THE MOLECULE WE WAKE UP TO:

A COMPREHENSIVE ANALYSIS OF CAFFEINE FROM CHEMISTRY TO CULTURAL IMPACT

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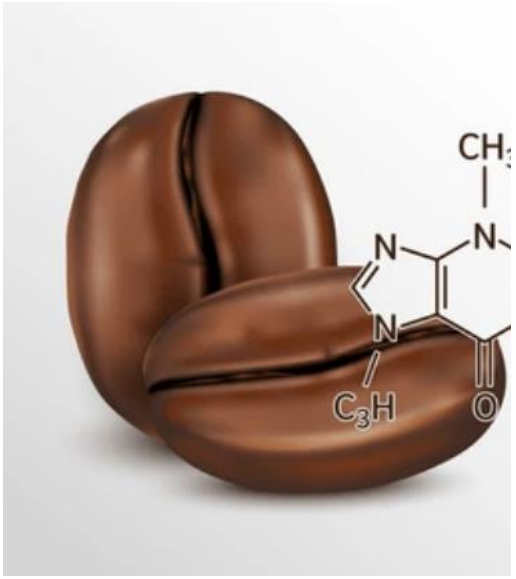
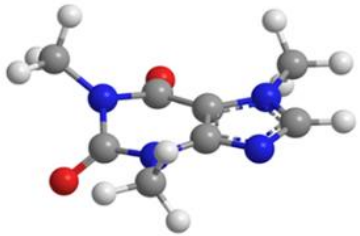
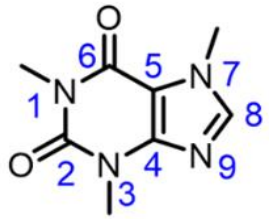


point	235-237°C
water)	21.7 g/L (~ 0.1 M), 66 g/L in boiling water
LogP	-0.07 – -0.01
aco2)	-4.41
pKa	14
HBD	0
HBA	3
PSA	58.44 Å²
onds	0
ations	0

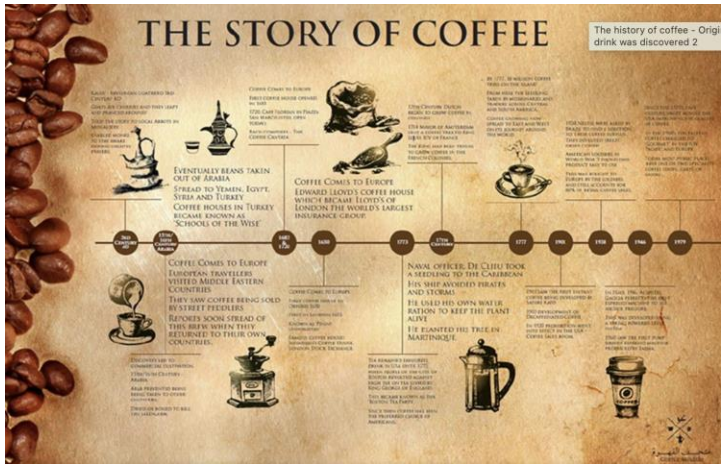


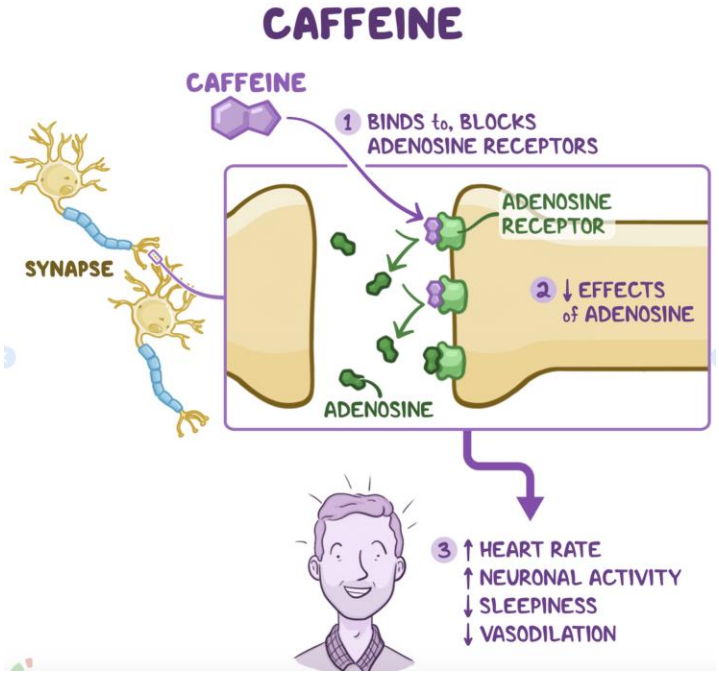


ties, structure, and numbering of caffeine.

What is Caffeine?

- A natural ingredient found in coffee, tea, and chocolate
- Chemical name : 1,3,7-trimethylxanthine
- The most popular ‘energy booster’ in the world
- Nature’s little spark plug!
  - Blocks the sleepy signals in our brain



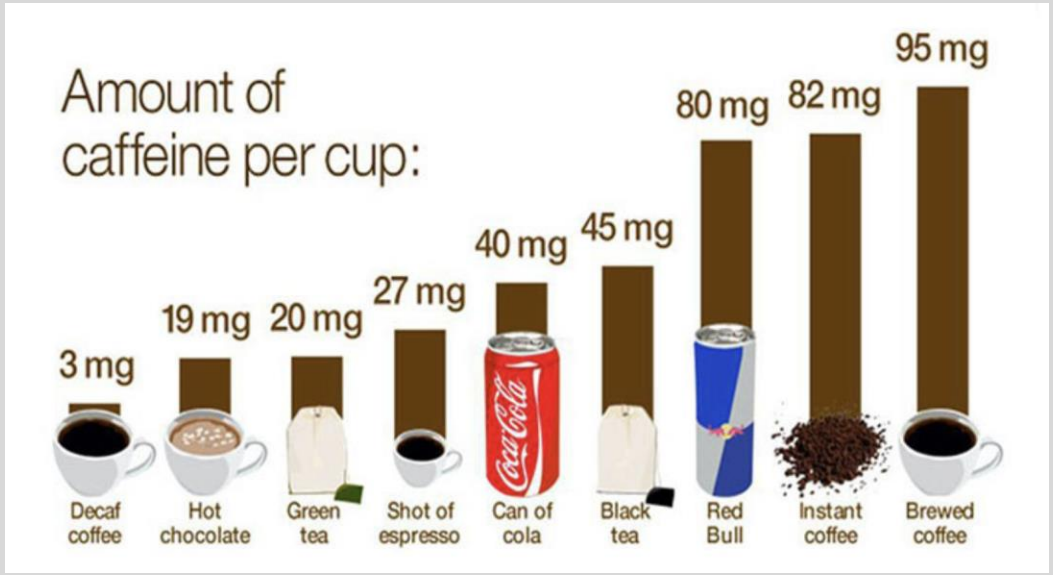


Historical Context of Caffeine Consumption

- Consumption of certain leaves or beans gave burst of energy.
- Felt alert and focused
- Psychostimulant effects of caffeine.

Caffeine and Culture

In Italy they prefer Espresso
In Japan they prefer Matcha green tea
In Argentina they prefer Mate
In Peru they prefer regular coffee
In Spain they prefer Cortado
In India they prefer Chai latte

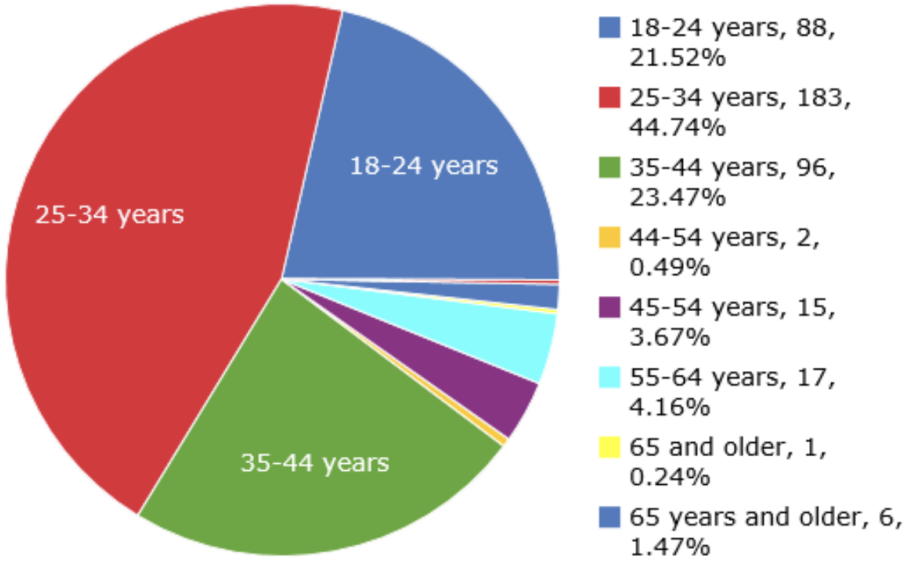


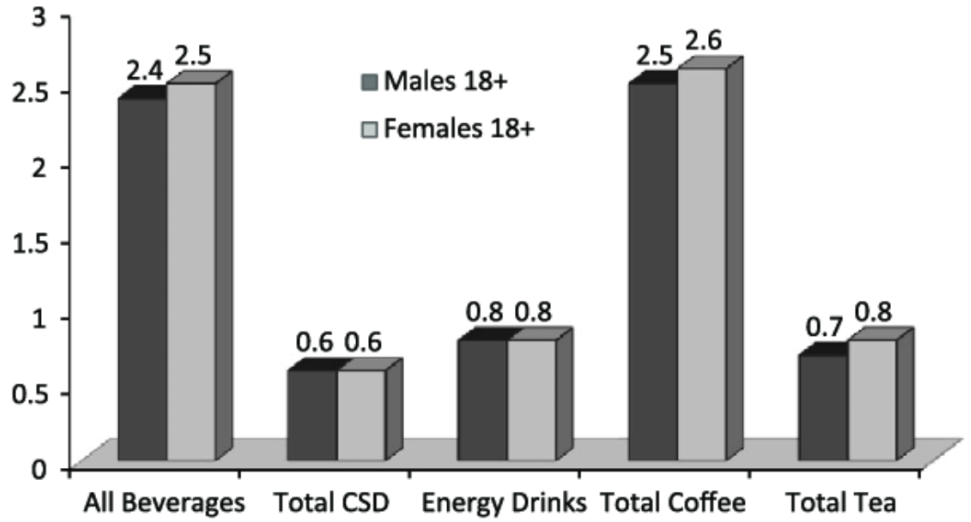
Global love for caffeine

- 1 cup of coffee has about 95 mg of caffeine.
- Energy drinks can contain up to 250 mg of caffeine.
- Did you know…… Finland consumes most caffeine per capita!

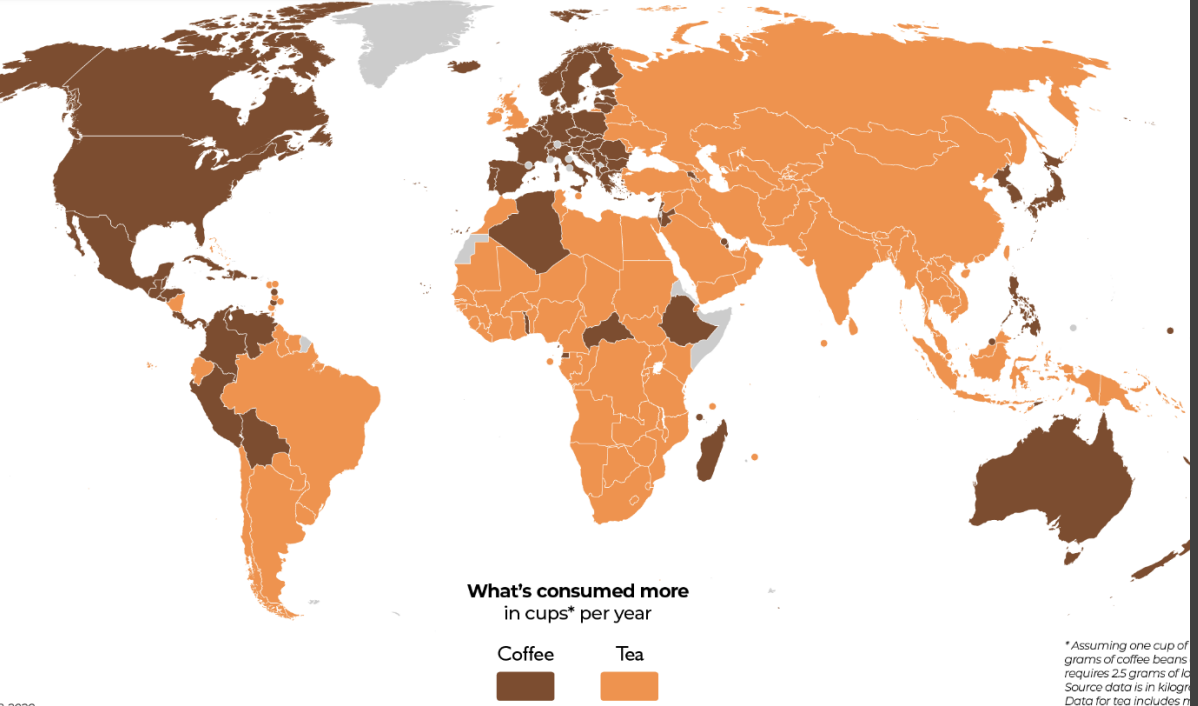
Caffeine around us

- Coffee plants use caffeine to ward of pests-natures own pest control
- Tea leaves contain more caffeine that coffee beans before they are brewed
- "Morning Ritual: Over 60% of people start their day with caffeine"
- "Afternoon Pick-me-up: Tea-time isn't just for the British!"
- "Late Night: Soda or energy drink during study sessions or night shifts"



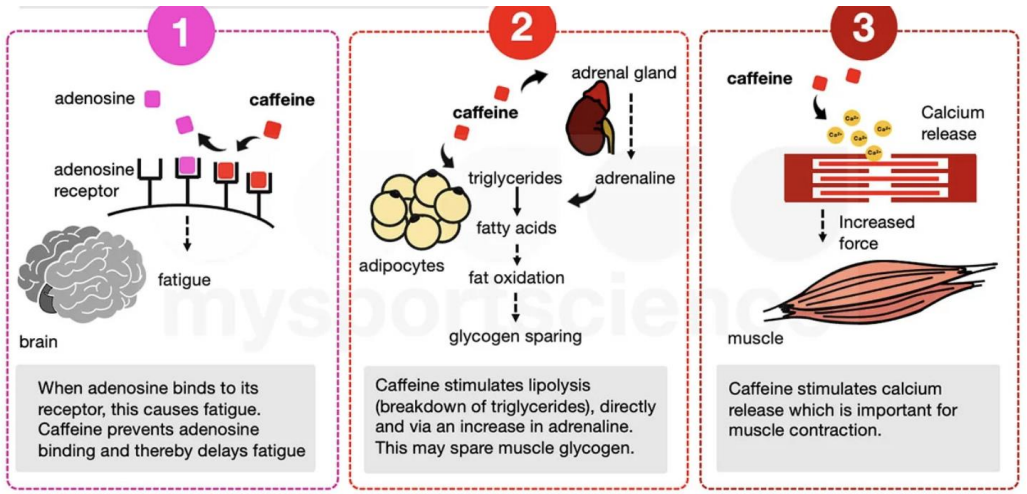


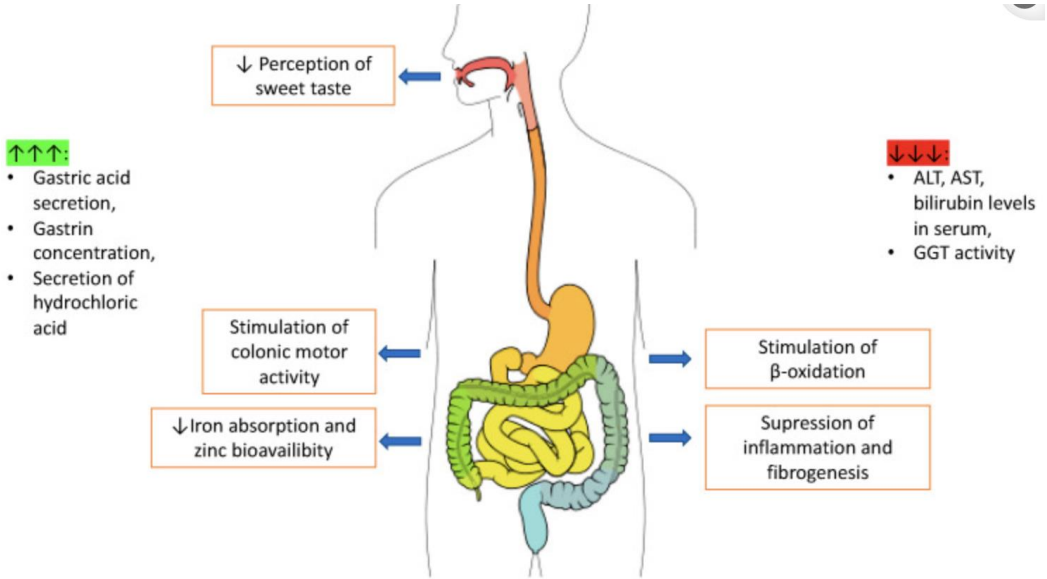
GLOBAL OCCURRENCE AND PREFERENCES BASED ON GENDER, AGE, AND ETHNICITY



CAFFEINE IN TEA VS COFFEE

- An average cup of coffee offers 95 mg of caffeine vs 26 mg in a cup of tea.
- The strength of the brew and steeping affects caffeine levels.
- Tea is deeply ingrained in the cultures of countries like China, Japan, India and the UK.
- Coffee culture is predominant in nations like Columbia, Peru, Brazil, Italy and the US.
- Globalization is blending Tea and Coffee cultures.
- Despite regional preferences, tea is twice as popular as coffee in the number of cups consumed annually.



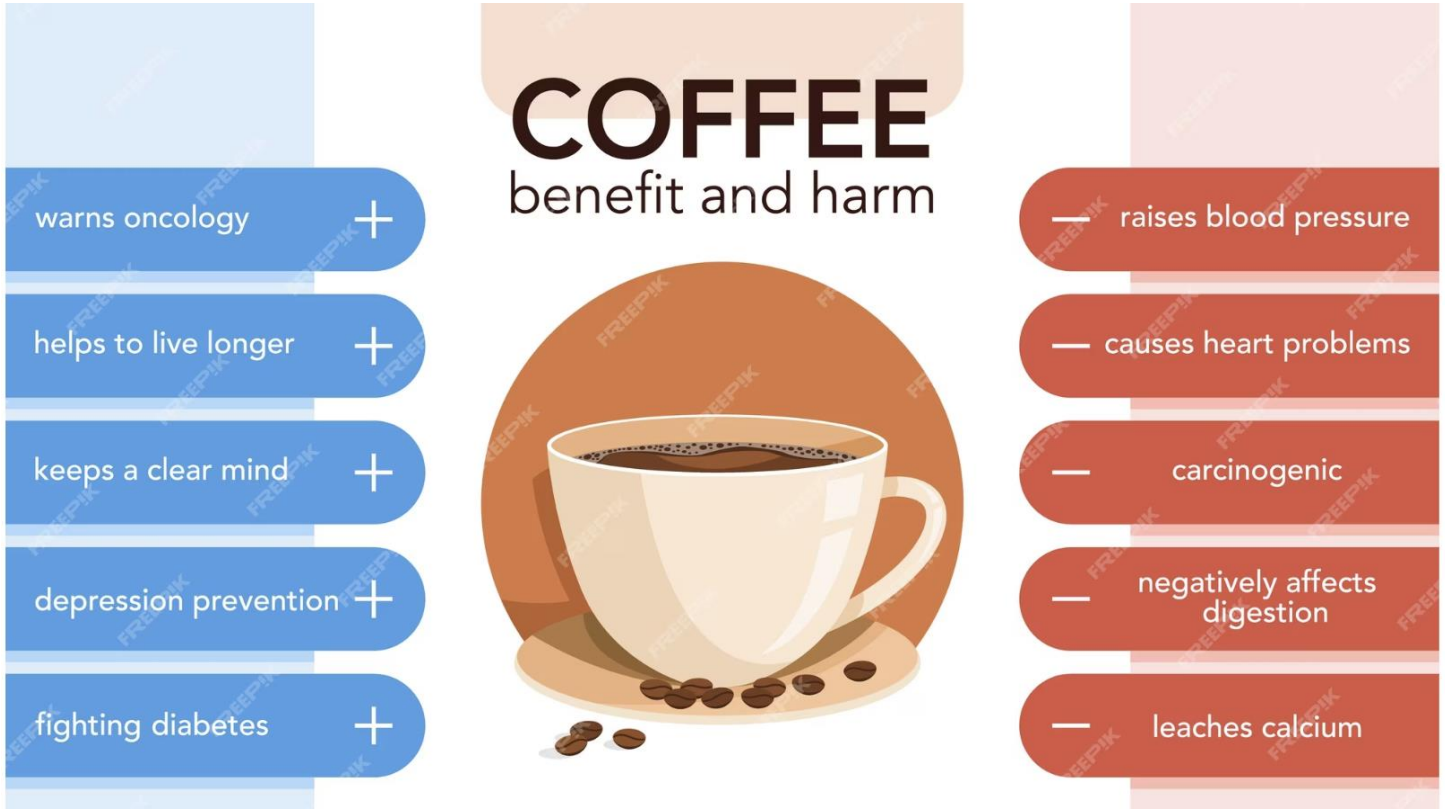


How does Caffeine Work?

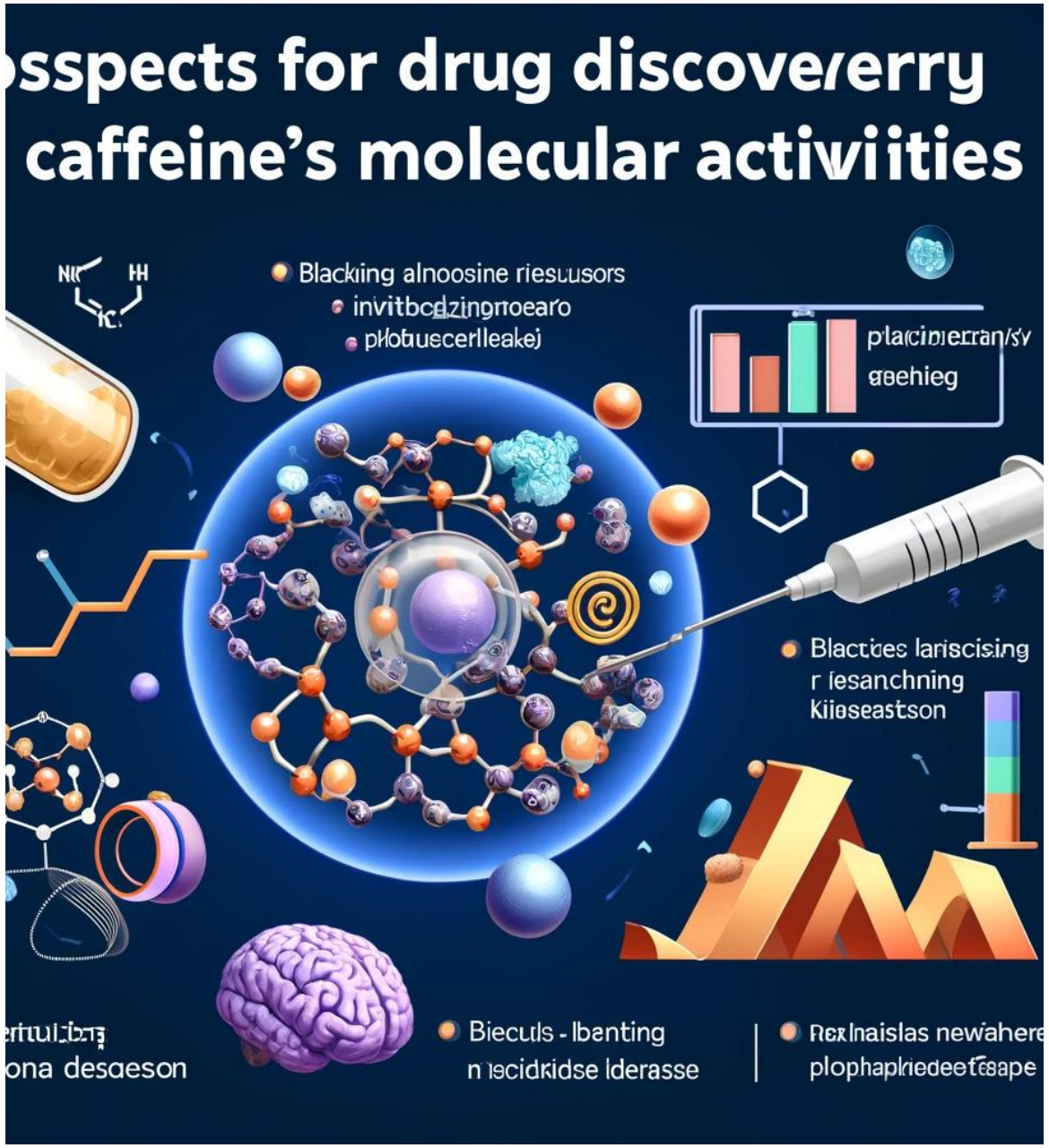
- **BRAIN ALERTNESS**: ACTS AS AN ADENOSINE RECEPTOR, PREVENTING ADENOSINE FROM INDUCING FATIGUE, THUS KEEPING THE BRAIN ALERT.

ENERGY MOBILIZATION: HELPS MOBILIZE FATTY ACIDS LEADING TO INCREASED ENERGY.

MUSCULAR PERFORMANCE: PROMOTES CALCIUM RELEASE IN MUSCLES, THUS IMPROVING PHYSICAL PERFORMANCE.



PROS AND CONS OF CAFFEINE CONSUMPTION



Prospect of Drug Discovery based on Caffeine's Molecular Activities

- Targeting Neurological Disorders: Caffeine's knack for blocking adenosine receptors opens doors for new treatments in neurological conditions like Parkinson's and Alzheimer's diseases.
- Respiratory Therapies on the Horizon: As a phosphodiesterase inhibitor, caffeine paves the way for innovative approaches to managing asthma and other respiratory ailments.
- Enhancing Drug Efficacy: By understanding caffeine's molecular pathways, scientists are aiming to create drugs with improved effectiveness and reduced side effects.
- A New Chapter in Medicinal Chemistry: The study of caffeine's diverse molecular activities could lead to a breakthrough in the pharmacological treatment of various health issues.

ACKNOWLEDGEMENTS

DR. SMITA JADHAV
&
UCBA

LET'S TAKE A TRIVIA QUIZ!

Answers to the Trivia Quiz

- 1.A) $C_8H_{10}N_4O_2$
- 2.A) Brazil
- 3. C) 200 mg
- 4. B) Black tea
- 5. B) Caffeine
- 6. D) Ethiopians
- 7. C) Decaf coffee
- 8. D) Increased risk of heart disease
- 9. B) Japan
- 10. C) Gorilla