














CARBGAME (CARD & Board GAMES in Medical Education) : HEME METABOLISM									
100  HEMOLICIOUS! You're Almost There Get your WINNING CARD !	99 Why 2,3 BPG has decreased interaction with foetal Haemoglobin?	98  OMG ! You're severely HYPOXIC ! TAKE REST Go Back by 20 moves.	97 Reason out: Serum Creatine Kinase is a more useful marker for diagnosis and severity assessment of Rhabdomyolysis than Myoglobin	96  What is the average glucose level for 6% of HbA1c?	95  PICK A CARD	94 How does acidosis decrease the solubility of HbS and precipitate sickle cell crisis?	93 How does replacement of lysine by methionine in Hb Helsinki affect the oxygen affinity of hemoglobin?	92 Find the error and reason out: Carbon dioxide increases the oxygen affinity of hemoglobin by binding to the C-terminal groups of the polypeptide chain	91  Boost Your Energy! 1 GLUCOSE
81  PEACE BRO!	82  PICK A CARD 	83  Boost Your Energy! 1 GLUCOSE	84 In a family, mother is affected with Congenital Erythropoietic Porphyria, father is completely normal, what is the chance (in %) of their daughter getting affected with the same disorder?	85  Make the Genie Happy to Proceed. Tell the Heme synthesis pathway in 25 seconds with all substrates, products and enzymes. You have 2 chances. If you lose throw 1 ten times on the dice. Then move to 86.	86 State the effect of Phenobarbital in type I and type II Crigler-Najjar Syndrome?	87  Roll the dice twice. Add up the numbers and Go in the backward direction	88  Find me: I am a non-aspirin analgesic and antipyretic agent. I produce Methemoglobin MEAOCHANEINT	89 How do you differentiate hereditary coproporphyria and variegate porphyria with results of urinary and fecal analysis?	90 Suggest an intravenous treatment option for Glucose-6-Phosphae-Dehydrogenase deficiency
80 True / False and reason out Purified HbF (stripped of 2,3 BPG) has a higher affinity for oxygen than purified HbA	79 What is the characteristic radiological finding in excessive bone marrow hyperplasia as a result of chronic haemolysis	78 In addition to rise in serum level of myoglobin in muscle injuries, in what other clinical condition it is the first marker to rise?	77  Boost Your Energy! 2 GLUCOSE	76 What would be the extent of red blood cell sickling in individuals with HbS and hereditary persistence of HbF?	75  PEACE BRO!	74  In HbA1c, where does glucose molecule gets attached?	73  HYPOXIA getting worse Go Back by 10 moves	72  PICK A CARD 	71  Boost Your Energy! 3 GLUCOSE
61  Boost Your Energy! 3 GLUCOSE	62 What is the threshold level of carboxy-Hb (%) above which clinical symptoms manifest?	63 Hydroxy methylbilane non-enzymatically gets converted to which product by spontaneous cyclization?	64  PICK A CARD	65 What is the physiological adaptation in chronic pulmonary disease to ensure maximum unloading of O2 to tissues?	66 How do you differentiate carotenoderma and icterus by physical examination? 	67  Boost Your Energy! 1 GLUCOSE	68 What is the characteristic manifestation of skin and mucous membrane in methemoglobin?	69 Find the error: Coproporphyrinogen oxidase catalyzes the conversion of coproporphyrinogen 1 to protoporphyrinogen 1	70 What is the major complication of transfusing large volumes of stored blood?
60 A boy with staining of teeth and raised Coproporphyrin-I levels and increased risk of photosensitivity. The enzyme deficient is _____	59 Which isoform of ALA synthase cannot be induced by drugs?	58  PICK A CARD 	57  Boost Your Energy! 3 GLUCOSE	56  PEACE BRO!	55 Name the soluble isomer of bilirubin which is produced as a result of phototherapy with blue light	54 Repeated attacks of dermatitis and scarring lead to a typical facial deformity that often referred as	53  NEXT THROW 1,2,3 - FORWAD 4,5,6 - BACKWARD	52 When does the synthesis of foetal haemoglobin begin in intra-uterine life? 	51  Boost Your Energy! 2 GLUCOSE
41  You're starting to feel HYPOXIC Go Back by 5 moves	42 Why is the ODC of myoglobin hyperbolic?	43 Mention the reaction which is the only source of endogenous carbon monoxide in the body	44 What are the allosteric modifiers of hemoglobin? 	45 What is the compensatory mechanism seen in hemoglobin in children with anemia or beta chain defects ?	46  Boost Your Energy! 2 GLUCOSE	47 Name the type of mutations in alpha and beta thalassemia	48  Non blistering photosensitivity is the characteristic feature of which porphyria?	49 What are the causes of mental retardation in Neonatal 'Physiological Jaundice"	50  PICK A CARD
40 Name the enzymes of Heme synthesis that are present in the cytosol 	39  Boost Your Energy! 1 GLUCOSE	38  Repeat the same number on the last dice throw to move ahead	37 What is the difference between Dubin-Johnson syndrome and Rotor syndrome?	36 What is the basis of administering glucose to relieve acute attacks of porphyrias?	35  PICK A CARD	34 When does fetal Hb level reach to that of an adult level in a child?	33  PEACE BRO!	32 X-Linked Sideroblastic Anemia may respond to treatment with which of the agents that act as cofactor for one of the enzymes involved in synthesis of heme?	31 Which isoform of ALA synthase is expressed in erythroid precursor cells?
21 What is the conjugation capacity of liver?	22  Boost Your Energy! 2 GLUCOSE	23  PICK A CARD 	24 Which oral supplement can help patients with photosensitive manifestations in porphyria?	25 Name the side product released in the cytosol when four molecules of PBG condense to form hydroxy methylbilane	26 Name the porphyrias that present with both neurovisceral symptoms and cutaneous photosensitivity	27 What is δ - bilirubin (Delta Bilirubin)?	28  Boost Your Energy! 3 GLUCOSE	29 Name the other terms given for the enzyme uroporphyrinogen I synthase 	30  First tell a number from 1-6 aloud. Then throw the dice. Proceed only after you get the same number on dice
20  NEXT THROW 4,5,6 - FORWAD 1,2,3 – BACKWARD	19 Name two drugs that should be avoided in patients with porphyria 	18 Find me. I am a zinc containing enzyme and sensitive to inhibition by lead	17  PEACE BRO!	16 A girl licks paint that is peeled off from the toys, develop acute abdominal pain, tingling sensation of hands, legs and weakness. Which enzyme is most likely to be inhibited in this child?	15 Find me: I am a heme containing protein involved in hydroxylation of xenobiotics	14  PICK A CARD	13  Boost Your Energy! 2 GLUCOSE	12 Which porphyria is associated with hemochromatosis and blistering skin lesions particularly in the dorsum of hands?	11 Name the compound which is formed when heme is underutilised and what is its function?
1 Which porphyria is frequently seen in countries where Hepatitis C and HIV are prevalent?	2 Among HbA1 and HBS, which has lesser electrophoretic mobility?	3  Boost Your Energy! 1 GLUCOSE	4 Why is hemoglobin C disease a non-sickling disease?	5 Name the intermediate formed in the reaction between Succinyl CoA and Glycine 	6  PICK A CARD	7 I produce cytotoxic effects when I am excited. I am used in cancer phototherapy. Who am I?	8 Which compound is responsible for the yellow colour in urine?	9  This box is locked Throw 1 on dice to move out	10 Where is the enzyme glucuronyl transferase located in cells?