PHARMA HIGHLIGHTS

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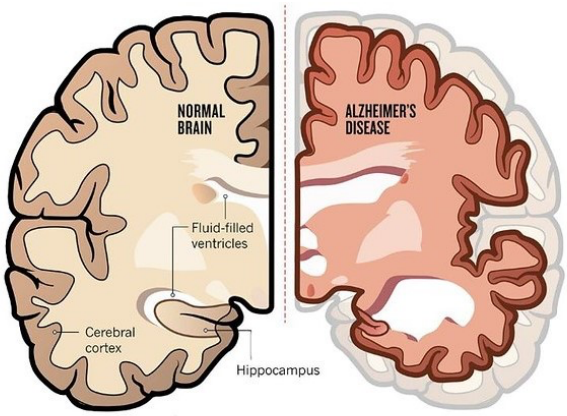
Alzheimer's Disease

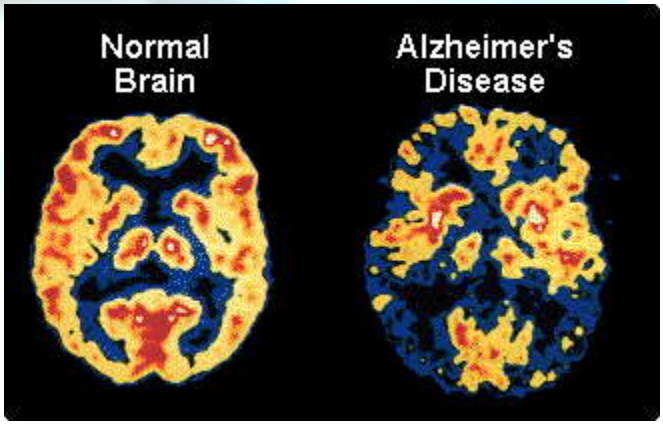


The silent theft of memories, and the gradual fading of identities — Alzheimer's disease poses a profound threat to the essence of who we are. In a world where memories shape our identities, Alzheimer's disease emerges as a formidable adversary, chipping away at the essence of who we are.

There are no disease-modifying medicines for Alzheimer's disease (AD), despite the fact that it is a global public health priority. Since Alois Alzheimer's first case in 1907, there have been tremendous improvements in our understanding of the etiology of AD, but no disease-modifying therapies have been developed. According to current estimates, dementia affects 44 million people globally; the number is expected to triple by 2050 as the population ages. Low- and middle-income nations, which exhibit rising trends of cardiovascular illness, hypertension, and diabetes, are predicted to experience the biggest increase in dementia prevalence. Dementia is mostly brought on by AD, which accounts for 50% to 75% of cases. The majority of cases of Alzheimer's disease (AD) are sporadic, while a rare familial form (fAD) is brought on by mutations in the presenilin 1 (PSEN1), presenilin 2, and the amyloid precursor protein (APP) genes. The APOE gene is the main risk factor, and symptoms often occur between the ages of 30 and 50. A significant step in the pathogenesis of AD is microglial activation, which has been linked to over 20 genetic risk factors. While education and exercise can help prevent AD, hypertension and diabetes can have a detrimental impact on risk. There are several imaging techniques, such as magnetic resonance imaging (MRI), fluorodeoxyglucose positron emission tomography (FDG PET), amyloid PET, and tau PET, for locating biomarkers for Alzheimer's disease (AD). MRI is used to evaluate neurodegenerative illnesses, detect shrinkage in AD-related brain regions, and assess cerebrovascular disease. Specific brain regions with hypometabolism can be identified with FDG PET, which examines brain glucose metabolism. In order to measure the postmortem beta-amyloid burden and bind to fibrillar beta-amyloid plaques, amyloid PET is used. Tau PET, which visualizes tau pathology using tracers, is currently employed for research.

New treatment targets have been found as a result of the biology of Alzheimer's disease, such as immunotherapy to clear amyloid or stop harmful forms in the preclinical stage. Additionally, being studied are tau pathology and neuroinflammation. A more thorough understanding of the preclinical stage of AD will lead to a more all-encompassing approach to treatment and prevention, viewing beta-amyloid, tau, and inflammation as parts of a cellular stage of AD pathogenesis. Alzheimer's disease is characterized by aberrant protein accumulations that result in neuronal malfunction and death as well as cognitive and behavioral symptoms.

As researchers and carers labor assiduously to find solutions, it emphasizes the power of human intellect and compassion. Communities come together to support those who are suffering, and the fusion of empathy and science emphasizes the importance of shared experiences and knowledge. Although there is still a long way to go until Alzheimer's is completely eradicated, there is hope for improvement and better days ahead. Although the road is lengthy, the hope for better days to come is clear.



Written by: Adrita Rahman (ID 22146043)

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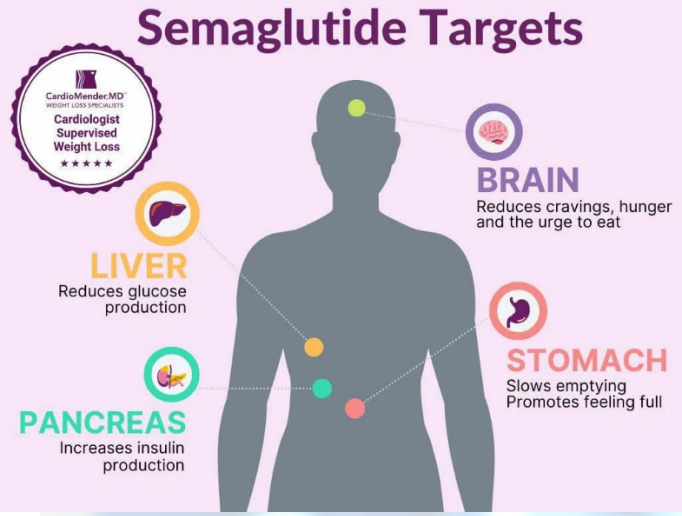
Antidiabetic Medication Making Waves as a Weight Loss Drug



After a 2021 clinical trial, different forms of semaglutide were FDA-approved for treating type 2 diabetes or obesity (in conjunction with diet and exercise).

Semaglutide is the active ingredient in the brand-name medications Ozempic (injection), Wegovy (tablet), and Rybelsus (injection). Semaglutide is a glucagon-like peptide-1 (GLP-1) receptor agonist that works by mimicking the activity of GLP-1, a hormone released in the intestine after eating. GLP-1 triggers insulin production, thereby reducing blood sugar levels, and interacts with parts of the brain to decrease hunger and promote feelings of satiety. The 2021 phase 3 clinical trial found that 2.4-milligram weekly semaglutide injections produced a mean weight loss of 14.9% (versus 2.4% with placebo) after 68 weeks in people with a body mass index (BMI) of 30 or above.

Currently, semaglutide is only approved for weight loss under the brand name Wegovy. However, as interest in semaglutide for weight loss continues to grow, healthcare professionals are finding ways to manage the demand. In the short to medium term, cost will be the most substantial barrier to the accessibility of obesity medications.

Like most other weight loss drugs, semaglutide also has side effects along with the potential to increase the risk of developing tumors of the thyroid gland, including medullary thyroid carcinoma (MTC; a type of thyroid cancer). Laboratory animals that were given semaglutide developed tumors, but it is not known if this medication increases the risk of tumors in humans. Apart from that, in a recently published research, Wegovy and Ozempic were found to be linked to digestive diseases, such as pancreatitis, bowel obstruction, and stomach paralysis. Even though the chance of developing such conditions is rare (about 1%), with tens of millions of worldwide consumers, rare risks like these may amount to hundreds of thousands of new cases. Therefore, this drug should be prescribed carefully, keeping the risks in mind.

Written by: Kazi Samiha Islam Mohona (ID 20346012)

Antibiotics for Cystic Fibrosis

Antibiotics play a crucial role in today's therapy for cystic fibrosis (CF), significantly contributing to the notable rise in median survival rates, which have reached almost 40 years. The outcomes of antibiotic therapy have a significant role in determining the quality of life, survival duration, and healthcare expenses associated with Pseudomonas aeruginosa infections throughout early infancy. This includes the effectiveness of first and subsequent antibiotic treatment in eradicating these infections, as well as the efficacy of antibiotic treatment for respiratory exacerbations.

Cystic fibrosis (CF) is an illness that affects several organs and is caused by mutations in the CF transmembrane conductance regulator (CFTR) gene. The disorder is complicated, diverse, and multi-organ.

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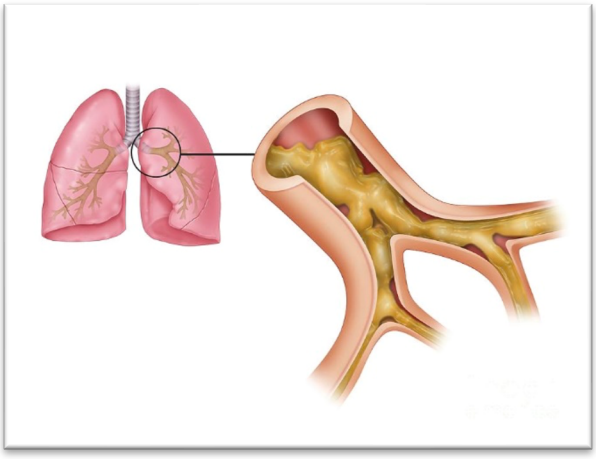
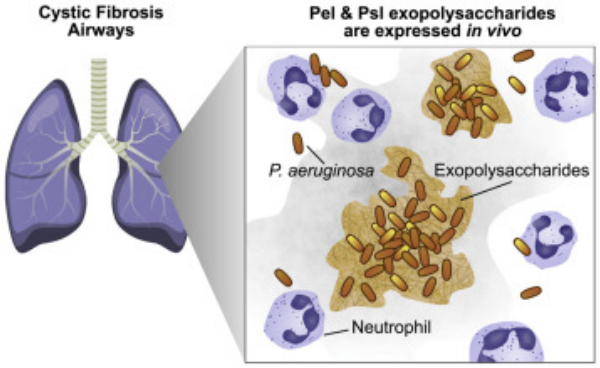


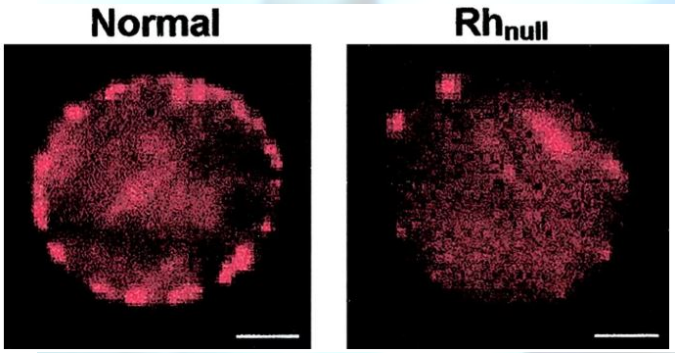
Patients with cystic fibrosis are more likely to have P. aeruginosa isolates that are resistant to more than one drug and naturally resistant organisms like Stenotrophomonas maltophilia, Achromobacter (Alcaligenes) xylosoxidans, and non-tuberculous mycobacteria. This is likely due to the more effective treatment of the classic bacterial infection associated with CF.

Staphylococcus aureus infection is spreading more widely and displaying methicillin resistance. It is not known whether medication is the most effective for these antibiotic-resistant bacteria or even if treatment is always required. All these conditions have the potential to be connected with either asymptomatic infection or respiratory exacerbations in patients who have a chronic infection with significant numbers of these organisms.



Written by: Syeda Maliha Tarannum (ID:22146065)

Golden Blood: The Rarest Blood Type



The golden blood type, or Rh null blood group, contains no Rh antigens (proteins) in the red blood cells (RBCs). This is the rarest blood group in the world, with fewer than 50 individuals having this blood group. Until 1961, when it was discovered in an Aboriginal Australian woman, scientists believed that embryos with Rh-null blood would simply pass away in gestation.

The concern with the golden blood group is that Rh null donations are extremely rare and challenging to obtain. If a Rh null person needs blood, they must rely on the assistance of a limited global network of frequent Rh null donors. There are just nine living donors of this blood type worldwide. Golden blood appears golden in color when viewed in a test tube, which is why it is referred to as "golden" blood. Because of this rarity, it is valuable in weight.

Antigens, which are proteins, are found on the surface of our red blood cells. We have blood types A, B, O, or AB depending on the antigen that is present. ABO blood types can also be classified as Rh-positive or Rh-negative based on whether cells have the "Rh-D" factor or not. A person with the golden blood type is devoid of all Rh antigens, while a person with the Rh-negative blood group is devoid of all Rh antigens except for RhD.

Who has the golden blood type?

The genetic mutation (a spontaneous alteration in a gene) that gave rise to the golden blood group appears to have occurred. The Rh-associated glycoprotein is produced by the RHAG gene, which frequently exhibits mutations. The Rh antigens must be directed toward the RBC membrane by this protein. Hereditary stomatocytosis is a disorder that is frequently linked to RHAG mutation. These people may experience prolonged, moderate hemolytic anemia and enhanced RBC lysis. Certain

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anemias that a person may be born with exhibit the Rh-null phenotype as well.

The following conditions may put you at a higher risk of the golden blood group:

• Consanguineous marriage (marriage between cousins, brother-sister, or anybody who is a near or distant relative)

• Autosomal genes (abnormal genes that have disease traits, passed down through families)

• Changes or complete deletion of certain genes, which are RHD and RHCE or RHAG

Can golden blood be donated?

Yes, one can donate golden blood. A person with Rh null blood is regarded as a universal donor because there are no antigens on RBCs, and this blood can be given to anyone with a rare blood type within the Rh system. Due to the absence of common antigens, this blood is suitable for transfusion because it may be used on anyone who needs it without running the risk of a blood transfusion reaction. However, finding this type becomes incredibly challenging due to its rarity.

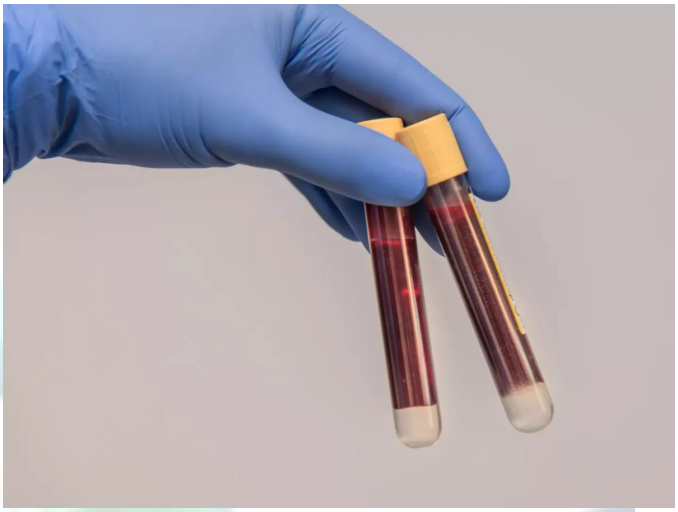
What possible side effects could the golden blood type have?

People with Rh null or golden blood type may have mild to moderate hemolytic anemia since birth. This causes RBCs to degrade more quickly, which could lower hemoglobin levels and result in paleness and exhaustion. This happens because of RBC structural flaws like less elastic structure of red cells, abnormal red cell covering, and increased fragility due to the lack of Rh antigen.

Moreover, people with the golden blood type may face challenges during a blood transfusion. A serious transfusion reaction could occur if the recipient's blood is exposed to Rh antigens, which are proteins on the surface of RBCs, from the blood of another individual. Hospitals must, therefore, have specific processes in place for these patients as well as swift reaction management.

Additionally, according to several studies, sepsis or an infection in these people can lead to significant hemolysis, which can lead to kidney failure and other problems.

Furthermore, if the mother is Rhnull and the baby is Rh-positive, and if the mother's blood gets sensitized by the baby's positive blood, then the mother's blood may produce protective proteins called antibodies that could target future pregnancies or lead to abortion or miscarriage.



Written by: Fardin Khan (ID: 22346051)