltransferases are member of glycoside hydrolase family and catalyze the formation of glucan with various types of glycosidic linkages – alpha (1-3), -alpha (1-6) from sucrose via transglycosylation reaction[1,2].

Few approaches are currently available for controlling cariogenic biofilms. Chlorhexidine (CHX) is considered the gold standard for oral antimicrobial therapy. But in oral use as a mouth rinse chlorhexidine has been reported to have a number of side effects including: brown discoloration of the teeth, bitter taste, and sometime sloughing of oral mucosa which restricts its general use[3]. Thetransistion metal complexes as metal based drugs has a promising pharmacological application and may offer unique therapeutic opportunities.Development of transition metal complexes as drugs is not an easy task; considerable effort is required to get a compound of interest. The present investigation, an *in-silico* approach is aimed at use of transition metal complexes to inhibit the glucosyltranferase activityof *S. mutans.* The study can be promising in development of anti plaque agents.

References

1. J. M. Hardie, "Oral microbiology: current concepts in the microbiology of dental caries and periodontal disease," *BritishDental Journal*, vol. 172, no. 7, pp. 271–281, 1992.
2. Sbordone, L., Bortolaia, C. "Oral microbial biofilms and plaque-related diseases: microbial communities and their role in the shift from oral health to disease." *ClinOral Invest*. 2003. Volume 7. P. 181-188.
3. Mandel ID (1988). Chemotherapeutic agents for controlling plaque & gingivitis J Clin.Periodontol. 15: 488-498.

P05Investigating "Bright metals" as Anti-Cancerous agents – an *in-silico*mechanism based approach

ShivaniSukhralia, CharuPareek, JaveriyaTasneem, ShanmugarajanDhivya, Talambedu Usha[1], Sushil Kumar Middha*
DBT-BIF Facility, Department of Biotechnology, Maharani Lakshmi Ammanni College For Women, Bangalore-560012, INDIA; [1]Department of Biochemistry, Maharani Lakshmi Ammanni College For Women, Bangalore-560012, INDIA
*Corresponding author: ***drsushilmiddha@gmail.com***

Third row transition metals are used profusely and marketed fondly for the treatment of cancer. Cisplatin, a well-known chemotherapeutic drug, and its analogs are known best for their anti-cancer activity[1]. Though there is ambiguity in its molecular mechanisms of action. The complex of these metal ions induces cancer cell death using various mode of action[2]. Notably small structural changes can significantly alter the manner of cell death; preclude efforts to elucidate structure-activity interrelation[3]. The Ovarian cancer is detected annually in more than 230000 women globally and having less than 47% survival rates in women of India[4]. Our strategy involving various organometallic drug compounds compared with marketed anticancer drugs, to understand their activity using *in-silico* tools. The future prospect lies to understand these molecules *in-vitro* and *in-vivo*.

Keywords: Cancer, Ovarian, *In-silico*, Docking.

References

1. Dasari S, Tchounwou PB. Cisplatin in cancer therapy: molecular mechanisms of action. *Eur J Pharmacol*. 2014;740:364–378.
2. Ma DL, Wu C, Cheng SS, Lee FW, Han QB, Leung CH. Development of Natural Product-Conjugated Metal Complexes as Cancer Therapies. *Int J Mol Sci.* 2019;20(2):341.
3. Johnstone TC, Suntharalingam K, Lippard SJ. Third row transition metals for the treatment of cancer. *Philos Trans A Math Phys Eng Sci.* 2015;373(2037):20140185.
4. www.cancer.org

P06Synthesis of transition metal cadmium-cysteine complex using thermophilic bacteria

Prathibha.B, Chandana.P, Sahana. D, Gowri Neelima
Department of Biotechnology, Maharani Lakshmi Ammani College
*Corresponding author: mgowrineelima@gmail.com

Cysteine and cadmium(II) can form transition ion complexes. These complexcan be investigated by various method. Isothermal titration calorimetry was used to study the binding of Cd(II) by phytochelatins and their selected fragments including cysteine in order to understand the influence of the chain length on the complex stabilities. Different

References

1. V. V. Mody, R. Siwale, A. Singh, H. R. Mody, J. Pharm. Bioallied. Sci. 2010, 2, 282-289.
2. Maldoti, A. Molinari, R. Ahmadi, Chem. Rev., 2002, 102, 3811-3836.

P17Antioxidant And Biolubricating Properties Of Zincdialkyldithiophosphate

Meenakshi Y.S, Sindhushree.M.G, Nayeema Sultana, Kamala. A*
Department of Biochemistry, Maharani Lakshmi AmmanniCollege ForWomen, Bangaluru-560012, Karnataka, India

Transition metal complexes are of great interest, in the field of medicine, industries and other fields. It has broad range of applications as they can adopt to wide variety of coordination numbers, geometries and oxidation states in comparison with other main group elements. They are used in various interdisciplinary fields of treatment like antioxidants, biolubricating agents, antifungal agents, antimicrobial agents, anticancerous agents. Among the characteristics of metals, is their potential to undergo redox reactions. The transition metal ions are able to switch upto seven oxidation states. Antioxidants are the substances which regulate the oxidative stress. Depending on the structures and on the source of oxidative stress, metal complexes act as antioxidants, it includes Nickeldialkyldithiophosphates, Zincdialkyldithiophosphate, Zincdiaryldithiophosphate.

Zincdialkyldithiophosphate is known to inhibit the azonitrile- initiated oxidation of cumene and squalane and the non initiated oxidation of indene by acting as chain breaking agents.The antioxidant mechanism of this compound was the key to its ability to reduce bearing corrosion, since it supresses the formation of peroxides.

The need of searching for an alternative for lubricant oil has been studied by a number of researchers due to the awareness of environmental issues. However, with the limitations of low oxidation stability, many straight vegetable oil needs to be added with certain additive in order to improve the performance as lubricant oil. With the addition of ZDDP in straight vegetable oil is hoped to contribute to the development of a more stable bio-lubricant that

3. Heavy metal content in an ayurvedic formulation *Triphala* prepared by different manufacturers, SunitaShailajan, Ambika Sharma. *Environmental Science An Indian Journal* 4(4), 2009 , 200-203
4. Curent trends in the research of *Emblica officinalis* (Amla): A pharmacological perspective: SwethaDasaroju, Krishna Mohan Gottumukkala. *Int. J. Pharm. Sci. Rev. Res*.,24(2), Jan-Feb 2014, 25, 150-159

P16Assessment on Titanium and Vanadium Complexes for Anticancer Therapy

Manaswini.B.N, Pooja.A, Bharathi.R, K. N. Shravana Kumara*, B. N. Nagalaxmi
Department of Chemistry, Maharani Lakshmi AmmanniCollege ForWomen, Bangaluru-560012, Karnataka, India
*Corresponding author:shravankumarkn25@gmail.com

In the field of research work nowadays nanotechnology is a facilitating technology that deals with nano sized particles in several fields of science such as Chemistry, Biotechnology, Physics, medicinal and also in Material science. The numbers of transition metals are able to form a large variety of metal oxides. They involve the structural geometries with an electronic structure that can reveal semiconductor, metallic or insulator character. In technological applicationsof transition metal oxides nanoparticles are used in the optoelectronics, in fabrication of microelectronic circuits, sensors, fuel cells, piezoelectric devices. There are several types of metal oxide nanoparticles such as ZnO, TiO_2,MgO, CuO, NiO, ZrO_2 nanoparticles etc. The metallic nanoparticles are used to define Nano sized metals with dimensions such as thickness, width or length within the size range 1-100 nm. The metallic nanoparticles have large surface area to volume ratio as compared other bulk materials and They have large surface energy and number of low-co-ordination sites such as corners and edges. There are several types of metal nanoparticle aresynthesized by different chemical methods, green route and co-precipitation methods with transition metals like like Cu, Ag, Au, Ni, Zn, Mg, Fe, Si nanoparticles etc.

Key words : Nanotechnology, transition metal Oxides, material science.

complexes are formed with glutathione and its fragments, Cys, Cys-Gly and gamma Gly-Cys, and their stabilities depend on the corresponding pK(a) value of the thiol group in the ligands. Studying of the complex formation between cadmium(II) and the ligands cysteine and penicillamine in aqueous solutions reveals differences between cysteine and penicillamine as ligands to the cadmium(II) ion that can explain why cysteine-rich metallophone's are capable of capturing cadmium(II) ions, while penicillamine, clinically useful for treating the toxic effects of mercury(II) and lead(II) exposure, is not efficient against cadmium(II) poisoning. It was also described that the presence of chiral carbons in molecules containing cysteine markedly influence their affinities to zinc(II) and cadmium(II) ions.

Thermophiles and extremophiles are the bacterial strain which thrive in adverse condition of high temperatures. Thermophiles are observed growing in temperatures from 55-80 degree Celsius and extremophiles are observed growing in temperatures above 80 degree Celsius.The thermophiles were isolated and checked for the minimal tolerance level of Cd. The bacterial growth media LB was mimicked with different concentration of Cd and thermophiles were grown in them. From this tolerant strains Cd nanoparticles were biosynthesised. Molecular characterization of genomic DNA of this thermophiles was conformed by CPrDNA.

Reference:

1. Gerard J. Tortora, B.R. (2016). Microbiology An Introduction, 12th Edition.
2. LoloWalMarian,M.H.(2016). Isolation and biochemical characterization of heavy-metal resistant bacteria from tannery effluent.Egyptian Journal of Aquatic Research, 1.
3. Simon Silver, Li. T. (1996). BACTERIAL HEAVY METAL.Annual. Rev. Microbiology.
4. Silver, G. J. (1995). Bacterial resistance mechanism for heavy metals of Journal of Industrial Microbiology.

P07Applicationsof Transition Metal Complexes

Rajeev Ramchandra Kolgi[1], Sachin C[1]
[1]Department of Chemistry and Biochemistry, Government Science College, Bengaluru.
*Corresponding author: rajeevkolgi@gmail.com

Transition metals have an important place within medicinal chemistry. Transition metals exhibit different oxidation states due to small difference in energies between (n-1) d and ns orbitals and hence react with a number of negatively charged molecules. This property led to the recent development of drugs which are based on metals and are considered to be potential candidates for therapeutic applications.

The introduction of metal ions or metal ion binding components into a biological system for the treatment of diseases is one of the main subdivisions in the field of bioinorganic chemistry. Transition metal complexes due to their well-defined coordination geometries and DNA binding ability are attractive moieties.

Cu (II) complexes of naproxen, diclofenac, Co (II) complexes of naproxen and tolfenamic acid, have been reported by the research groups that showed anti-inflammatory activity. The success of the clinical uses of cisplatin has stimulated considerable interest in using other metal complexes as new therapeutic agents.Platinum complexes conjugated with sugarmay bring about biological changes to the platinum compound which include improved solubility, andcellular uptake of the drug.

Key words: Transition metals, DNA binding.

References

1. Thompson KH, Orvig C (2003) Boon and bane of metal ions in medicine. Science 300: 936-939.
2. Zeglis BM, Pierre VC, Barton JK (2007) Metallo-intercalators and metallo-insertors. Chem Commun (Camb), pp: 4565-4579.

P15Bridging ancient knowledge and new innovations: Therapeutic uses of transition metal complexes

Bhavya B,ArshiyaTarannum, Harshitha SG, Sowmya N,Aruna H K*
Department of Zoology, Maharani Lakshmi AmmanniCollege ForWomen, Bangaluru-560012, Karnataka, India
*Corresponding author:arunahk67@gmail.com

Ayurveda is a system of medicine of India dating back to about 5000 years. Rasashastra, a branch of Ayurveda provides details regarding the transition metals which form co-ordination compounds/complexes in which a central metal atom/ion is bound to a ligand imparting useful properties, as illustrated in sacred writings - Vedas (Atharvaveda). It also provides details of origin, characters, processing methods, properties, therapeutic uses, possibilities of developing adverse effects and management of metals which are converted into poly-herbal, herbo-mineral and metallic compound formulations.

Charaka Samhita one of the scheduled books of Ayurveda provides details of usage of heavy metals (micro fine powder in complex form) which are detoxified during the highly complex manufacturing processes derived from plants, animal, metal and mineral sources for various therapeutic and non therapeutic purposes which are documented and passed on for generations (1).Recent studies suggest that these ayurvedic metallic preparations function as anti-oxidants, anti cancerous, immuno-modulators, anti-mutagenic and anti-diabetic agents. A This paper is an attempt to highlight the use of heavy metal namely mercury which is quoted as Rasasindura in ancient literature with many curative properties with both external and internal applications if administered in the right dosage (2). Another is "*Triphala*" used extensively in Ayurveda which has been documented for therapeutic uses (3, 4)

Keywords: Transition metals complexes, Mercury, Triphala, Ayurveda

References:

1. *Charaka: 'Charaka Samhita' Sutra Sthaana*, 1/69. Varanasi, India: Choukhambha: Sanskrit Sansthaan, 2000
2. Mercury based drug in ancient India: The red sulfide of mercury (Rasasindur) in nanoscale. PriyabrataMukhi et al. *Journal of Ayurveda and Integrative Medicine*. Xxx 2017, 1-6

P14Transition metal complex based on chelant–enhanced phytoextraction of lead from contaminated agricultural soils.

PunitaV,Likhitha N, Deepa C N., M GowriNeelima**.**

Department of Biotechnology, Maharani Lakshmi Ammanni College for Women, Malleshwaram, Bangalore-560012,India.

*Corresponding author: mgowrineelima@gmail.com

Contamination of soils by heavy metals is of widespread occurrence asa result of human, agricultural and industrial activities. Lead is a major heavy metal which is readily accumulated in soils and sediments, there by serving as a potential pollutant. Although lead is not an essential element for plants, as it is toxic, it gets easily absorbed by the plants.(1). Non – destructive remediation of contaminated soil includes chelant – enhanced phytoextraction of heavy metals. The synthetic chelating agents used were EDTA and EDDS, where EDTA was more efficient than EDDS in desorbing and complexingPb from both soils, removing as much as 60% of Pb. The phytoextraction efficiency was tested on maize (*Zea mays*) and poplar (*Populusnigra*x *Populusmaximoviczii*) using EDTA. Maize exhibited better results in extracting Pb in more acidic (pH 4) and more contaminated (up to 1360 mg Pb kg^{1}) agricultural soil S (smelting area). Whereas, poplars proved to be more efficient when grown on the near-neutral (pH 6) and less contaminated (up to 200 mg Pb kg^{1}) agricultural soil originating from the mining area. Furthermore, the addition of EDTA led to a significant increase of Pb content especially in poplar leaves, proving a strong translocation rate within the poplar plants.(2).

Keywords: Phytoextraction, EDTA (ethyelenediaminetetraaceticacid), EDDS (ethylenediaminedisuccinicacid), Smelting, Mining.

Reference:

1. Pallavi Sharma, Rama Shaker Dunes, *Lead toxicity in plants*, Department of Biochemistry, Faculty of science, plant physiology, 17(1): 35-52.
2. Michael Komarek, PavelTlistos, JirinaSzakova, VladislavChrastny, VojtechEttler,The use of maize and poplar in chelant-enhanced phytoextraction of lead from contaminated agricultural soils, 2006.

P08Potential antimicrobial properties offered by transition metal complexes

Mahak H. S. Karapurkar[1*], Mateesha N. Borkar[2] and Madhu Malleshappa
MSc Biotechnology Sem III, * Associate ProfessorSchool of Sciences, Department of Life Sciences, Garden City University, Bengaluru, Karnataka 560049
*Corresponding author: mahakkarapurkar@gmail.com

In today's scientific world transition metals captivate immense attention due to their enormous range of properties. Because of their relatively low electronegativity, they are frequently found as cations and attract other ions forming transition metal complexes or coordination complexes. The activity of metal chalets is considerably increased as compared to that of the free metal and the ligand alone. The observation of antimicrobial activities of complexes show that they are more active as compared to free ligand and metal involved. A series of first complexes of Co(II), Ni(II), Cu(II), Mn(II), Al(II), Ag(II), SiO_2 and Fe(III) synthesized with Schiff base have been characterized using elemental analyses, spectral and magnetic studies. The redox properties of the complexes owe to their *in-vitro* antibacterial (*Escherichiacoli, Pseudomonas aeruginosa, Bacillus subtilis* and *Staphylococcus aureus*) and antifungal (*Aspergillus niger and Pencillium Chrysogenum)* properties. Benzo derivatives when complexed with transition metals are shown to have antiviral, antimicrobial, anticancer, antinematodal, cytotoxic activities and act as a free radical scavengers. The mechanism of action include generation of Reactive Oxygen Species (ROS) with enzymatically or non enzymatically generated superoxide and hydrogen peroxide. The nuclease activity of the above metal complexes shows that Cu(II), Ni(II) and Co(II) complexes cleave DNA through redox mechanism. Moreover these antimicrobial properties offered by the transition metal complexes when complexed with rare earth metals can be exploited to synthesize pigments and colourants in paints, cosmatics and coatings, as well as against various plant pathogens.

keywords: Transition metal, Antibacterial, Antifungal, Cytotoxic.

References:

1. O.A.G. Wahb, A.M. Hassan1, A. M. Naser and A.M. Hanafi 2017 Preparation and Spectroscopic Studies of Some Copper and Nickel Schiff Base Complexes and their Applications as Colouring Pigments in Protective Paints Industry.
2. Rasleen Sudan,1 Madhulika Bhagat,1 Sahil Gupta,1 Jasvinder Singh,2 and Anupurna Koul 2014. Iron (FeII) Chelation, Ferric Reducing Antioxidant Power, and Immune Modulating Potential of Arisaema jacquemontii (Himalayan Cobra Lily)

3. Tej Narayan Poudel and Yong Rok Lee. 2013 An advanced and novel one-pot synthetic method for diverse benzo[c]chromen-6-ones by transition metal free mild base-promoted domino reactions of substituted 2-hydroxychalcones with β-ketoesters and its application to polysubstituted Q1 terphenyls
4. N Raman, J Dhaveethu Raja and a Sakthivel 2007. Synthesis, spectral characterization of Schiff base transition metal complexes: DNA cleavage and antimicrobial activity studies.
5. Zahid H. Chohan, M. Arif, Muhammad A. Akhtar, and Claudiu T. Supuran. 2006 Metal-Based Antibacterial and Antifungal Agents: Synthesis, Characterization, and In Vitro Biological Evaluation of Co(II), Cu(II), Ni(II), and Zn(II) Complexes With Amino Acid-Derived Compound.

P09Studies on Preparation and Biocompatibility assay of Porous Titanium-Niobium Alloy and its use in orthopedic Implants

Asfiya Taj, Akshaya, Sharina, Babitha.B*.
Department of Biotechnology,Maharani Lakshmi Ammanni College for Women Autonomous, Bengaluru- 560012.
*Corresponding author:babitha_1780@yahoo.co.in

Improving the bone ingrowth into prosthesis and enhancing the combination of the range between bone and prosthetic surface are significant for long-term stability of artificial joints. The present review paper gave an understanding about development of Ti-25Nb alloy. Further biocompatibility studies provided the evidence in using Ti-25Nb alloys a powerful tool as new porous prostheses or bone implants for bone tissue regeneration. During the study, T-25Nb alloys with different porosities were produced using the technique of powder metallurgy,The alloys were then evaluated for mechanical properties, purity, pore size and porosity parameters. The study also included Biocompatibility assays which included methylthiazol tetrazolium (MTT) assay, cell adhesion and proliferation assays. The results obtained during the study showed production of porous Ti-25Nb alloy with interconnected pores having pore size of 200 µm to 500 µm. Biocompatibility assays also showed favorable results with MTT assay showing that the alloy has no adverse reaction to rabbit bone marrow mesencymal stem cells, with toxicity level of 0 to 1. The cell adhesion and proliferation experiments also showed excellent cell growth on the surface and inside the pores of the

ion should be in correct proportionate this can be maintained by a regular food diet therefore metal ions are very important in pregnancy.

P13Aging ironically

Nanditha C J,Nisha Singh A, Sneha S and Jolitha A B*
Department of Biotechnology, Maharani Lakshmi Ammanni College for Women, Malleshwaram, Bangalore-560012,India.
*Corresponding author: jolithasagar@gmail.com

The four basic elements of life are oxygen, hydrogen, nitrogen and phosphorus. These four elements are found in both human body and other animals. The question “which elements are essential for human life?” is frequently asked, and seems simple enough to answer. However, the longer you consider it, the more complicated the answer becomes.Elements like oxygen and iron support our life by sharing delicate partnership since both are indispensable for survival. Inadequate partnership rapidly terminates life. This is the irony of life. Iron toxicity (higher concentration) mainly relates to its involvement in the Fenton’s Reaction and generation of free radicals. Certain altered oxygen like superoxide, hydroxyl radical, singlet oxygen and peroxides which are also free radicals that are ever present in our body, will damage our own cells and DNA causing degeneration leading to aging. Aging, defined as the accumulation of diverse deleterious changes occurring in cells and tissues with advance in age that are responsible for increased risk of diseases and death. Is it possible to delay aging? Yes, our body uses the help of anti-oxidants to neutralize the oxidation properties of those invading free radicals. Aging can be delayed by altering the molecular interplay of this ions,the process of aging can be delayed which can prove as a breakthrough in medical field.

Key words: Reactive oxygen species (ROS), Fenton reaction, oxygen, free radical, antioxidants

References

1. Shayeghi M., Latunde-Dada G.O., Oakhill J.S., Laftah A.H., Takeuchi K., Halliday N., Khan Y., Warley A., McCann F.E., Hider R.C., et al. Identification of an intestinal heme transporter. Cell. 2005;122:789–801. doi: 10.1016/j.cell.2005.06.025
2. Fraga CS. 2005. Relevance, essentiality and toxicity of trace elements in human health. Mol. Aspects Med. 26, 235–244. (10.1016/j.mam.2005.07.013)
3. Wright T.L., Brissot P., Ma W.-L., Weisiger R.A. Characterization of non-transferrin-bound iron clearance by rat liver. J. Biol. Chem. 1986;261:10909–1091.

References

1. Vanadium treatment of type 2 diabetes: A view to the future - Katherine H. Thompson, JayLichter, CarlLeBel, Michael C.Scaife, John H.McNeillChrisOrvig, Journal of Inorganic BiochemistryVolume 103, Issue 4, April 2009, Pages 554-558
2. Vanadium: A Review of its Potential Role in the Fight Against Diabetes- Vladimir Badmaev, Subbalakshmi Prakash, and Muhammed Majeed , The Journal of Alternative and Complementary Medicine, Vol. 5, No. 3.
3. The potentiality of vanadium in medicinal applications - Dieter Rehder, Future Med. Chem. (2012) 4(14), 1823–1837.

P12Metal Ion Complexes In Pregnancy, Boon Or Bane ?

Monica.K,Chandana.R, Vinutha.KH , Jolitha AB*
Dept. of Biotechnology, Maharani Lakshmi Ammanni College for Women Autonomous, Bangalore**.**
*Corresponding author:jolithasagar@gmail.com

The state of carrying developing embryo or fetus within the female body is known as pregnancy. Pregnancy last about forty weeks or just over 9 months. Health care providers refer to three segments of pregnancy called trimesters, first trimester (week 1 to week 12), second trimester (week 13 to week 28) and third trimester (week 29 to week 40) Oxidative stress is an imbalance between free radicals and antioxidants In the body pregnancy is well known to increase the oxidative stress by a normal systematic inflammatory response, which results in high amount of circulating reactive oxygen species (ROS).The important metal ion in pregnancy are zinc ,copper ,iron. Zinc belongs to group12,copper belong to group 2, iron belong to group 8,lead belong to group 15 of periodic table. Iron is a important metal ion involved in pregnant women. Iron helps to move oxygen from lungs to the body. Loss of iron lead to anemia , low iron weaken mother human system result in low birth weight (baby).Iron is abundant in placenta and are important in production of free radicals. Oxidative stress peaks by second trimester of pregnancy. Iron excess will lead to festal damage. Zinc plays as important role in delivery of baby low zinc concentration will lead to u normal delivery .Zinc protects cells against oxidative damage acts in stabilization of membranes. Copper helps from baby's heart, blood vessels, skeleton, nervous system. High level of copper concentration will lead to complications in pregnancy and affecting the baby. Therefore we conclude metal ions are important in pregnancy. Too low or too high of metal ion leads to complications .so metal

alloy. Further, alloy produced did not cause inflammatory response as evident from IL-6 assay. The data clearly satisfies the basic requirements of clinical orthopedic implants, making Ti-25Nb alloy a good prospect for biomedical applications.The characteristics of alloy with 70% porosity, suitable pore size, optimum mechanical properties allow more ingrowth and can be used effectively in orthopedic implants.

References :

1. Jian Xu,Xiao-Jun Weng, Xu Wang, Jia-Zhang Huang, Chao Zhang, Hassan Muhammad, Xin Ma, and Qian-De Liao (2013). Potential Use of Porous Titanium–Niobium Alloy in Orthopedic Implants: Preparation and Experimental Study of Its Biocompatibility *In Vitro*. PLoS 8(11):e79289.
2. Cheng WW, Ju CP, Lin JH (2007). Structure, castability and mechanical properties of commercially pure and alloyed titanium cast in graphite mould. J Oral Rehabil 34: 528–540.
3. Figueiredo DMM, Neto FR, Grossi PA, de Andrade RM (2008) Measurement of thermophysical properties of human dentin: effect of open porosity. J Dent 36: 588–594.
4. Wang X, Li Y, Hodgson PD, Wen C (2010) Biomimetic modification of porous TiNbZr alloy scaffold for bone tissue engineering. Tissue Eng Part A 16: 309–316.

P10A Review on Transitional metal complexes as Therapeutic Drugs for Neurological Disorders.

N.Uma, Gayathri ,Deepshika and Archana Preetha R.*
Maharani Lakshmi Ammanni College for Women, Autonomous,Bengaluru, Karnataka 560012, India.
*Corresponding author:archanapreethar@gmail.com

Transition metals play an important role within medicinal biochemistry. Research proves significant progress in utilization of transition metal complexes as drugs to treat several neurological disorders such as Parkinson’s disease, Alzheimer’s disease, Huntington’s

chorea, Tardive dyskinesia, Spasmodic torticollis, Tourette's syndrome, L-dopa induced hyper kinesia, organic brain disorders, drug induced delusional disorders, migraine and cluster headache, periodic hypersomnolence, epilepsy, Meniere's disease and periodic hypokalemic paralysis. The ability of transition metals to exhibit different oxidation states and its interaction with a number of negatively charged molecules has started the development of metal-based drugs, a unique therapeutic opportunity with promising pharmacological applications.

One example of this is lithium, the mechanism of action involves lithium binding to inositol phosphates, inhibiting their breakdown to inositol, and so reducing inositol-containing phospholipids. A consequence of this chain of events would be disruption of the neurotransmission pathway reducing neuronal communication, which is most likely hyperactivated in the manic state. Valproic acid in combination with lithium delays the onset of disease, it also reduces the neurological deficits, anti-depressive effect and hence, prolongs survival. Zinc is another transition metal which acts as a transmitter in the neuronal signalling pathways. Neuronal Zn (II) serves as a regulator for signalling component responsible in the initiation of the neuroprotective pathway.

Keywords: Neurological disorders, Lithium, Inositol and Zinc.

References:

1. Feng HL, Leng Y, Ma CH, Zhang J, Ren M, Chuang DM (2008). Combined lithium and valproate treatment delays disease onset, reduces neurological deficits and prolongs survival in an amyotrophic lateral sclerosis mouse model. Neurosci. 155(3): 567-572.
2. Aras MA, Hara H, Hartnett KA, Kandler K, Aizenman E (2009). Protein kinase C regulation of neuronal zinc signaling mediates survival during preconditioning. J. Neurochem. 110(1): 106-107.
3. Metal Complexes of Pharmaceutical Substances, Spectroscopic Analyses - Developments and Applications, EramSharmin and Fahmina Zafar, IntechOpen, DOI: 10.5772/65390.

P11Vanadium: its potential role in the fight against diabetes mellitus.

Sharaniya.M, Meghana.R, Shreyashwini.H.D, Ranjitha.A*
Maharani Lakshmi Ammanni College for Women Autonomous, Bengaluru-560012, Karnataka, India.
*Corresponding author:ranju19sep@gmail.com

In the early treatment of diabetes with vanadium, inorganic vanadium compounds have been the focus of attention; organic vanadium compounds are nowadays increasingly attracting. In the classical treatment of diabetic animal and , sporadically , human individuals ,inorganic vanadium compounds such as vanadate(V) , peroxidovanadates(V) and vanadyl sulfate (oxidovanadium(IV) sulfate) have been employed . A key compound is bis(maltolato)oxidovanadium, which became introduced into clinical tests phase IIa. 3-Hydroxy-2-methyl-4-pyrone and 2-ethyl-3-hydroxy-4-pyrone (maltol and ethyl maltol, respectively) have proven especially suitable as ligands for vanadyl ions, in potential insulin enhancing agents for diabetes mellitus. Both bis(maltolato)oxovanadium(IV) (BMOV), and the ethylmaltol analog, bis(ethylmaltolato)oxovanadium(IV) (BEOV), have the desired intermediate stability for pro-drug use, and have undergone extensive pre-clinical testing for safety and efficacy.Vanadium compounds mimic the ability of insulin and , thus , ascertain glucose & lipid homeostasis. Vanadate is a potent inhibitor of phosphatases , a likely key function in its insulin -mimetic/-enhancing potential. Organic vanadium compounds allow for the fine tuning of the uptake and transport towards the target cells. Clinical test with bis(ethylmaltolato)oxidovanadiumhave shown promising results with respect to glucose homeostasis. Speciation of organic vanadium compounds in the blood serum provides VO2+ transferrin and H2VO4- as the main forms for the cell targeting. Vanadate functions as an inhibitor of an protein tyrosine phosphatase and thus re-establishes a signaling cascade at the end of which a glucose transporter is activated.

Keywords: Diabetes mellitus, Vanadium, Insulin.