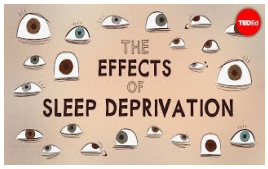

Sleep and the Brain: What Happens When You Don't Sleep?

eslvideo.com Quiz by: tugasmatkulteknologi

1. How long did Randy Gardner stay awake during his famous experiment?

○ a.) 8 days

○ b.) 11 days

○ c.) 14 days

2. What happened to Gardner on the second day without sleep?

○ a.) He became paranoid

○ b.) His eyes stopped focusing

○ c.) He started hallucinating

3. What is the estimated percentage of sleep-deprived adults in the United States?

○ a.) 30%

○ b.) 50%

○ c.) 66%

4. What substance builds up in the brain while we are awake?

○ a.) Melatonin

○ b.) Dopamine

○ c.) Adenosine

5. Based on the video, how might sleep deprivation affect a student's performance on an examination?

○ a.) It may improve concentration.

○ b.) It may reduce attention and memory.

○ c.) It has no effect on academic performance.

6. Why does the accumulation of adenosine increase the need for sleep?

○ a.) It signals that the brain needs rest and recovery.

○ b.) It increases physical strength.

○ c.) It helps people stay awake longer.

7. What relationship can be inferred between sleep and memory formation?

○ a.) Sleep interferes with learning.

○ b.) Sleep supports memory consolidation and learning.

○ c.) Sleep only affects physical health.

8. Based on the evidence presented in the video, which study strategy would be most effective before an important exam?

○ a.) Studying all night without sleeping

○ b.) Getting adequate sleep before the exam

○ c.) Replacing sleep with caffeine

9. The speaker uses the phrase "In fact" mainly to:

○ a.) provide supporting evidence

○ b.) introduce a contrasting idea

○ c.) summarize the discussion

10. The phrase "As a result" is used to:

○ a.) compare two ideas

○ b.) show a cause-and-effect relationship

○ c.) define a scientific concept

Transcript

In 1965, 17-year-old high school student,
Randy Gardner stayed awake for 264 hours. That's 11 days to see how
he'd cope without sleep. On the second day,
his eyes stopped focusing. Next, he lost the ability
to identify objects by touch. By day three, Gardner was moody
and uncoordinated. At the end of the experiment,
he was struggling to concentrate, had trouble with short-term memory, became
paranoid, and started hallucinating. Although Gardner recovered without
long-term psychological or physical damage, for others, losing shuteye can result
in hormonal imbalance, illness, and, in extreme cases, death. We're only beginning to understand
why we sleep to begin with, but we do know it's essential. Adults need seven to eight hours
of sleep a night, and adolescents need about ten. We grow sleepy due to signals
from our body telling our brain we are tired, and signals from the environment
telling us it's dark outside. The rise in sleep-inducing chemicals, like adenosine and
melatonin, send us into a light doze
that grows deeper, making our breathing
and heart rate slow down and our muscles relax. This non-REM sleep is when DNA is
repaired and our bodies replenish themselves
for the day ahead. In the United States, it's estimated that 30% of adults
and 66% of adolescents are regularly sleep-deprived. This isn't just a minor
inconvenience. Staying awake can cause
serious bodily harm. When we lose sleep, learning, memory, mood, and reaction time
are affected. Sleeplessness may also cause inflammation, halluciations, high blood
pressure, and it's even been linked
to diabetes and obesity. In 2014, a devoted soccer fan died after staying awake for 48 hours
to watch the World Cup. While his untimely death
was due to a stroke, studies show that chronically sleeping
fewer than six hours a night increases stroke risk
by four and half times compared to those getting a consistent
seven to eight hours of shuteye. For a handful of people on the planet who
carry a rare inherited genetic mutation, sleeplessness is a daily reality. This condition,

known as Fatal Familial Insomnia, places the body in a nightmarish
state of wakefulness, forbidding it from entering
the sanctuary of sleep. Within months or years, this progressively worsening condition
leads to dementia and death. How can sleep deprivation
cause such immense suffering? Scientists think the answer lies
with the accumulation of waste prducts in the brain. During our waking hours, our cells
are busy using up
our day's energy sources, which get broken down
into various byproducts, including adenosine. As adenosine builds up, it increases the
urge to sleep,
also known as sleep pressure. In fact, caffeine works by blocking
adenosine's receptor pathways. Other waste products
also build up in the brain, and if they're not cleared away,
they collectively overload the brain and are thought to lead to the many
negative symptoms of sleep deprivation. So, what's happening in our brain
when we sleep to prevent this? Scientists found something called
the glymphatic system, a clean-up mechanism
that removes this buildup and is much more active when we're asleep. It works by using
cerebrospinal fluid
to flush away toxic byproducts that accumulate between cells. Lymphatic vessels,
which serve as pathways for immune cells, have recently been discovered
in the brain, and they may also play a role in clearing
out the brain's daily waste products. While scientists continue exploring
the restorative mechanisms behind sleep, we can be sure that slipping
into slumber is a necessity if we want to maintain our health
and our sanity.