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Review Paper

Application of organic complex compounds as drug

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Abstract

Metal complexes have been widely used for applications in drugs for their special chemical properties. The therapeutic use of as medicine has been clear. Coordination compounds have power to interact and react with bio as possibly also the complex compounds that palladium and ruthenium or platinum are anti-cancer drugs. Some coordination compounds are antimicrobial. Few complexes are also show potential for disease like Malaria and Alzheimer's, a clear concept of mechanistic level of complex will help to develop new coordination compound in our study the role of metal coordination to work as medicine /Drug is explored.

Keywords: Medicine, Metal ion, Ligand, Metabolic, Drugs, Diagnosis.

Introduction

The use of metal and complexes metal ions in the form of medicines since the last decade and has been happening continuously and will continue to happen in the future also because the development of metal complexes in structural form has proved to be very good in modern medicine and this metal the discovery in the form of complexes has been very promising and it has proved to be a milestone for the use of metal complexes as these metal complexes have super future potential for modern medicine While organometallics and coordination compounds have been established in the field of drugs and medicine discover for some time, yet they are nevertheless relatively overlooked by medicinal chemists[1].

The specified field based on associated betwixt medical as well as inorganic chemistry as it includes compounds of great importance in the form of metal-based therapeutics, metal separation and mobilization agent, metal contains indicative assist as well as pharmacological enlistment until autogenously metal ions. But even so, owned bodies as well as biological systems contain hundred and thousands regarding inorganic complexes & metals as cofactors for many enzymes and proteins as it is also essential for biological processes. Because of their biological significance including there vital necessity activities into conserving significant biological process, that always inspires and fascinated pharmacist into work. Several coordination compounds have demonstrated biological activity contrary to fungi & bacteria and other microorganisms[2-4].

As the large structural and these numbers do not allow a rigorous diversity of complexes to be systematized, some attempts have been made to classify them using criteria such as type of ligand, complexes with metal–metal bonds, charges based on complexes ions, metal carbonyl, number as regards central atoms, Werner complex, cluster and coordination numbers of coordination compound and was classify in to complex with macro cyclic ligands molecular complexes (adduct, cloth rates) metal and chalets metal organic complexes. Its each broad numbers based on pharmaceuticals substance that be-have as ligands and chelating agents under in vivo or in vitro conditions[5,6].

A few benefit based on transition metals complexes while therapeutic compounds possess set off moreover conspicuous. As those complexes mostly provide a very diverse range of activities such as anti-diabetic, anti-inflammatory and anti-infective compounds, as transition metal complexes have been extensively attempted in drug development, they also have many side effects and limitations. Transition metal complexes have made a major contribution to pharmacological therapeutics and are still the most widely used form of chemotherapeutic agents[7].

Very serious side effects have been observed in patients undergoing chemotherapy with metal-based drugs which also perform their primary functions covalent binding to and with bio molecules and as such that insufficiency of selective in covalent binding contributes to the issue[8]. Regarding cisplatin as DNA exist also a ubiquitously targeted and nevermore unique present into cancer cell because furthermore into healthful cells as such cisplatin cans futher hold together into proteins[9]. As ridaura further contains more 2-amino-3-sulfhyrylpropanoic acid contained enzyme & protein[10] and thus limit its selectively and into over-come that limitations complex therapeutics strategies turned out to be developed, including tumor targeting drug distributed system, which have markedly reduced sides effect.

For example, liposomal formulations of cisplatin enhance its amassment specifically within tumors[11].

As small molecule catalysts offer a number of advantages, including precise control over catalytic activity and ease of modification to optimize desired properties as well as potential cost effectiveness in production and application, advances in synthetic materials may further expand their potential into coming times. Novel metalloenzyme drugs may be developed, which may likely provide greater therapeutic benefits. Because these synthetic materials can integrate the catalytic capabilities of metalloenzymes with the advantages of synthetic chemistry, there may be new opportunities for therapeutic intervention and medical applications[12].

In nature, a variety of forms are widely used by many biological systems corresponding to zinc copper and zinc and metal ions, whatever participate in key and important role into ordinary function based on organism[13]. As transition metal alike while iron, manganese and copper occur too elaborate into a variety of biological processed ranging through electrons shifting into structural's as well as catalytic roles, they exist often associate beside the aggressive places about enzymes & proteins[13]. As deregulation about a part based on that essentials metals throughout ordinary bio-chemical process own also occur implicate into developed away from several pathological disorderliness like cancer[14].

Let's improve numerous case studies have been reported in medicine as well as in the literature that apart from improving solubility, drug mixtures also provide multifunctional functions such as enhancing solidity, decrease destructive based on drugs, reducing & increasing dissoluteness rates along with enhanced bio distribution as well as bioavailability[15].

Metal-based compounds are biologically active compounds used as many drugs and mainly modified and administered toxically and have pharmacological potential[16]. Most and especially and possibly the different metal ions used are copper, zinc, cobalt, and nickel[17] as the complexes that the form of lowering molecular weight and thus more beneficial against many diseases[18,19]. Such as different valuable biologically active compounds are anti-thyroid[20], diuretic[21], hypoglycaemic[22], antibacterial[23-25], proteinase blockage[26], anti-carbonic anhydrase[27,28] and antitumor[29].

In this review, special attention is paid to the future of many complex drugs or drug processes in the chemistry of these compounds due to the increasing complexity of many diseases as well as the safety and in particular the appropriate efficacy of many drugs and medicines. There are also advanced or advanced forms of many metal complexes.

Complex compounds as drug: Even after many efforts and researches drugs consignment formulations all the time unexpressed thoroughfare remain into great stand against for the scientist's as many of the complexes which are pharmacosome, organic molecule's (drug hydrophilic polymers and drug caffeine drug hydrophilic polymers), sensitivity complexes (drug cyclodextrin) & metal complexes (drug metal ions)[15].

From the past to the present most drugs also exist in the form of water-insoluble systems, as we know that water-soluble drug delivery systems rarely exist. The low solubility of drugs in water is a common problem in pharmaceutical development. As research has shown that 90% of drugs are less soluble in water while about 40% of commercial drugs, but when given in conventional dosage form or even through any medium, these drugs are not soluble and their bioavailability limited and because of this they show limited therapeutic effect and they mostly fail. As it often includes a combination of different methods to make drugs soluble, notably co-solvent systems, modifiers, pH modifiers, salt forms, complex ants, or surfactants.

As a complex pharmaceutical systems, its also to complex systems to produce consistent and desired effects. Complex medicinal system's exist often also mention into like atypical products as were generic tablets that were not. As the most commonly used complexes include phosphatidylcholine complexes, cyclodextrin complexes, chitosan complexes, and also phosphor lipid complexes. Complex drug systems are also used in various fields to treat various clinical conditions such as platinum complexes for anticancer therapy, cyclodextrin complexes for schizophrenia, and insulin complexes for antidiabetic therapy[30].

Complex compound as medicine: Complex compounds play a very important role in the life of biological systems, mainly plants and humans are as essential for human life is a specific blood oxygen conveyor hemoglobin whichever exist that coordination compounds based on iron whichever exist to coordination compound's besides magnesium conducive to the continuation of life's on this planet as well as chlorophyll a coordination compound of plant life. Because compounds like drugs and molecules arise ne'er exclusive biological dominant except additionally consist of the drug group's. Coordination compounds have also shown very effective and very important behavior tolerant a lot of diseases like malaria and Alzheimer's along with these complex coordination compound's are also anti-carcinogenic drugs like as palladium, ruthenium and platinum[31].

In recent times coordination compounds are mostly used as antivirus as well as against coronavirus. As we have currently Identify the most significant coordination complexes this particular additionally recreates to critical part in medicines. Despite to use of complex drugs in modern medicine for more than a hundred years and the use of complex drugs for rheumatic diseases for more than 60 years, no definite mechanisms of action for toxicity and efficacy have been established[32].

Specialty of complex compounds: For microbial disease: Anti-microbial resistance is a primary defense even in the post-antibiotic era. As for the emergence of antimicrobial resistance, there are also a variety of factors such as biofilm formation, activation of efflux pumps, and inactivation of antibiotics[33].

As a photosensitzers in photodynamic therapy: As in recent times, photodynamic therapy has been used in many diseases such as Ebola virus, anti-HIV, East Respiratory Syndrome, Coronavirus (Sars-Cov-2) and viruses such as middle and severe fungal, cancer, aesthetic, and microbial infections etc.[34-38].

For Alzheimer (Anti-Alzheimer): These metal complexes demonstrated specific ability to block toxicity and amyloid aggregation, and some complexes of KP1019, PMRU20 and NAMI A in ruthenium(III) have also shown an important role as anti-Alzheimer agents as have vanadium and in copper(II) complex etc[39-41].

As a Anticancer agents: The platinum complex $[PtCl_2(NH3)_2]$ has a geometrical difference between the cis isomer and the trans, like as biological activities of the cis isomer, which is also used as an anticarcinogenic drug where as Cl is an active ligand in the cis isomer so it is replaced by water molecules and a new product is then combined with water. As the platinum complexes replaced to the water molecule it reacts with the DNA of the cancer cell causing inhibition. Due to which there is a hindrance in the development of cancer cells[42].

As Antimalaria agents: As many metal complexes like ruthenium, rhodium, iron, zinc, palladium, cobalt, osmium, copper and gold etc. have also shown considerable antimalarial effectiveness[43,44].

As Anti-flammatory drugs: As seen the development of metal complexes has received mainly less attention in the past few years mainly conducive to a specific prescription based on autoimmune and inflammatory disease's. The metal complexes' also have several advantages for the develop based on therapeutics' agent's that also present an attractive alternative to organic small molecules, that highlighted example's of a specific recent develop based on transition metal complexes' though modulator's besides autoimmune & inflammatory responses[45].

Adaptive and innate inflammation involving the immune system is a normal response to infection that if left unchecked can result in neurodegenerative diseases, autoimmune, cancer, and auto inflammatory disorders. Then that latest epoch consists primarily based on anti inflammatory agent's like while anti-cytokine therapy as well as biologics such as insufficient molecule's that's inhibit a specific activity's besides kinesis' and dissimilar anti-inflammatory drugs, histone deacetylase inhibitors and stains currently under development and many other drugs are primarily under development[46].

As anti-inflammatory drug's can also intervene into patho-physiology based on inflammation toward minimized tissues damaged as well as maximizes patients consolation. Glucocorticoids also act as inhibitors, which are corticosteroids, proteins and prostaglandins involved in inflammatory processes and are also used in the treatment of inflammatory responses, among other indications, such as autoimmune and asthma by inhibiting the enzymes cyclooxygenase enzymes and Non-steroidal drugs also exert. As acetylsalicylic acid is also an instance of a non-steroidal drug[47].

Some Metal Complex for the viral disease: As we know metal ion's occur vital based on life and are very important for metabolic of process of the body[48]. Metal compounds are very important ingredients of the body to regulated to human immune systems by inhibits core enzyme into procedure based on virus's replications show it came use as a to increase the efficacy of antiviral vaccines and medicines[49,50]. Metal chelation therapy may be used to agitate metal Aβ reaction to cure Alzheimer disease[51]. This therapy initiated by introduction of chelating agents into blood and combined with the metal subsequently excrete by body[52].

Metal ion especially cupper and iron interact with Aβ in patients developed reactive oxygen species and consequently increase the Aβ plaque. As reactive oxygen species (Aβ) damage other positive molecules in the body so too. This metal chelating therapy shows good effect in Alzheimer disease. As over the last two decades many and different metal complexes have shown promising potential as anti-AD agents due to their attractive physical and chemical properties and neurodegenerative disorders that affect millions of people worldwide, mostly Alzheimer's. The disease (AD) is currently incurable[53].

Then metal complexes' possess set off an increasing accessory for the discovered of many new drugs, as they are widely used as treatments for many diseases as well as therapeutic compounds for human disorders[54,55].

Conclusions

The area of complex chemistry used for diagnosis and therapy of diseases, so the important thrust zone is ligand modification.. Complexes can increase potency by this modification. As our study of disease metabolism, and complexes provide additional benefits with respect to organic molecule. Complexes play a role in a number of essential metabolic process and therefore regulate many process of the body. Studious were conducted considering synthesis and to application based on metal complexes for pharmaceutical acting research to increase chelation potency and new drug development. The application of complex based drugs used against, Malaria, Alzheimer diabetes, viral, Cancer, fungal and bacterial etc. Our review is useful in order to researchers focusing on the applications based on complexes into the pharmaceutical industry.

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