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Letter to Editor

A Peep into Purple Medicine

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Prologue

The colors have role in diagnosis and treatment of diseases.[1] A change in color of skin or urine may indicate the underlying pathological alterations in body. Similarly, a change in visual color perception may be an early indicator of neuropsychological disorder requiring medical attention. In addition, colors affect the perceived effect (beneficial or adverse) of a drug and thus influence the effectiveness of a drug. In an experiment, 100 medical students were given blue or pink placebo in the garb of sedative or stimulant medicine respectively. Subjects taking the blue placebos felt less alert (66%) than those taking the pink (26%) and also drowsier. Studies show that red, yellow, and orange drug formulations are perceived as stimulant whereas blue and green as tranquillizing drugs.[2] The sildenafil is known world over as "the Blue Pill" because blue refers to calmness and tranquility. Interestingly, its use may result in difficulty in discriminating colors such as blue, purple, and green. The purple color is a secondary color, a mix of two primary colors red and blue. The purple color symbolizes calm, creativity, dignity, frustration and sadness, luxury, magic, and mysticism and power. Poetically, it signifies love. The purple-heart epitomizes love, trust, and support. 'A purple patch in once life' is an idiom to narrate a period of exceptional success or good luck. In Feng Shui, purple color emanates high vibrations and is used sparingly. Excess use can promote depression! The "Porphura" is the ancient Greek word for purple. It originates from the purpura mollusk, which produces a purple substance used to dye the royal clothes.

Keywords: Color, Medicine, Metaphors, Purple

The Purple Color in Medicine

Here I have described medical and pharmacological entities with a variety of purple hues.

Porphyria: The name is derived from the Greek πορφύρα, meaning "purple", the reddish-purple color of the urine that is often seen during an attack of porphyria.

Purpura: In Latin purpura means "purple" as taken from ancient Greek πορφύρα. Purpura is purple spots or patches on skin or mucus membranes which occur due to a variety of causes particularly platelet disorders and vascilitides. An interesting historical account on Tyrian purple and etymology of purpura is provided by Thachill.[3]

Porphyrophobia is fear of Purple colour (chromophobia): The Purple color triggers severe anxiety or panic attacks and such individuals avoid visiting parks, gardens, malls or show rooms where they encounter purple objects.

The "**purple heart**" contained amphetamine and barbiturates together and was mostly abused for recreational purposes in 1960s. Purple haze refers to a state of mind induced by use of psychedelics such as LSD.

The **purple Foxglove plant** (Digitalis purpurea): The botanical source of digitalis glycosides used for heart failure for over 100 years.

The **purple Coneflower** (Echinacea purpurea): The active ingredients show marked immune modulating and anti-inflammatory activity.

Purple Fentanyl: It is also known as 'purple heroin' and 'purple meth' despite the fact that these ingredients are not usually present in it. The purple color originates from combining fentanyl with substances like acetaminophen, brorphine, and methamphetamine. It is abused as an

alternative to fentanyl as a recreational drug.

Purple glove syndrome: It is an uncommon adverse effect that occurs with use of IV phenytoin. A purple discoloration is accompanied by oedema and pain distal to the site of IV injection in forearm.

Purple toe syndrome: It is a rare adverse effect with use of warfarin that develops 3 to 8 weeks after initiation of warfarin therapy. There is bilateral and reversible, sometimes painful, blue-tinged discoloration of the plantar surfaces and sides of the toes. The color blanches with pressure and fades with elevation of the legs. The exact cause is not known but cholesterol microembolization has been proposed.[4]

Purple feet are seen sometimes in acrocyanosis (digital ischemia) and syndrome is rarely caused by intravenous chemotherapy with gemcitabine, cisplatin or oxaliplatin.

Linear purple striae over abdominal skin are a well-known feature of Cushing' syndrome.

Purple urine and purple urine bag syndrome: Purple urine is reported to be associated with intestinal intussusception and constipation. It is uncommonly found among patients with urinary tract infections who are chronically catheterized by indwelling catheter. Tryptophan is metabolized by gut bacteria to indole which is absorbed and forms indoxyl by indoxyl sulphatase in liver. The indoxyl forms indigo (blue) and indirubin (red) pigments in alkaline urine. These pigments react with plastic material giving urine and bag the characteristic purple hue.[5]

Light purple ribbon is worn to increase awareness for testicular cancer and a purple ribbon for pancreatic cancer awareness. The April month is chosen for increasing awareness about testicular cancer by education and support activities. For bladder cancer a ribbon with a mix of blue, yellow, and purple colors is worn.

The Purple Book is an official publication of FDA-USA. It contains a list of biological products, biosimilars and interchangeable biological products. Some drugs are dispensed in purple colored dosage forms e.g., morphine, bupropion (200 mg), esomeprazole (40 mg) and L-thyroxin (75 mcg).

Alexandria's genesis (Purple eye syndrome): It is a fictitious character created by fiction writer Cameron Aubernon (or Miquelon) who was inspired by anecdotal evidence of individuals who lived for 150 years, had purple eyes since birth, well proportional body parts without body hair, excellent immunity and high fertility. The first reported case was a girl named Alexandria Augustine born in 1329 in London with purple eyes. This creation appears to reflects mankind's quest for being ageless and timeless. A "superman" is surrected with "purple eyes" assumed to be due to genetic mutations.[6]

Fuchs uveitis syndrome can change the eye color to purple.

In 'red/green colour blindness' there is poor discrimination among any colors which have some red or green as part of the whole color. Such individual is likely to confuse blue and purple because he can't 'see' the red element of the colour purple.

Tritanopia makes someone unable to tell the difference between blue and green, purple and red, and yellow and pink. Ethambutol may cause tritanomalous visual disturbance. Sildenafil may cause disturbance in discrimination of blue, purple and green.[7]

Some drugs are colored. **Clofazimine is purple damson** colored. Litmus paper is red when the pH is less than 4.5 and blue when the pH is greater than 8.3. If the paper turns purple, the pH level is close to neutral.

A purple dye called gentian violet (a synthetic dye named after a flower called gentian) was used in a mixture by Ehrlich for staining and was marketed as an antiseptic (bacteriostatic). It became the standard treatment for itchy patches, otitis externa and sore mouths in 20th Century. It is still used in Gram's test to classify bacteria as Gram positive and Gram negative.

William Henry Perkin, a young London chemist, patented a synthesis in 1856 for a purple dye he found serendipitously whilst trying to synthesize quinine, He named it Mauveine (Aniline purple), It was used to dye clothes to be worn almost exclusively by the richest and royal members in society.[8]

In conclusion, purple hues not only symbolize serenity and royalty, but do provide visible clues to an astute clinician regarding underlying disease process.

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