

P R E L I M S

ROUND 1

solutions



PROTEUS

6th February

# 1. HIPPOCAMPUS

**WHO AM I?**

**DAUGHTER OF HEAVEN AND EARTH,  
HIDDEN IN THE DEPTHS OF THE BONE-WHITE TEMPLE.  
ONE AMONG 14, ORBITING POSEIDON.  
AN UPRIGHT STALLION BECOMES AN EXPECTANT FATHER.**

The riddle has three parts and all of them point to the same answer. Mnemosyne, the Greek goddess of memory is the daughter of Ouranos and Gaea. The seat of memory in our temporal lobe is the hippocampus. One of the 14 natural satellites of Neptune is the hippocamp, derived from the hippocampus. Hippocampus, commonly known as the sea horse is a vertical swimmer and the males of the species are known to become pregnant and carry the progeny.



## 2. KREBS CYCLE (TCA CYCLE/ CITRIC ACID CYCLE)

HOW ARE THEY LINKED?



The given figures denote the natural sources of acids that correspond to the intermediates of the Krebs cycle.

Pineapple (Citric acid / Citrate), Blackberry (Isocitric acid / Isocitrate), Broccoli (Succinic acid-Succinate), Lichen (Fumaric acid / Fumarate), Apple (Malic acid / Malate), Daikon radish (Oxaloacetic acid / Oxaloacetate).

## SOLVE THE RIDDLE!

" SHE WAS MY ELDEST GRAND DAUGHTER.

HER GARDEN IS SURROUNDED BY RING OF WATER,  
AND IT IS THERE FOR DECADES "

-HIPPOCRATES

# 3. ORTO BOTANICO (BOTANICAL GARDEN IN PADUA)

Hippocrates is regarded as the father of medicine and Botany is one of the oldest branches of medicine (considered here as its eldest daughter). The clues point towards a garden of Botany - Botanical Garden, surrounded by a ring of water.

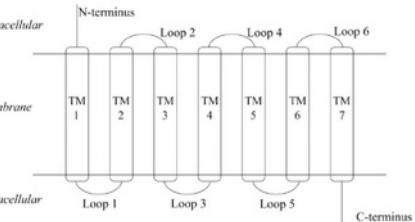
The final answer is the world's first botanical garden- Orto Botanica in Padua. Created in 1545, with a circular central plot surrounded by a ring of water, symbolizing that life originated in the Ocean. It was devoted to the growth of medicinal plants.



PROTEUS

# 4. RECEPTOR FOR THE COVID-19 SPIKE PROTEIN / ACE 2 (ANGIOTENSIN-CONVERTING ENZYME 2)

HOW ARE THEY LINKED?



(-) GPC

The first image is from the show “Locke and Key”, which is meant to point to enzyme-substrate interactions. The second image of the shoe has “spikes”, which give a clue towards spike proteins, a reference to spike proteins of the coronavirus, or more specifically COVID-19. The third image depicts a G Protein-Coupled Receptor (GPCR). [GPCR - GPC] = R, which is just a receptor.

Taken together, the answer is the receptor for the COVID-19 spike protein, or ACE 2 (angiotensin-converting enzyme 2)



## 5. WALLACE LINE

FIND ME OUT!

HUNT ME OUT IN ONE OF THE INDO-PACIFIC CHOKE POINTS  
HOW CAN A DISCONTINUITY GAIN FAME IN BIOLOGY?  
HOLDING THE CROWN OF A'S PARALLEL  
ENTITLED BY A'S BULLDOG OR THE VOYAGER OF RATTLESNAKE  
GUMTREE RESEMBLES FAUNA IN MY CASE

Wallace Line is a faunal boundary line drawn by the British naturalist Alfred Russel Wallace. All parts of the riddle point to the same answer- Strait of Lombok and Sunda are known as the two Indo-Pacific choke points, out of which Wallace line is located in the strait of Lombok. The line separates the biogeographical realms of Asia and Wallacea, a transitional zone between Asia and Australia. 'A' in the question is Charles Darwin. And Alfred Wallace is considered as Darwin's parallel for his work on the theory of natural selection. The line was named by English biologist Thomas Henry Huxley, who is known as Darwin's Bulldog. He was also a voyager of HMS Rattlesnake. Flora usually does not follow the Wallace Line boundary to the same extent as fauna. Expect for the Australasian genus Eucalyptus (Gumtree) plant that stays within the line, thus resembling fauna.



## 6. COVID-19 PANDEMIC

The first image from the show "The Crown" points to the word 'Crown' whose Latin translation is 'Coronam', a reference to the Coronavirus.

The second image is a photo of the American rapper- Comethazine, whose debut album is 'Pandemic' (2020).

The given dates represent a duration of 76 days, and "76 Days" is a documentary about people battling the COVID-19 pandemic in Wuhan.

CONNECT.

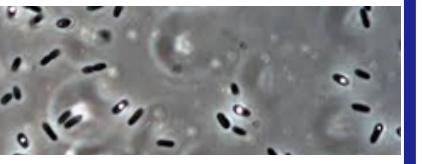


1 JULY 1990 - 14 SEPTEMBER 1990



## 7. PERSON- GARY LARSON X- STRIGIPHILUS GARYLARSONI

THE PERSON WILL GUIDE YOU TO X.GIVE US BOTH!



*Strigiphilus garylaroni* is a species of chewing louse named after cartoonist Gary Larson, creator of 'The Farside' comic.

The doll in the first image is Popo chan. An owl named Popo Chan, belonging to the species of Northern white-faced owls, was the subject of a Japanese Television show. And these owl species are the "host" of *Strigiphilus garylaroni*.

The second image (comic+American flag) indicates the person is an American cartoonist (Gary Larson).

The third image is of *Solibacillus kalamii*, the bacterium which was named after Dr. Abdul Kalam. This hints towards the final answer being an organism named after a person.



PROTEUS

# 8. BLAST



BLAST (basic local alignment search tool) is a program for biological sequence analysis, by identifying homology/similarity between sequences (DNA, proteins, etc).

The first figure represents the design of the blast program homepage of NCBI. The two pairs of songs in the second box represent almost similar songs - like the BLAST technique.

The images in the third box are connected to the plot of a "movie" called 'Blast', in which a terrorist group is holding the "US swimming team" as "Hostages".

FIND THE COMMON LINK



# 9. BIOMIMETIC ARCHITECTURE

SIGNIFICANCE?



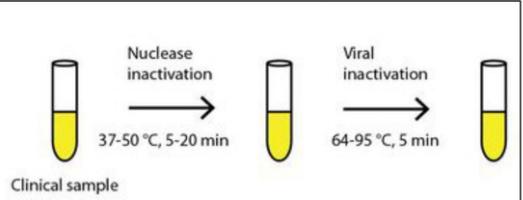
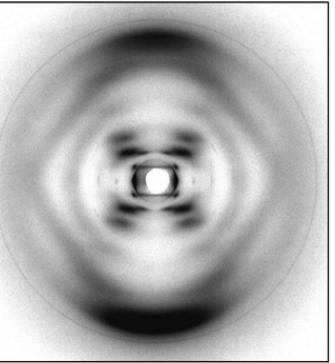
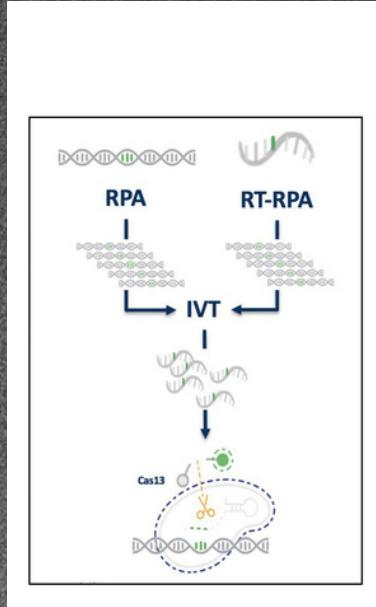
The photos are of buildings that use Biomimicry in their architectural design.

1. Council House 2, Melbourne: its design incorporates various strategies to replicate the system in termite mounds to control and maintain the temperature.
2. Esplanade Theatre, Singapore: the theatre has an elaborate skin system inspired by the hard thorn skin of the Durian fruit, that protects its seeds.
3. Institute du Monde Arabe, Paris: the adaptive facade of the structure mimics the iris of the eye.

10.

## SIR. ARTHUR CONAN DOYLE

CONNECT TO AN AUTHOR.



The first figure represents the SHERLOCK technique.

The second is the x-ray diffraction image of DNA (Photo 51) which helped James WATSON to solve the double-helical structure of DNA.

The third figure represents the HUDSON technique.

Sherlock, Watson, & Hudson are all characters from the Sherlock Holmes Novel series authored by Sir Arthur Conan Doyle.



PROTEUS

## WHO AM I?

I WAS BORN IN THE SOUTH AND TOOK UP PHYSICS AT  
THE START,  
BUT SOON BIOLOGY WAS TO BECOME CLOSE TO THE  
HEART.  
SHARK FINS AND RAT TAILS HELPED PAVE THE WAY,  
AS I SOLVED A GREAT PROBLEM OF THE DAY.  
THIS WAS ONLY A START; I'VE ALSO HELPED MILLIONS  
FEEL CONFIDENT CONNECTING THE DOTS.

# 11. GN RAMACHANDRAN

He was a famous Indian physicist born in Ernakulam. He correctly proposed the triple helical structure of collagen using X-Ray crystallographic methods, which was a landmark discovery of the time. Shark fins and rats' tails were some of his collagen sources.

He is also well known for the Ramachandran plot, a plot of the dihedral angles phi and psi of a protein, which is very commonly used to verify newly determined protein structures (hence the - feel confident “connecting the dots”, with dots referring to those obtained by x-ray diffraction analysis)

12.

## DEINOCOCCUS RADIODURANS

The bacterium *Deinococcus radiodurans* has been listed as the world's toughest known bacterium in the Guinness Book Of World Records. They possess the unique capability of being able to withstand up to 500,000 rads of ionizing radiation without losing its viability. The rapid DNA repair capabilities possessed by the bacterium enable it to survive such extreme doses of radiation. As a consequence of its supreme toughness, the bacterium has been nicknamed "Conan the bacterium"



WHO AM I?

I'M A WORLD RECORD HOLDER IN BEING  
TOUGHER THAN THE TOUGHEST.  
500,000 RADs, IT'S A PIECE OF CAKE!  
HUMANS ENVY MY GENOME REPAIR  
CAPABILITIES

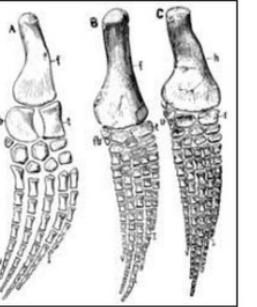
IS MY ROLE MODEL

# 13. BOWLING TECHNIQUES/ DELIVERIES IN CRICKET

UNIPROT: P55000



WHERE DO YOU FIND THEM  
TOGETHER?



1. The given UniProt ID corresponds to the protein Ly-6/uPAR related-protein, which is also known as BOUNCER protein.
2. A photo of the Red-eared SLIDER.
3. Illustrations of FLIPPER bones in reptiles.
4. KNUCKLE joints of the hand.

Bouncer, Flipper, Slider, and Knuckleballs are various deliveries or bowling techniques in cricket.

FOREIGN BODY

VECTOR

## ★ 14. CRISPR CAS9 X- PANDEMIC

CHARLATANS, \_\_\_\_X\_\_\_\_, GENESIS

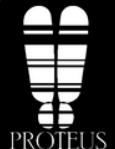
CHASE DOWN X TO FIND ME OUT

1/5TH OF ALL THE REMAINING  
REALIZABLE ASSETS OF THE PRECEDING YEAR!

CHR 6

HOST

X- Pandemic is a medical thriller book by Robin Cook published in 2018. Charlatans and Genesis are also Cook's works published in 2017 & 2019 respectively (hence the specific order in the question). The hidden words in the background- Vector, Marker, Host, Foreign body, Cell, Chromosome 6, are all names of his books (these are further clues to find X ). The book Pandemic is centered around CRISPR-CAS 9 ("me" in the question). Alfred Nobel in his Will quotes "All of my remaining realizable assets are to be disbursed as follows...", which is divided between the 5 Nobel prizes. Hence "  $\frac{1}{5}$  of the remaining realizable assets of the preceding year" hints to the Chemistry Nobel of 2020 awarded to Emmanuelle Charpentier and Jennifer A. Doudna for their work on the CRISPR-Cas 9 system.



PROTEUS

MARKER

CELL

# 15. EMIL VON BEHRING

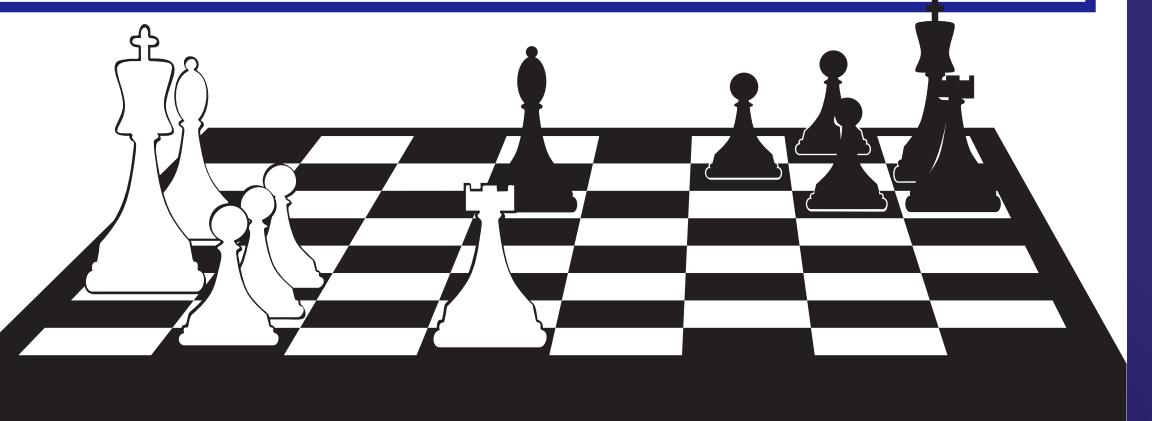
If we write the letters of the code on a chessboard in the given order, they can be read vertically as:

" THE FIRST NOBEL PRIZE IN PHYSIOLOGY OR MEDICINE FOR HIS WORK ON SERUM THERAPY "

- Which was awarded to Emil Adolf von Behring

CRACK THE CODE!

TNZIMFRMHOEDEOKTEBILDROHFENOIHNEILPGCISRRPHYISEASRYONWRPTISREOUY



T	N	Z	I	M	F	R	M
H	O	E	O	E	O	K	T
E	B	I	L	D	R	O	H
F	E	N	O	I	H	N	E
I	L	P	G	C	I	S	R
R	P	H	Y	I	S	E	A
S	R	Y	O	N	W	R	P
T	I	S	R	E	O	U	Y