



SMART

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# SMART Magazine



# SMART MAGAZINE 202306

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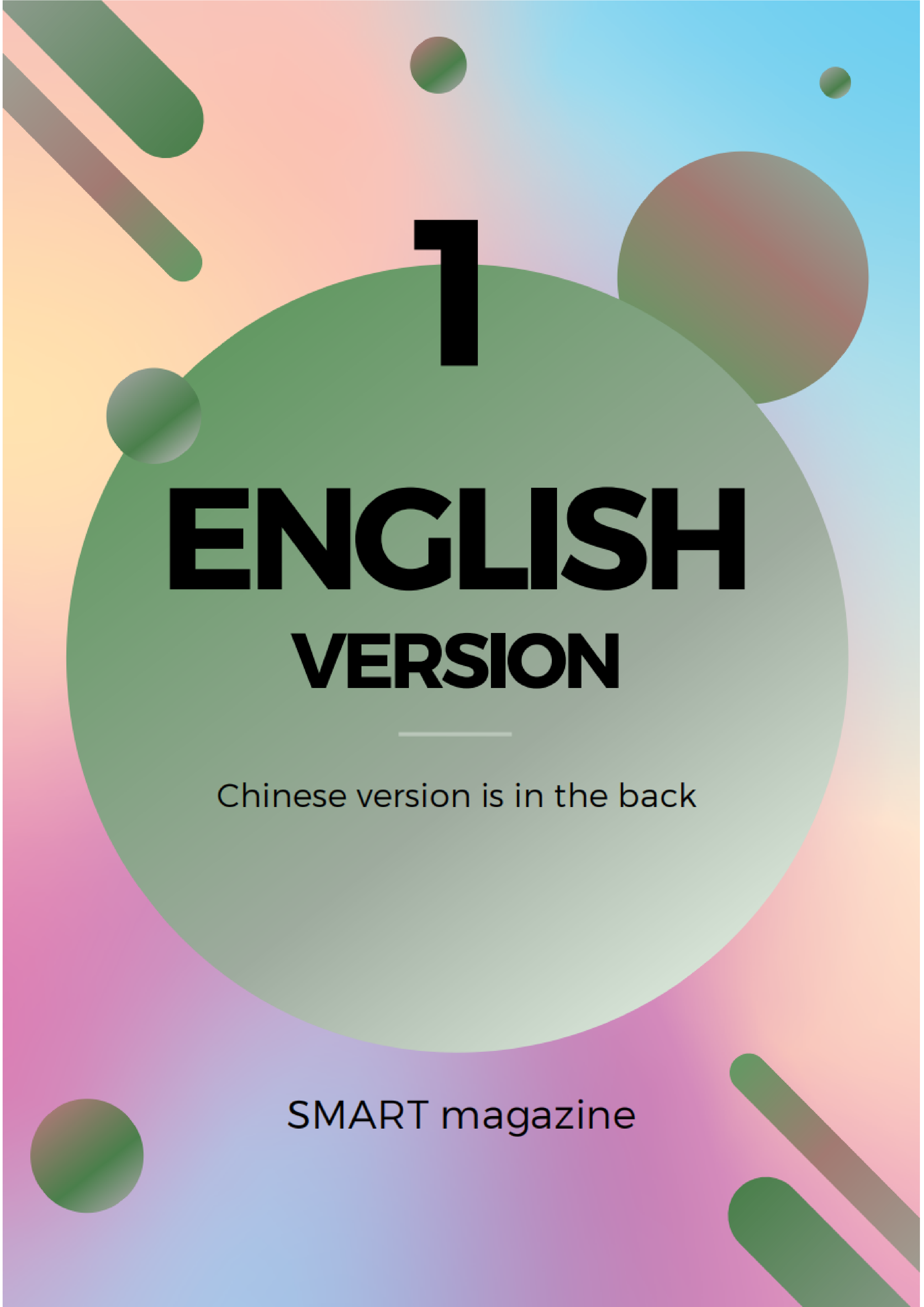
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SINCE  
01/2023

Insomnia, Stroke, Botox,  
Narcolepsy, Secretory Mechanism  
of Gastric Progenitor Cells,  
Danger of swiping our phones  
before sleep

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1

# ENGLISH VERSION

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Chinese version is in the back

SMART magazine

# Insomnia: a Disease that Should No Longer Be Neglected.

By Cindy He

01

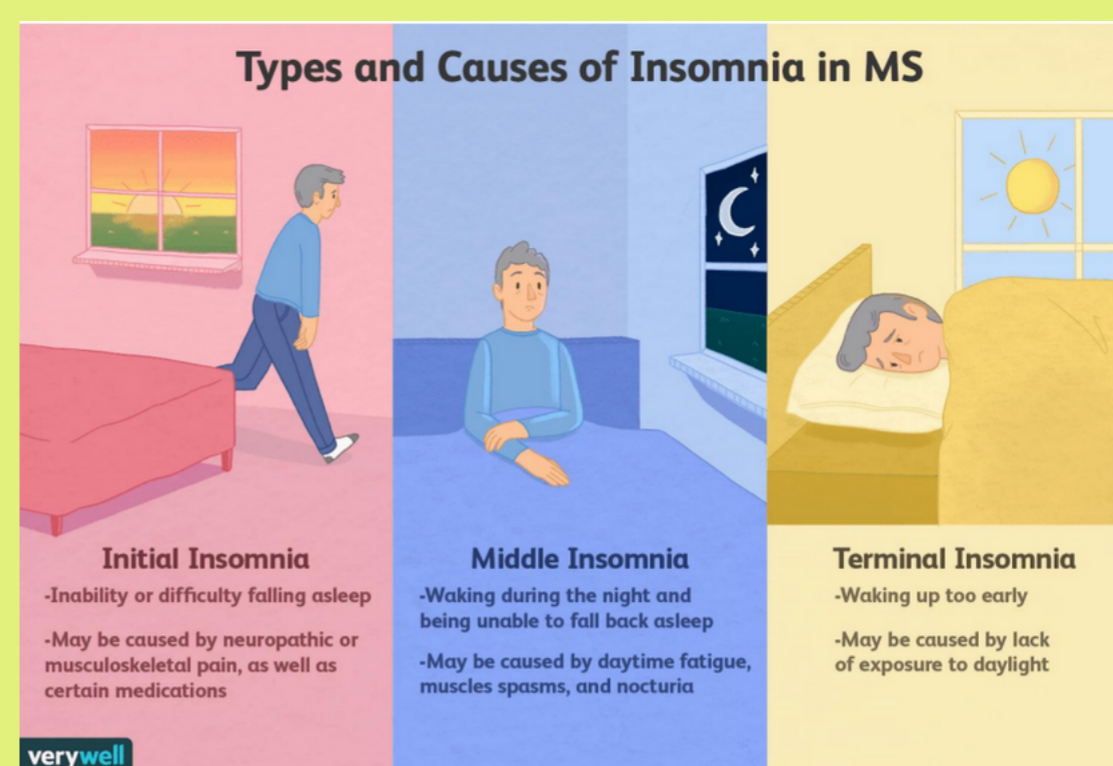
## Why is sleep a luxury now?

Have you ever had insomnia, or have you been plagued by it? An ongoing survey finds out that people under 18 have a high level of sleep procrastination rate, this group of people tends to stay on their phones for hours before going to bed, and consequently past the time when they should go to bed. On the other hand, people over 18 affected by work and school pressure, mental anxiety, and family reasons develop a feeling that sleep is a waste of life, so take the initiative to sleep late, by extending the night to pretend to seize the time, to resist the "life wasted" feeling of emptiness. This is the implementation of their own "sleep deprivation", in self-punishment, and self-torture. According to statistics from the Chinese Sleep Research Society (CSRS), more than 300 million Chinese people suffered from some kind of sleep disorder in 2021, and the incidence of insomnia among adults is as high as 38.2%. The 2022 China National Healthy Sleep White Paper shows that nearly three-quarters of respondents said they had sleep problems, including 33.1% of difficulty falling asleep, 25.8% of easy waking, 23.5% of insomnia, 21.8% of snoring and 20.5% of excessive dreaming. With these skyrocketing morbidities, people need to acknowledge this is indeed a problem. So, what exactly is insomnia and what are some criteria for it? The National Institutes of Health answered this question by explaining that "Three main components are required to diagnose insomnia: persistent sleep difficulties, adequate sleep opportunities, and associated daytime dysfunction" (nih.gov, 2022). Insomnia might be a minor annoyance for some people. Others may have severe disruptions from sleeplessness. For numerous reasons, your body need sleep and we should try our best to rest and keep you from functioning at your best.

03

## How does daridorexant work to treat insomnia?

The more widely used treatments today are pharmacotherapy, including those approved by regulatory agencies for the treatment of insomnia, off-label prescription drugs for insomnia, over-the-counter (OTC) sleep aids, and dietary supplements (e.g., melatonin). All of these medications have more serious side effects, including nightmares, while sleeping, short-term feelings of depression, stomach cramps, and sleep-related behaviors such as driving while not fully awake. The US Food and Drug Administration authorized daridorexant (Quviviq) for the treatment of adult insomnia in January 2022. Unlike other insomnia medications on the market, daridorexant has very few common side effects. Adult patients with insomnia may use the oral pill daridorexant. It comes from the class of medications known as orexin receptor antagonists. The Orexin receptor antagonist (ORA) is the most recent class of insomnia medications. Every day, your brain produces a protein called orexin that helps you wake up. During the wake-up process, orexin attaches itself to certain nerve cells. In the hours before sleep, orexin is typically less active so you feel sleepy. At that time, other proteins that promote sleep are more active. Daridorexant functions as an ORA by inhibiting orexin from attaching to those nerve cells. As a result, your brain enters sleep mode and remains there for as long as possible. It will take a while for daridorexant to wear off, and then you will feel a natural urge to wake up again. In three phases of clinical studies, most people tolerated Daridorexant well. Headache and sleepiness were the most common side effects. Because of the risk of addiction, Daridorexant has been requested by the FDA to be classified under controlled prescription drugs.



02

## We should put this issue under the spotlight.

Insomnia is a prevalent sleep disorder that often goes undiagnosed by physicians. However, its effect on the human body is massive. As Dr. Michael Twery, a sleep expert at NIH points out, "Almost every tissue in our bodies is affected by sleep;" and he furthers, "It has an impact on our immune system, appetite, breathing, blood pressure, and cardiovascular health." Among the most common treatments are relaxation techniques and deep breathing exercises. In some cases, medication is also prescribed. But consult your doctor before trying over-the-counter sleep medications, as they may leave you feeling a sense of drowsiness in the morning.

04

## How do I take care of myself?

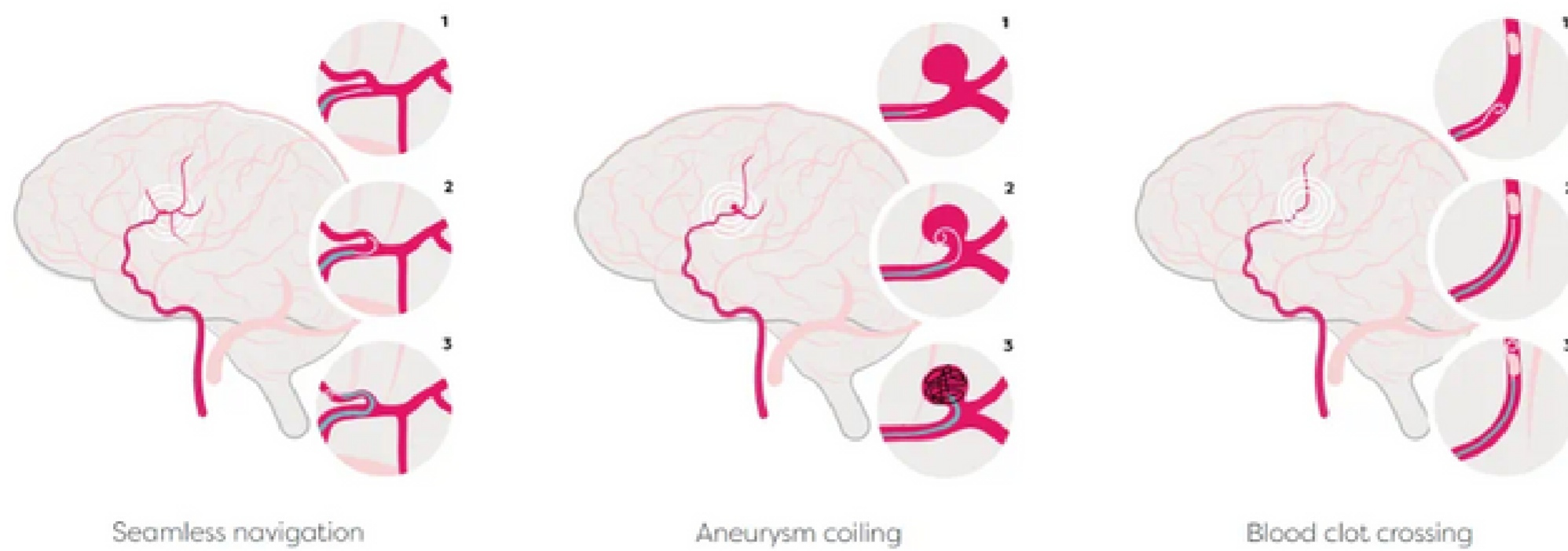
March 17th is World Sleep Day, and this year's theme is "Good Sleep, Source of Health". One-third of a person's life is spent in sleep, and a good night's sleep is related to one's the mental outlook and physical health. Here are some techniques you should practice to improve your sleeping quality.

- Establish healthy sleep habits: maintain a routine, go to bed regularly at night, and avoid staying on cell phones or TV too long before going to bed.
- Regulate emotions: face the stresses and challenges in life positively, find relaxation methods that suit you, such as yoga, meditation, and deep breathing, etc.
- Dietary regulation: avoid drinking large amounts of coffee, tea, and cola, and be careful to eat a light and regular diet;
- Face insomnia: if it is short-term insomnia, there is no need to over panic, you can first self-adjust by the above methods, if self-adjustment is difficult, insomnia persists, or combined with emotional problems, you should seek professional medical help.



# The New Born Hope for Patients with Stroke

By: Zhiyuan Li



**Stroke** is one of the most common disease which is caused by the sudden rupture and bleeding of blood vessels in the brain (hemorrhagic stroke) or cerebral ischemia and hypoxia caused by vascular blockage (ischemic stroke). There are more than 12.2 million people who suffer from stroke worldwide each year resulting in over 721 billion US dollars spent globally on stroke treatment. To reduce the cost of rehabilitation treatment, immediate thrombolytic therapy or surgical intervention is necessary in the event of a stroke. This is because during a stroke, nearly 2 million neurons are damaged every minute, which this damage is often irreversible. The longer the time delayed to take the treatment, the more severe the brain damage is. Even if the patient is not die, there could be a lifelong disability, with many patients suffering from lifelong paralysis. Cerebral stroke can be divided into two types: hemorrhagic and ischemic stroke. For ischemic stroke, prompt thrombolysis and removal of the thrombus are required as soon as possible. Therefore, mechanical thrombectomy is considered a primary option for stroke treatment.

Mechanical thrombectomy is to place the thrombectomy device at the embolic site of intracranial and extracranial Great vessels (including internal carotid artery, middle cerebral artery, vertebral artery and the basilar artery), extract the thrombus at the embolic site from the vessel, and then remove it from the body by catheter to restore the blood supply at the embolic site. However, an important factor in reducing stroke complications is the ability to quickly reach the site of cerebral vascular embolism during surgery. This intervention technology can reopen the occluded Great vessels and restore neural function, but it requires a high level of technical skill from the operator. At the same time, because the performance of the existing equipment and instruments cannot fully meet the requirements of the crooked cerebral vessels, reaching the site of cerebral vascular embolism can be time-consuming. The longer the time, the more necrotic neurons will be, and the patients will lose more functions.

"Therefore, there is an urgent need for instruments that can better adapt to the physiological and anatomical structure of the brain's blood vessels during surgery, and the ease of operation of the guide wire has become the most important part to put in more effort."

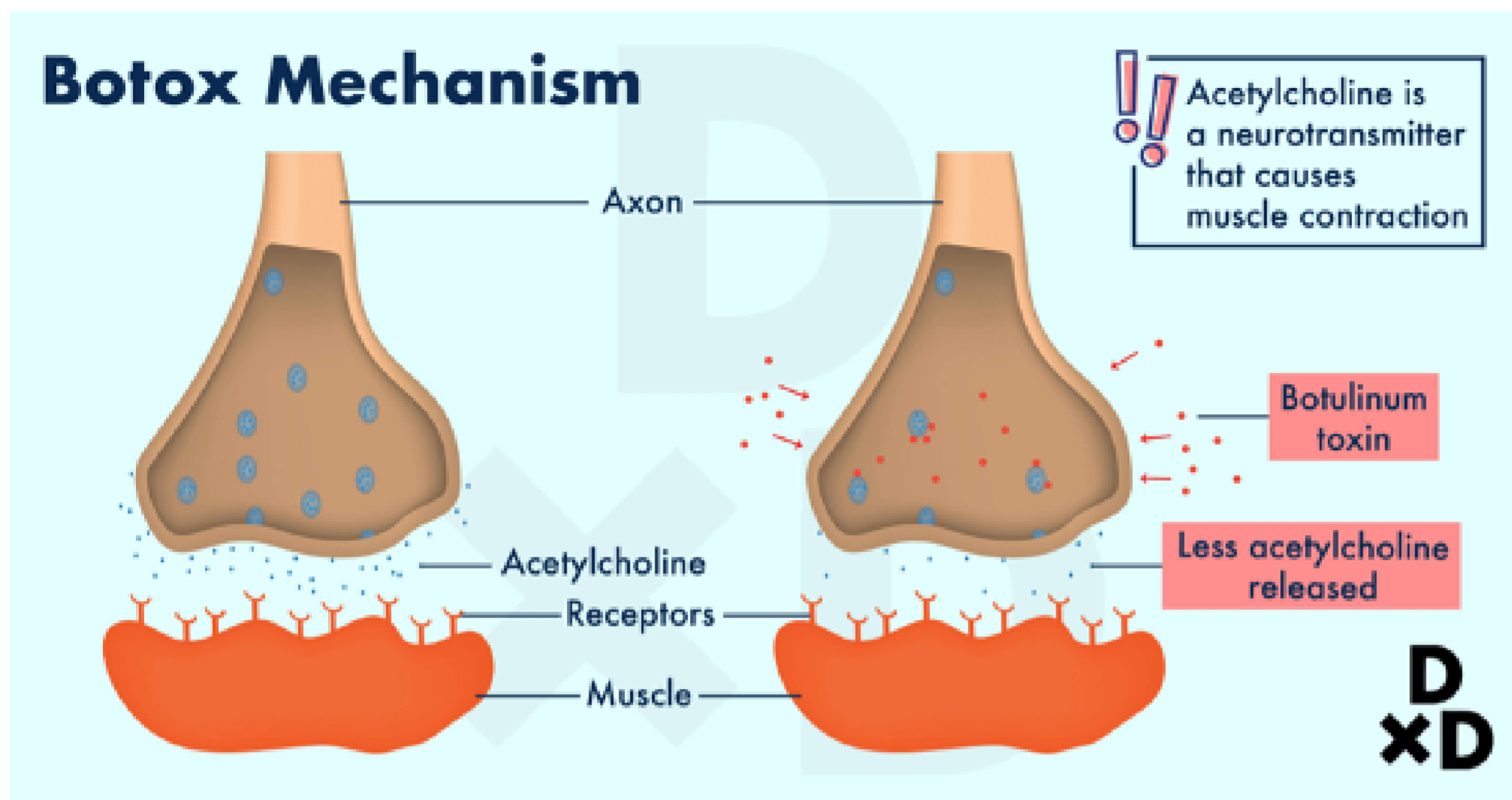
This year, Atria Medical has launched its own new real-time deflection guide wire called Atria and it has improved the method of navigating complex cerebral arterial networks. The distal tip can be formed in real-time without the need to remove the instrument from the patient. Atria has three unique features: adjustable guide wire, detachable handle, and traceability. The real-time deflection of the guide wire end is directly controlled by the handle, which can achieve the highest accuracy and flexibility. The detachable handle can quickly and reliably adjust the adjustable head end. At the same time, it has a brand new connection with the guide wire, and the Atria handle is detachable, allowing doctors to install the guide wire on the detachable handle anytime and anywhere. After the handle is installed, the angle of the guide wire head can be freely controlled, allowing the guide wire to better pass through the tortuous blood vessels. Finally, Atria's headend technology provides infinite possibilities for contacting complex and distal neurovascular targets. Its unique coating enables seamless navigation and improves the traceability of blood vessels.

Faster and more flexible guide wires allow doctors to reach the embolic point deep in the brain at the fastest speed, remove the thrombus, restore blood flow, and restore oxygen supply. This can greatly improve the postoperative prognosis of patients and save a lot of postoperative care and rehabilitation costs.

# THE PAST AND PRESENT OF

# BOTOX

By: Icey Wang



**Origin:**

P2: The Mechanism of Botox

## The Rising water

Botox&Myobloc is produced by Botox during reproduction. It is also a neurotoxin containing a high molecular protein, as a result the essence of botox is protein. It is worth mentioning that botox is the most toxic biological toxin known in nature among natural toxins and synthetic toxins.

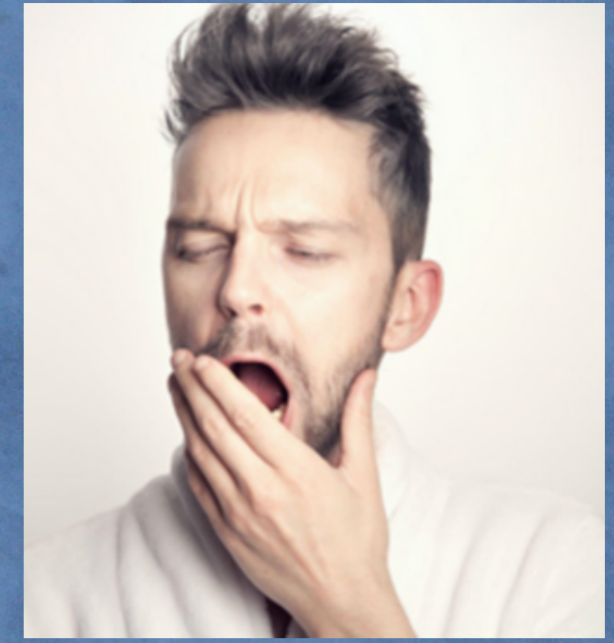
## The Evolution of Botox :

From Biochemical Weapons to Medical Aesthetics "Weapons" , when we mentioned Botox, I believe we all know its role in medical aesthetics. Popular projects such as face-slimming needles and wrinkle elimination are all related to Botox. But before that, Botox was an important biochemical weapon during World War II, because Botox can damage the biological nervous system, making people feel dizzy, weak and have difficulty in breathing .

Botox was first discovered in 1820 in a small town in Germany, where many residents suffered from dizziness and fatigue after eating sausages, which may be related to toxins in spoiled sausages. A doctor named Justinus Kerner called this unexplored poison "botulism poison". Because of the nerve paralyzing nature of Botox, it has become a feared biological weapon on the battlefield. It was not until 1920 that a Swiss scientist Karl Friedrich Meyer discovered that food heating could prevent botulinum toxin poisoning. After that, Botox was often used to treat symptoms such as muscle movement disorder. It was not until 1986 that Botox really stepped into the door of the beauty industry. A Canadian ophthalmologist accidentally discovered that Botox could remove wrinkles from patients' eyes, a discovery that started the rapid spread of Botox in the beauty industry.

In China, the number of botulinum toxin injections has grown rapidly. From 2017 to 2021, the number of injections has increased from 1.70 million to 4.50 million, reflecting the huge demand for botulinum toxin in the increasingly grown market. In addition to its most popular medical aesthetics, it has also begun to be used to treat symptoms such as isolated neck dystonia, temporary masseter hypertrophy and strabismus. Research is also in progress on new production technologies, such as recombinant protein technology, to improve the potency and purity of botulinum toxin neurotoxins.

# Uncontrolled Sleep - Narcolepsy



How would you feel if someone sleep deeply during the day? Do you think he didn't sleep well last night, or think he wants to have a Lie-Flat Movement? However, if he said that sleeping during the day is out of his control, would you believe it? In fact, this condition may indicate the presence of a rare disorder called narcolepsy.



In addition to falling asleep during the day, most people with narcolepsy also experience five common symptoms: excessive sleepiness, cataplexy, sleep paralysis, hypnagogic hallucinations, and nocturnal sleep disturbances.

**Excessive Sleepiness:** People with narcolepsy often doze off during the day for about 10 to 20 minutes, usually no longer than an hour, and fall asleep again within two to three hours after dozing off.

**Cataplexy:** About 60% of narcolepsy patients have this symptom, and it often occurs after the patient expresses strong emotions, such as after laughing or crying. The patient's muscles lose tension without warning, and this state can last from a few seconds to a few minutes. The symptoms of cataplexy include a drooping head, jaw-dropping or slurred speech, general weakness, and falling asleep after falling. Depending on the presence or absence of cataplexy, narcolepsy can be classified into two types: Narcolepsy Type 1 (NT1), which includes cataplexy, and Narcolepsy Type 2 (NT2), which does not involve cataplexy.

**Sleep Paralysis:** This is because the brain is very active during REM. In order to prevent the body from responding to the dream (such as punching and kicking) and causing injury, the brain temporarily relaxes the arm and leg muscles so that we cannot move. If you are already awake but this state has not been lifted, it is commonly known as sleep paralysis. This state is more likely to occur in patients with narcolepsy than in ordinary people.

**Hypnagogic Hallucinations:** About 40-80% of patients may have hallucinations before falling asleep. This is a state in which reality and dreams are interlaced, causing patients to have visual, auditory, and tactile hallucinations. Usually, the duration is not long, but because the feelings are so realistic, patients often feel very scared, or mistakenly believe that they have a mental illness.

**Nocturnal Sleep Disturbances:** Tossing and turning in bed at night, unable to fall asleep, or falling asleep but unable to sleep deeply and waking up frequently. Some patients also have problems such as nightmares and leg twitching, which lead to a decrease in sleep quality or an increase in the probability of daytime sleepiness.

At present, narcolepsy cannot be completely cured, and it can only be treated by cultivating sleep habits and drugs. In addition, because narcolepsy is a lifelong disease when using drugs for treatment, issues such as drug resistance and side effects need to be considered.

#### Cultivating Sleep Habits:

Patients need a regular schedule of waking up, falling asleep, or engaging in hazardous activities (such as driving or cooking) at set times, and taking naps at regular intervals during the day. These methods can minimize the potential safety hazards caused by patients falling asleep suddenly, and reduce the patient's dependence on drugs.

#### Drugs Treatment:

Doctors currently use two classes of drugs to treat narcolepsy: stimulants and antidepressants

**What is narcolepsy?** According to the definition of the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), if the daily sleep time is more than 7 hours or even more than 9 hours, but still tired, or repeatedly enter the sleep state in a day; and occurs more than 3 times a week and lasts for at least 3 months. This is narcolepsy.

In 1975, people first noticed this dangerous disease and held the first international symposium in France. Patients will fall asleep uncontrollably, which will have a huge impact on life and work. For example, when a patient falls asleep uncontrollably while driving a vehicle. That's really a high-wire act.

The human sleep cycle can be divided into four stages, which are sleep onset, light sleep, deep sleep, and rapid eye movement (REM). At present, the medical community believes that narcolepsy patients will enter the REM period for no reason when they are awake. Researchers are also actively trying to understand the causes of narcolepsy. According to the current research results, the incidence of narcolepsy is similar in males and females, and it is more common in adolescents and adults aged 15 to 30. The central nervous system of patients has trouble controlling sleep and wakefulness. Most patients carry a special antigen - HLA. The hormones in the brain of patients will be different from those of normal people. And it may be a genetic disease.

At present, clinically, doctors use three methods to judge whether they are suffering from narcolepsy, multiple daytime sleep test (MSLT), night sleep multiple physiological test (PSG), and cerebrospinal fluid test (CSF).

**MSLT:** This test needs to be done while the patient is awake during the day. During the multiple sleep latency test (MSLT), patients are given several opportunities to nap every two hours, with each nap lasting approximately 20 to 35 minutes, and this process is repeated four to five times. The examination is mainly to detect the patient's sleep cycle and determine how likely the patient is to enter the rapid eye movement period.

**PSG:** The test will ask the patient to fall asleep in the ward, and measure the patient's brain waves, eye movement, muscle activity, heart rate, respiration, and blood oxygen concentration during sleep. In the examination, people with narcolepsy will soon fall asleep and enter the dreaming stage earlier, and usually have more disturbing experiences at night. Multiple sleep exams can also help identify other possible causes of daytime sleepiness.

**CSF:** Hypothalamin (also known as orexin) and dopamine in the cerebrospinal fluid can regulate human wakefulness and sleep. If the patient's hypocretin is reduced or the secretion of dopamine is abnormal, both can be used as indicators for judging narcolepsy. Researchers currently believe that hypocretin decreases because the immune system attacks the areas of the brain that secrete hypocretin, but not all patients with narcolepsy have reduced hypocretin. And the reason the immune system attacks the brain is also unclear.



Since humans first came across narcolepsy in the late 20th century, we've had many new breakthroughs. In addition to the two treatments mentioned in this article, researchers are also trying to inject the hypothalamus back into the brain; they also found that current treatments for certain diseases may lead to narcolepsy; and narcolepsy not only happen in humans, but some animals (such as dogs) also show symptoms of narcolepsy. At present, Stanford University has the most in-depth research on narcolepsy and also released "History of Narcolepsy at Stanford University" in 2014. It can be found for free on the internet.

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# Molecular Research On the Secretory Mechanism of Gastric Progenitor Cells that May Lead to Various Gastric Diseases

By Rachel

Defective gastric progenitor cell differentiation is associated with several gastric diseases such as atrophic gastritis, intestinal chemosis and gastric cancer. The gastric body is the major part of the mouse and human glandular stomach and contains functional epithelial cells that secrete mural cell acids, main cell proteases, and pit and neck cell mucus. These cells are continuously replenished by stem/progenitor cell populations in the gastric unit, thus defects in differentiation of gastric epithelial cells are associated with gastric diseases. For example, chronic *H. pylori* infection can lead to pseudopyloric chemosis, in which proliferating progenitor and premature cells express increased neck and principal cell markers, while the number of mural cells is reduced.

Through ultrastructural evidence, we know that in healthy gastric body tissues, highly proliferating isthmus progenitor cells in the upper middle part of the gastric unit differentiate into a variety of epithelial cell lineages, including concave, cervical, mural, and endocrine cells. In the past, the progenitor cells were thought to differentiate from the neck cells, but recent studies have shown that the progenitor cells possess a stem cell-like self-renewal capacity for maintaining their own numbers. Currently, researchers do not have a clear understanding of the mechanism by which the close coordination between progenitor cell self-renewal and differentiation to maintain tissue integrity. To investigate this process, scientists used Quartz-Seq2, a single-cell RNA sequencing technology, to analyze the gene expression dynamics of progenitor cell differentiation into depressed cell, neck cell and wall cell lineages in healthy adult mouse somatic tissues.

The results showed that the EGFR-ERK signaling pathway plays an important role in promoting the differentiation of depressed cells, while NF- $\kappa$ B signaling maintains the undifferentiated state of gastric progenitor cells. Furthermore, inhibition of EGFR in vivo by pharmacology revealed a decrease in the number of recessed cells. This finding was surprising because in previous studies, EGFR signaling was considered to be one of the major predisposing factors for the development of gastric cancer. However, the researchers' findings suggest that in normal gastric homeostasis, EGFR signaling acts as a promoter of differentiation rather than cell mitosis.

Gastric gland cell differentiation and signaling studies: The researchers performed a detailed single-cell analysis of the differentiation process of gastric gland cells and explored the regulatory mechanisms involving signaling pathways.

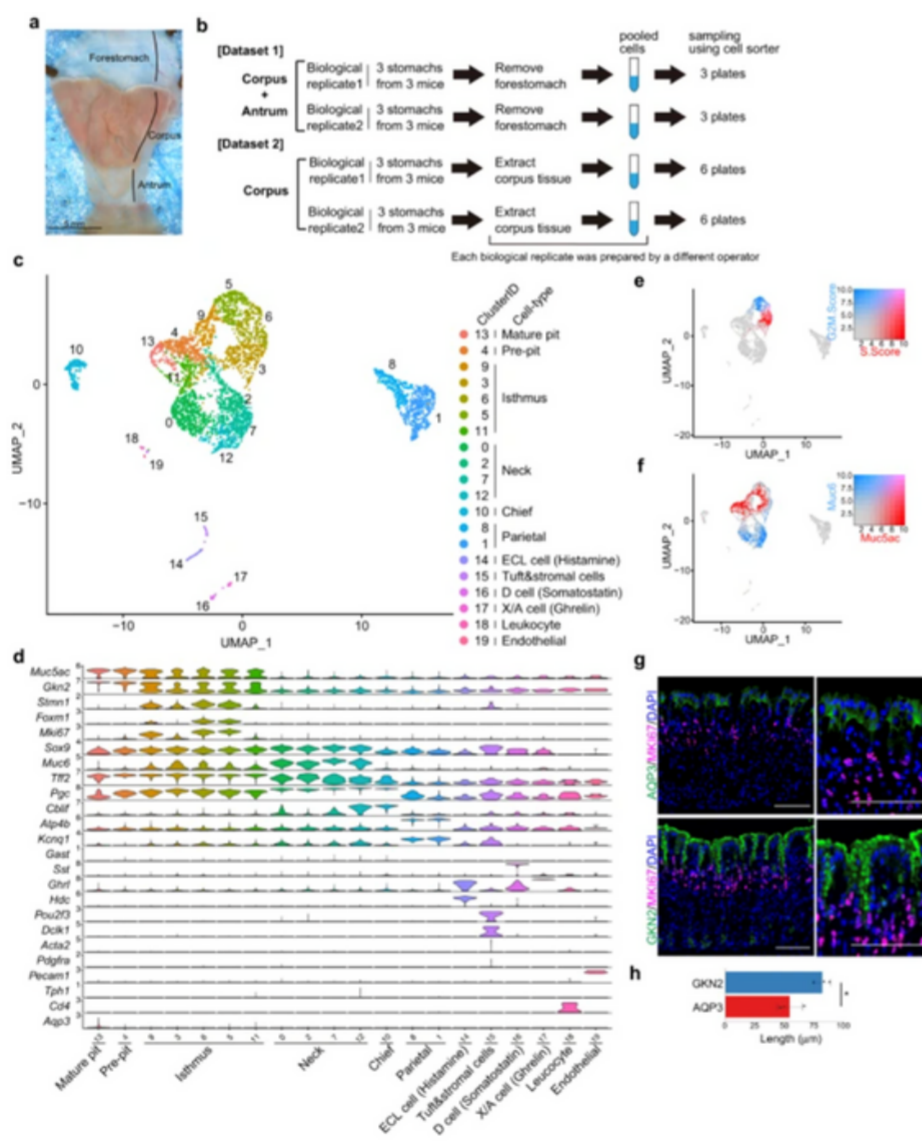
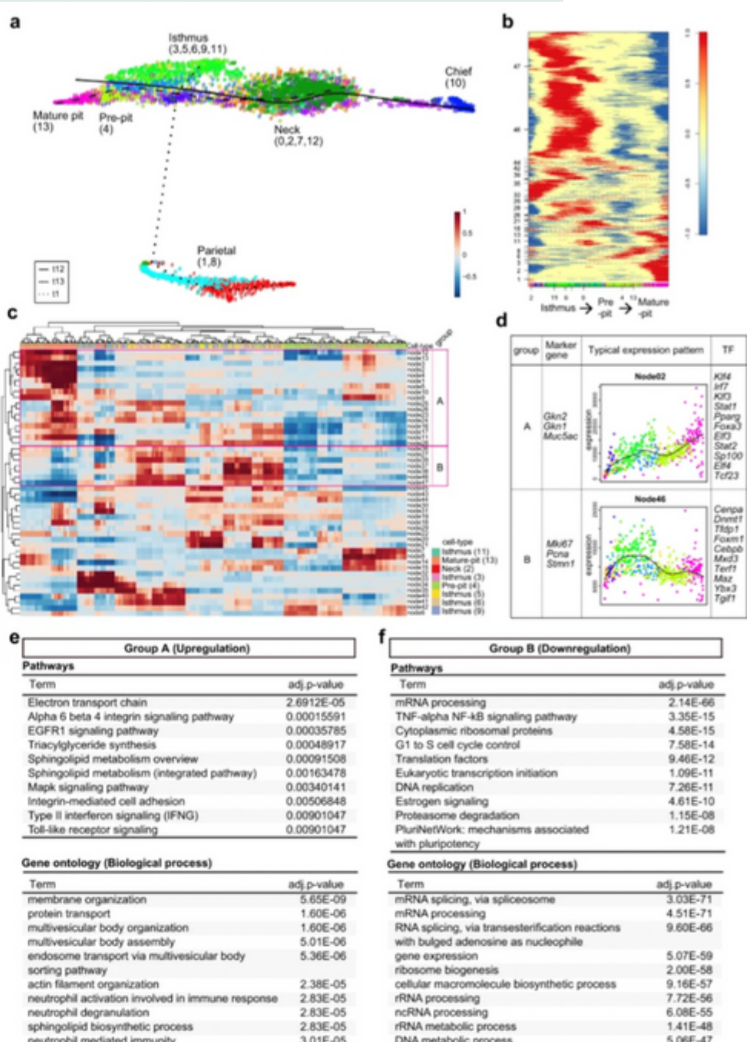


Figure 1. Single-cell analysis of adult mouse corpus gastric units (right)

EGFR signaling: EGFR is a receptor tyrosine kinase that is associated with overexpression of these receptors in gastric cancer by HER2 (ErbB2) and EGFR. However, this study found that in healthy gastric glands, EGFR signaling acts as a promoter of differentiation rather than cell division.

Figure 2. Characterization of the differentiation process of pit cells (below)

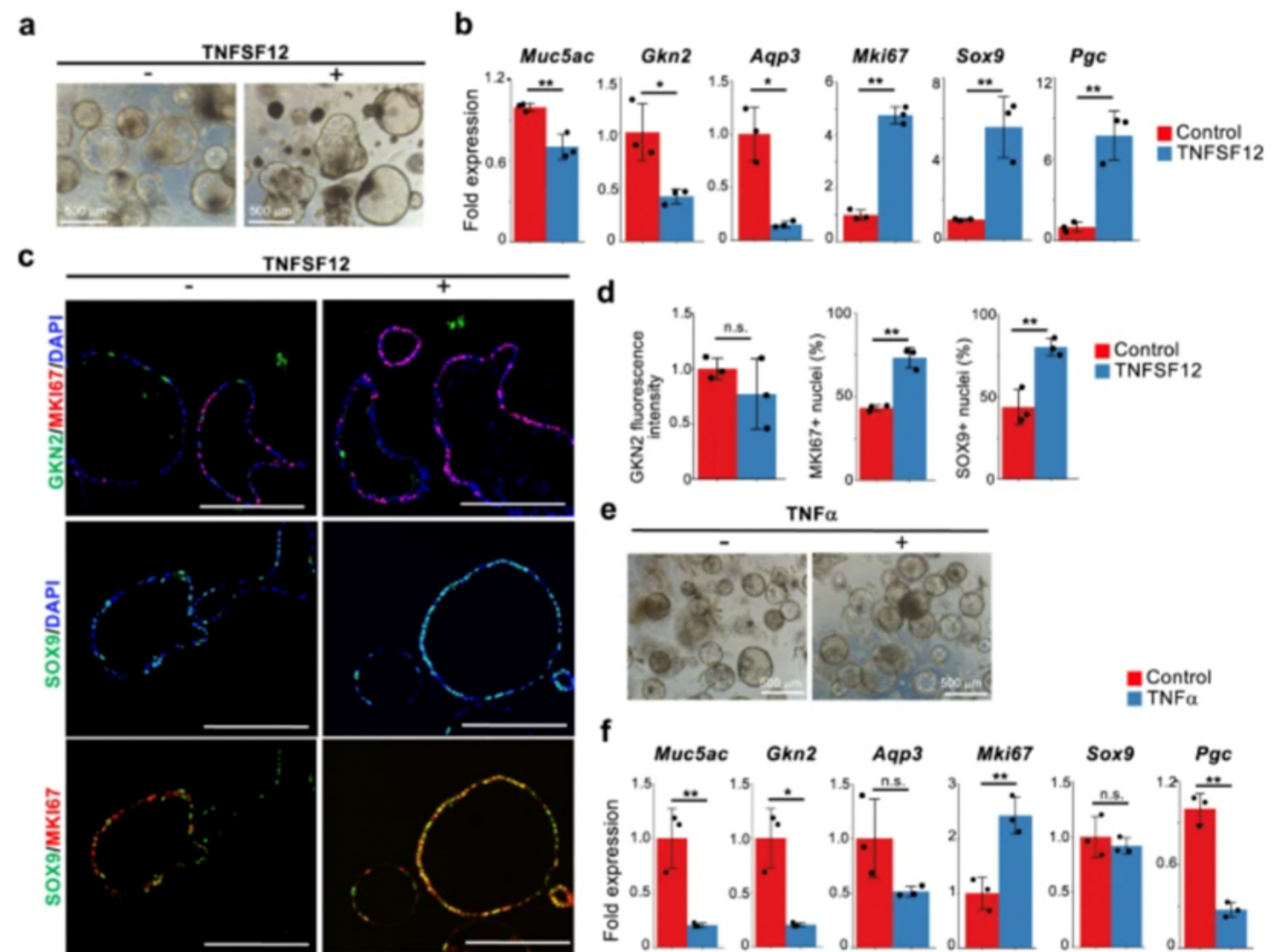
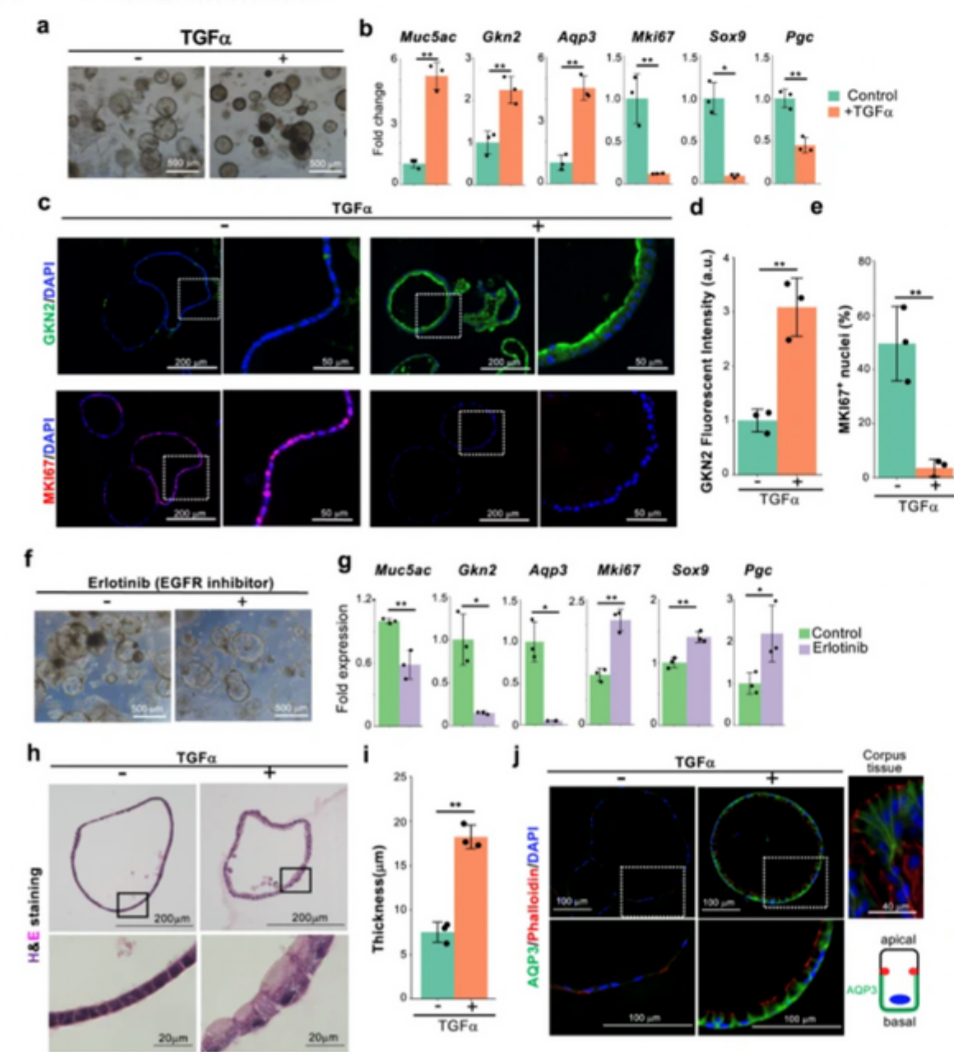


TGF $\alpha$ -EGFR-ERK signaling: TGF $\alpha$  promotes sunken cell differentiation but inhibits sunken cell proliferation via the EGFR-ERK signaling pathway in healthy gastric glands at steady state.

Figure 3. TGF $\alpha$  promotes sunken cell differentiate (right)

TNFSF12-NF- $\kappa$ B signaling: TNFSF12-NF- $\kappa$ B signaling plays a role in isthmus progenitor cell maintenance, maintaining these cells in an undifferentiated state.

Figure 4. TNFSF12 and TNF maintain isthmus progenitor cells in an undifferentiated state (below)



Limitations of the study are that while computer analysis inferred signaling networks, the study has not validated signaling pathways involved in neck and wall cell differentiation. And, some cellular markers were not detected in their gastric-like organs. Overall, this study broadens the understanding of gastric progenitor cell differentiation in the academic community. activation of EGFR-ERK signaling plays an active role in the differentiation of gastric progenitor cells and contributes to the formation of recessed cells. This finding contributes to further understanding of the mechanisms underlying gastric diseases and provides new ideas for the development of therapeutic approaches for related diseases. However, further studies are still needed to reveal the complete mechanism of gastric progenitor cell differentiation and its relationship with the disease.

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# THE HIDDEN DANGER OF SWIPING BEFORE SLEEP: THE HARMS OF MOBILE PHONE ADDICTION REVEALED



In today's highly developed Internet society, mobile phones seem to have become an indispensable existence in our lives. Every time dragging your heavy body back home, the short-lived joy of lying on the bed and swiping my phone seems to be the greatest comfort for a tired day. However, can playing with mobile phones before going to bed really wash away our fatigue and let us welcome the new day with a new look? The answer is negative. Recently, Dr. Raisa Kaz from Saudi Arabia and his colleagues conducted a cross-sectional study on 300 college students, and the data obtained through the questionnaire revealed that the hidden danger behind "playing with mobile phones before going to bed" cannot be ignored.

## WHY CELL PHONES?

Raisa found that nearly 97% of college students use social media software to varying degrees, and only 1% of them use these apps to acquire knowledge; in contrast, 35% of students use social media to chat and make friends, 43% People flick their mobile phones aimlessly to kill time, and 57% of the respondents confessed that they have become more or less "addicted" to social media... More importantly, a large number of students admit that social media has indeed It has greatly affected their studies, thinking that "swiping mobile phones" is much more interesting than learning book knowledge. Every like on Instagram and every reply from friends on Snapchat will promote the secretion of dopamine in the brain, making social software accidentally have a physiological mechanism similar to various addictive drugs, attracting the attention of young people all the time.

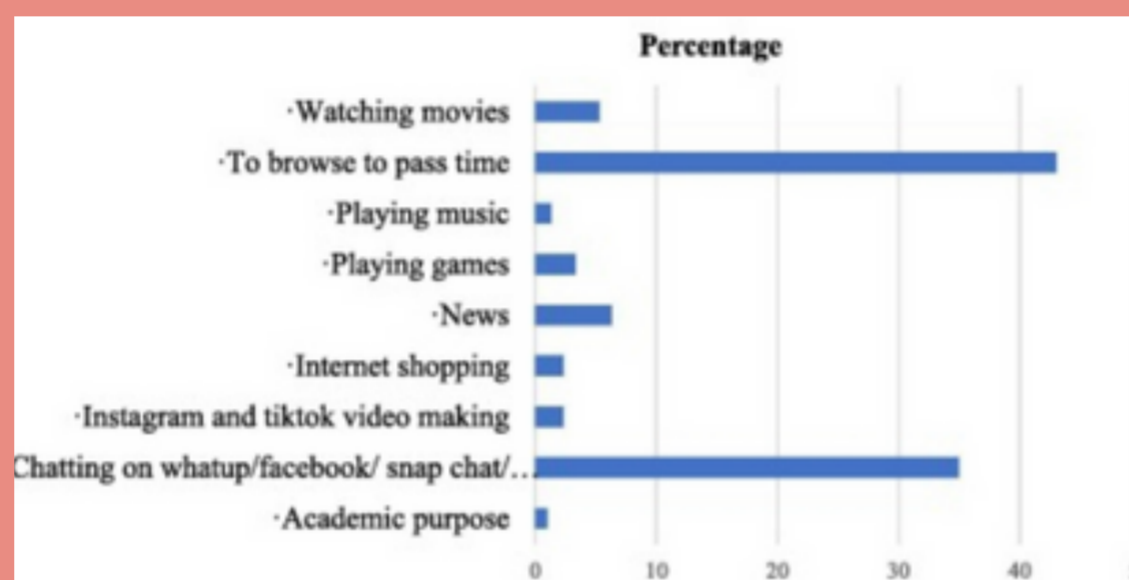


Figure 1. Main reasons and percentages of young people using mobile phones. It is not difficult to find that simply killing time has become the main reason for young people to go online.

## AFFECTING US:

In his recent article, Raisa focused on analyzing the direct consequences of playing with mobile phones before going to bed—the adverse effects of lack of sleep on college students. It's not hard to see that sleep deprivation can do us far more than just lethargy the next morning. In contrast, the consequences of sleep disorders are multifaceted and long-term, so that we only pay for the short-term relaxation after days or even months.

Numerous studies have shown that swiping our phones a few minutes before bed does nothing to improve our mental and physical health—the moment of pleasure neither eases our real-world stress nor makes us forget about life's woes. On the contrary, content stimuli from social media or games and light stimuli from mobile phones can induce hyperarousal before going to bed, reduce the secretion of melatonin, and make it more difficult for us to fall asleep. Raisa pointed out that reducing mobile phone use before going to bed can significantly reduce sleep latency and the frequency of wake-up before sleep, while enhancing people's working memory, making them more handy when facing memory tasks.

Lack of sleep will also affect our normal physiological functions, thus causing a series of intractable diseases. For example, sleep loss will directly affect the body's metabolic rate, which can lead to a series of metabolic diseases, such as diabetes and obesity. At the same time, lack of sleep can also stimulate the body's sympathetic nervous system, put people into more aggressive stress, and even further reduce the length of sleep, which in turn inhibits the excretory function of the kidneys, leading to annoying symptoms such as frequent urination and urgency.

What's more, Dr. Knudsen from the University of Chicago discovered as early as 2008 that sleep disorders can significantly increase the chances of glucose intolerance, reduce the sensitivity of insulin in the body, and thus greatly increase the risk of type 2 diabetes (i.e. acquired diabetes). At the same time, endocrine disorders accompanied by sleep problems will also lead to an increase in the concentration of cortisol, gastrin and other hormones and a large decrease in leptin, which will further reduce the consumption of energy sources such as glucose and increase the patient's appetite. Therefore, the alarming obesity rates in many highly industrialized countries can be attributed in part to the extreme cost and stress of living in the country, the hardship of people's life, and the lack of sleep caused by stress.

In fact, the most intuitive problems caused by lack of sleep still come from our cognitive level. The reduction in sleep time directly leads to a significant decrease in concentration the next day, making it harder for students to concentrate on the content of the class, resulting in less effective learning. The lack of energy caused by sleep disorders will make students have no time to take care of social activities in reality, and unconsciously reverse their original intention of staying up late: using social software itself is to promote the relationship between friends, not because of the previous night Lack of sleep caused me to have no time to deal with the friends around me.

## HARMFUL ADDICTION:

It keeps us hungry for information all the time, willing to observe and record the bits and pieces of life and gives us the ability to actively spy on the lives of others, so as to appreciate the different situations of life. However, its evil consequences are also unforgettable. Through this research, Raisa discovered an interesting phenomenon: 93% of college students are more or less troubled by lack of sleep—in fact, this is not uncommon for college students who need to catch up with the eighth day— However, some 68 percent of students cited social media as the main reason for their lack of sleep. In fact, this is the scientific proof that many people experience every night, "swipe the phone for a while and go to sleep, and the sky is already bright before you know it". Often unbeknownst to people, sleep deprivation can be fatal to a student, and by the time people realize how much less sleep has actually affected their lives, it's often too late to regret it.



## WHAT SHOULD WE DO?

Coping with sleep deprivation is actually not a difficult problem. Now that there are scholars like Raisa who focus on the prevalence and effects of sleep loss, it's only natural that there will be corresponding scholars studying how to eradicate these undesirable consequences. For example, numerous physiological experiments have pointed out that long-term use of melatonin can greatly reduce the mental stress of patients, thereby making it easier for patients to fall asleep. A lot of melatonin gummies have been launched on the market now, so that friends with insomnia will not toss and turn in bed and have trouble falling asleep. At the same time, given the similarities between the phenomenon of using mobile phones before bedtime and various addictive activities, various psychological therapies (including cognitive behavioral therapy, etc.) will also have good results. In fact, compared with drugs and professional treatment, the key to eradicating sleep deprivation is still to make the public aware of the dangers of sleep deprivation. There are educational institutions launching related popular science forums, and there are family and friends' advice before going to bed, which will make people realize how important adequate sleep is, so they choose to put down their phones and fall asleep. I believe that in the not-too-distant future, when the various tragedies around people make them gradually realize the dangers of lack of sleep, the "ritual" of swiping their mobile phones before going to bed will completely become a thing of the past, and people will also be able to enjoy it energetically after getting enough sleep. Every day in the future.



2

# CHINESE VERSION

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English version is in the front

SMART magazine

# 中风患者的新希望

By: Li Zhiyuan

脑卒中及我们常常所谓的中风，是由于大脑内部的血管突然发生破裂出血或者因血管堵塞而造成大脑缺血，缺氧而引起。全世界每年有超过1220万人中风，为此每年全球用于中风治疗方面花费超过7210亿美元，其中花费最大是在于术后康复治疗。要想减少康复治疗费用，就需要在发生中风立刻进行溶栓药物或者手术干预。因为中风后，每分钟就有近200万个神经元受到损伤，这些损伤往往是不可逆，拖的时间越久脑部损伤就越严重，甚至就算避免死亡，也会留下终身残疾，不少患者终身瘫痪。脑卒中共分为出血性和缺血性两种「1」，其中对于缺血性卒中，尽快溶栓和取出血栓是最重要的，因此，机械取栓是中风后治疗的首选。

机械取栓即将取栓装置放置在颅内外大血管（包括颈内动脉、大脑中动脉、椎动脉及基底动脉）栓塞处，将栓塞处的血栓从血管内抽出，再由导管从体内取出，恢复栓塞处血流供应。但是手术中如何快速到达脑血管栓塞处，成为减少中风并发症关键之一「2」。这种介入技术能让闭塞的大血管再通，恢复神经功能，但对手术者的技术水平要求很高，同时由于现有设备和器械性能无法完全满足弯弯曲曲的脑部血管，导致到达脑血管栓塞处要花费很多时间，时间越长，坏死的神经元就越多，患者将丧失更多机能。因此手术中急需能够更好适应脑部血管生理解剖结构的器械，导丝的操作便捷度也成了最需要关注的部分。

Atria Medical公司在今年推出了自己一款新的可实时偏转的导丝Atria，并改进了导航复杂脑动脉网络的方法。远端尖端可以实时成形，而无需从患者身上移除器械。Atria具有可偏转导丝，可拆卸手柄和可追踪性等三个特点。实时可以偏转的导丝头端由手柄直接控制，这样可以获得最高的精确性和灵活性。可拆卸的手柄能快速可靠地调整可偏转头端。同时具备全新与导丝的连接，Artiria手柄具备可拆卸性，医生可以随时随地将导丝装到可拆卸手柄上。手柄装上后就能随意控制导丝头端角度，让导丝更好通过曲折的血管。最后Artiria的头端技术为接触复杂和远端神经血管靶点提供了无限可能。其独特的涂层可实现无缝导航并提高血管的可追踪性。

更快的，更灵活的导丝让医生能够以最快的速度到达大脑深处的栓塞点，取出血栓，恢复血流，恢复氧气供应。这样一来能够极大的提高患者的术后预后，也能节省许多术后护理和康复的费用。



# 失眠，一个不容再忽视的疾病

作者 Sindy He

## 01

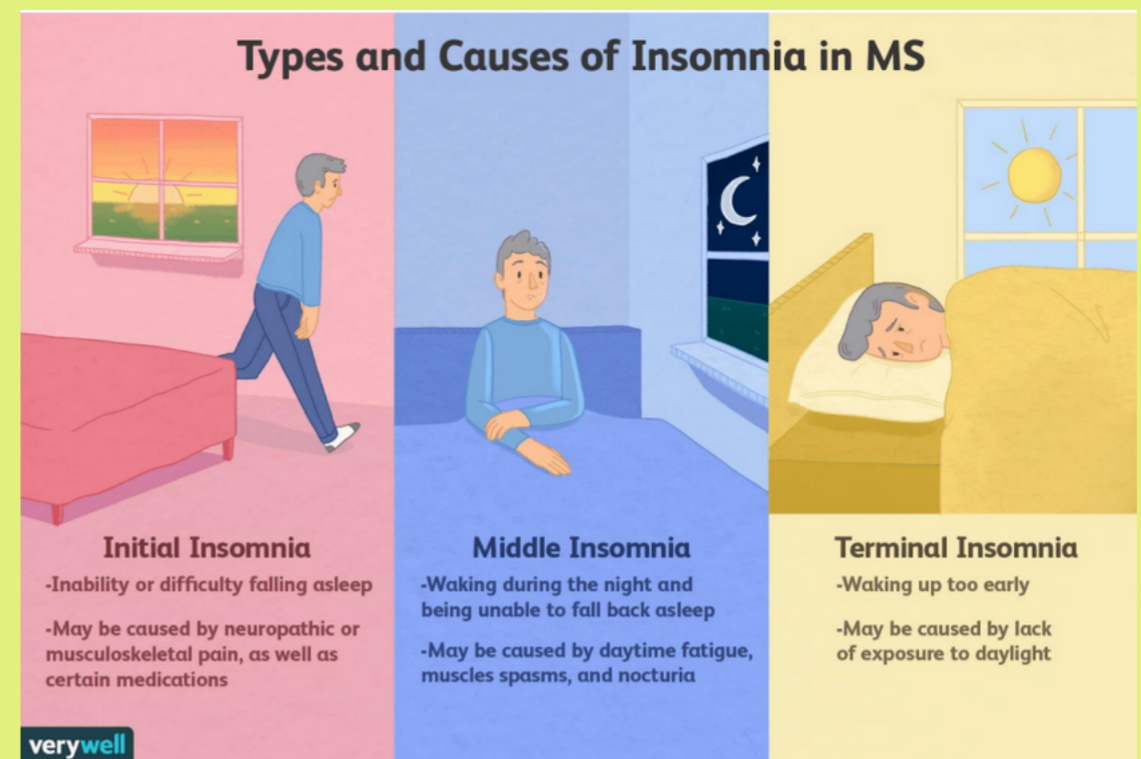
### 为什么现在睡眠成为一种奢侈？

你曾经有过失眠的经历，或者被失眠所困扰吗？一项正在进行的调查发现，18岁以下的人睡眠拖延率较高；这群人往往在睡觉前花几个小时玩手机，从而错过了应该睡觉的时间。另一方面，18岁以上的人受到工作、学业压力、精神焦虑、家庭原因的影响，产生了睡眠是浪费生命的感受，于是主动晚睡，通过延长睡眠时间来假装抓住睡眠。时间，来抵制“生命被浪费”的空虚感。这是对自己实施的“剥夺睡眠”，是在自我惩罚、自我折磨。据中国睡眠研究会（CSRS）统计，2021年中国有超过3亿人患有某种睡眠障碍，成年人失眠发病率高达为38.2%。《2022年中国国民健康睡眠白皮书》显示，近四分之三的受访者表示存在睡眠问题，其中入睡困难的占33.1%，易醒的占25.8%，失眠的占23.5%，打鼾的占21.8%，过度做梦的占20.5%。随着发病率的飙升，人们需要承认这确实是一个问题。那么，失眠到底是什么？失眠的标准是什么？美国国立卫生研究院回答了这个问题，解释说“诊断失眠需要三个主要组成部分：持续的睡眠困难、充足的睡眠机会和相关的日间功能障碍”（nih.gov, 2022）。对于某些人来说，失眠可能是一个小烦恼。其他人可能会因失眠而受到严重干扰。由于多种原因，您的身体需要睡眠，我们应该尽力休息，让您无法发挥最佳状态。

## 03

### 如何治疗失眠？

当今更广泛使用的治疗方法是药物治疗，包括那些经监管机构批准用于治疗失眠、治疗失眠的标签外处方药、非处方（OTC）助眠药和膳食补充剂（例如褪黑激素）。所有这些药物都有更严重的副作用，包括睡眠时做噩梦、短期抑郁感、胃痉挛以及与睡眠相关的行为，例如在未完全清醒时驾驶。美国食品和药物管理局于2022年1月授权 daridorexant (Quviviq) 用于治疗成人失眠。与市场上其他失眠药物不同，daridorexant 的常见副作用很少。成年失眠患者可以使用口服药 daridorexant。它来自称为食欲素受体拮抗剂的一类药物。食欲素受体拮抗剂（ORA）是最新一类失眠药物。每天，您的大脑都会产生一种称为食欲素的蛋白质，可以帮助您醒来。在唤醒过程中，食欲素会附着在某些神经细胞上。在睡觉前的几个小时，食欲素通常不太活跃，因此您会感到困倦。那时，其他促进睡眠的蛋白质更加活跃。Daridorexant 通过抑制食欲素附着在这些神经细胞上发挥 ORA 的作用。结果，您的大脑进入睡眠模式并尽可能长时间地保持该状态。daridorexant 需要一段时间才能消退，然后您会自然地感到想要再次醒来的冲动。在三个阶段的临床研究中，大多数人对 Daridorexant 的耐受性良好。头痛和嗜睡是最常见的副作用。由于存在成瘾风险，FDA 已要求 Daridorexant 归类为受控处方药。



## 02

### 问题的重要性

失眠是一种普遍存在的睡眠障碍，常常未被医生诊断出来。然而，它对人体的影响是巨大的。正如美国国立卫生研究院（NIH）睡眠专家迈克尔·特韦里（Michael Twery）博士指出的那样：“我们身体的几乎每个组织都受到睡眠的影响；”他进一步说道，“它对我们的免疫系统、食欲、呼吸、血压和心血管健康有影响。”最常见的治疗方法是放松技巧和深呼吸练习。在某些情况下，还会开药。但在尝试非处方安眠药之前请咨询您的医生，因为它们可能会让您在早上感到困倦。

## 04

### 我该如何照顾自己？

3月17日是世界睡眠日，今年的主题是“良好睡眠，睡眠之源”健康”。人的一生有三分之一的时间是在睡眠中度过的，良好的睡眠是关系到一个人的精神面貌和身体健康。这里有一些技巧你可以应该练习以提高睡眠质量。

1. 建立健康的睡眠习惯：保持作息规律，晚上按时睡觉，睡前避免长时间看手机或看电视。
2. 调节情绪：积极面对生活中的压力和挑战，找到放松适合自己的方法，比如瑜伽、冥想、深呼吸等。
3. 饮食调节：避免大量饮用咖啡、茶、可乐，注意饮食清淡、规律；
4. 面对失眠：如果是短期失眠，无需过度恐慌，可以先用上述方法进行自我调节，如果自我调节困难，失眠持续存在，或结合情绪问题，应寻求专业医疗帮助。



# 肉毒素的前世今生

By: Icey Wang

肉毒素（肉毒杆菌毒素，Botox&Myobloc）是肉毒杆菌在繁殖过程中所产生的，含有高分子蛋白的神经毒素，因此肉毒素的本质就是蛋白质。值得一提的是，肉毒素是自然界中已知在天然毒素和合成毒剂中毒性最强的生物毒素。

## 肉毒素功能的进化：从生化武器到医美“武器”

提起肉毒素，相信不少人对它在医美方面的作用有所了解。像瘦脸针，消除皱纹等热门项目都与肉毒素离不开关系。但在这之前，肉毒素在二战时期是重要的生化武器，因为肉毒素能够破坏生物神经系统，使人感到头晕，乏力和呼吸困难。

### 起源：

肉毒素首次发现于1820年的一座德国小镇，许多居民在食用腊肠之后出现了头晕乏力等症状，变质香肠中的毒素。一位名为Justinus Kerner的医生将这当时还未深入探索的中毒物质称为“腊肠毒素”，“肉毒之毒”。在1895年，相似的腌制火腿中毒事件再次在比利时上演。随后，比利时细菌学家Emile Pierre Van Ermengem教授将一种名为肉毒梭状芽孢杆菌的细菌从食物中分离出来，并命名为“肉毒杆菌”（肉毒梭状芽孢杆菌）。而正是由于肉毒素的神经麻痹性，使之成为战场上令人畏惧的生化武器。直到1920年才由一名瑞士科学家Karl Friedrich Meyer发现了食物加热法避免肉毒素中毒。



图1:肉毒素消除皱纹

## 肉毒素的作用机制：

乙酰胆碱（acetylcholine）是一种神经递质（neurotransmitter），为于神经元之间用来传递信息，因此肌肉运动是离不开乙酰胆碱的释放的。肌肉收缩的正常过程是神经冲动，乙酰胆碱再释放到神经肌肉接头处，紧接着终板电位，肌肉动作电位，最终肌肉变会收缩。在图2的左侧可以看到，乙酰胆碱可以顺利释放到神经肌肉接头，而在右侧图中，肉感毒素会阻断神经肌肉接头处的乙酰胆碱释放。因此肉毒素可以阻断神经和肌肉间的信息传递，达到“麻痹”的效果。那么肉毒素的这一特性是怎么运用于医美的呢？注射肉毒素来消除皱纹是一个很好的例子：皮肤皱纹是由表情肌（面肌）长期收缩产生的，因此肉毒素可以通过阻断神经肌肉传导，抑制表情肌的收缩来缓解皱纹的产生。然而肉毒素的抑制功能不是永久性的，因为新的神经肌肉接头会产生，因此需要反复注射来维持效果。

## 行业现状：

在中国，肉毒素的注射数量迅速增长，从2017年至2021年，注射数由170万次增加至450万次，反映出肉毒素庞大的需求量于不断夸张的市场。其功能除最为流行的医美外，也开始运用于治疗孤立性颈部肌张力障碍，暂时性咬肌肥大和斜视等症状。新型生产技术的研究也在进行当中，如重组蛋白技术，从而提升肉毒素神经毒素效力和纯度。

在这之后肉毒素常常被用来治疗肌肉运动紊乱症等症状。直到1986年肉毒素才真正踏入美容界的大门。一位加拿大眼科教授意外发现肉毒素能够去除患者眼部的皱纹，这一发现开启了肉毒素在美容界的迅速传播。

# 不受控制的睡眠 —— 嗜睡症



如果有个人在白天呼呼大睡你会怎么想？会觉得他昨晚没睡好，亦或是认为他想躺平？不过，如果此时他表示在白天睡觉并非他所能控制的，你会相信吗？其实，这有可能是一种罕见疾病——嗜睡症。



什么是嗜睡症？根据精神疾病诊断与统计手册第五版（DSM-5）的定义，若每日睡眠时间超过 7 小时，甚至超过 9 小时却仍有倦意，或者在一天内反覆进入睡眠状态；且以上状况每周发生超过 3 次且持续至少 3 个月以上，即属于嗜睡症。

西元 1975 年，人类第一次注意到了这项疾病，并在法国召开了第一次有关嗜睡症的国际研讨会。且嗜睡症是一项非常危险的疾病，患者会不受控的入睡，对于生活和工作都会带来一定程度的影响。例如，当患者驾驶机动车时，不受控的进入睡眠，危险程度可想而知。

人类的睡眠周期可分为四个阶段，分别是入眠期、浅睡期、熟睡期和快速动眼期。目前，医界认为嗜睡症患者会在清醒时无理由的进入快速动眼期。研究员们也正在积极了解嗜睡症的病因。以目前的研究成果而言，嗜睡症在雄性与雌性身上的发病率相似，好发于 15~30 岁的青少年及成人。患者的中枢神经系统对于控制睡眠与清醒有障碍，多数患者带有一种特别的抗原——HLA，患者脑内的贺尔蒙会与正常人不同，且有可能是一种遗传性疾病。

除了会在白天进入睡眠以外，多数嗜睡症患者也有以下五种常见症状：过度嗜睡、猝倒症、睡眠麻痹症、入睡前幻觉以及夜间睡眠障碍。

- 过度嗜睡：嗜睡症患者经常在白天打瞌睡，时间约 10~20 分钟不等，通常不超过一个小时，并在打完瞌睡后的二至三小时内再度产生睡意。
- 猝倒症：约有六成的嗜睡症患者有此症状，且常在患者表现强烈情绪之后发生，如大笑或大哭之后。患者的肌肉会无预警的失去张力，这种状态可持续数秒至几分钟。猝倒的症状轻则垂头、下巴下坠或口齿不清等，重则突然全身无力，并可能于跌倒后陷入睡眠状态。且可根据猝倒症的有无，区分嗜睡症的类型；第一型嗜睡症包含猝倒的发生，而第二型嗜睡症则无。
- 睡眠麻痹症：睡眠麻痹症即为俗称的鬼压床，这是一种睡眠障碍而非超自然现象。这是因为大脑在快速动眼期十分活跃，为了防止身体随着梦境做出动作反应（比如：拳打脚踢）而导致受伤，大脑会暂时放松手臂和腿部肌肉，使我们无法动弹。如果已经清醒但这种状态尚未解除，即为俗称的鬼压床。而在嗜睡症患者身上较一般人更容易出现这种状态。
- 入睡前幻觉：约有 40~80% 的患者，可能于入睡前出现幻觉。这是一种现实和梦境交错的状态，会使患者产生视觉、听觉及触觉上的幻觉。通常持续时间不长，但因为感受十分逼真，患者往往会感到十分害怕，或误以为自身患有精神疾病。
- 夜间睡眠障碍：夜间在床上翻来覆去，无法入睡，或睡着但无法深眠且经常醒来。部分患者同时也有做恶梦、脚部抽动等问题，导致睡眠质量下降或提高白天嗜睡发作的机率。

目前，嗜睡症尚无法完全根治，仅能依靠培养睡眠习惯及药物进行治疗。另外，因为嗜睡症是一种终生疾病，所以在服用药物治疗时，还需考量耐药性和副作用等问题。

- 培养睡眠习惯：患者需要规律的作息，在固定的时间清醒、入睡或进行危险活动（如开车或烹饪），并且在白天定时安排小睡时间。这些方法可以尽可能地减少患者突然入睡所带来的安全隐患，且减少患者对于药物的依赖。
- 药物治疗：目前医师们用来治疗嗜睡有症状的药物有两类，分别是兴奋剂与抗忧郁剂。兴奋剂可以刺激中枢神经，使患者提高白天时的警觉度；而抗忧郁剂则可以减缓猝倒、入睡前幻觉，以及睡眠麻痹等症状。西元 1935 年是人类使用药物治疗嗜睡症的元年，第一款用于治疗嗜睡症的药物为苯丙胺（即安非他命）。虽然安非他命是一种毒品，不过在嗜睡症的治疗上有显著效果。其他常见的药物包含利他林、托法尼、安那芬尼、百忧解、左洛复等，常见的副作用有昏沉感、血压较低、以及性功能方面的问题。

目前在临床上，医生们会透过三种方法来判断是否罹患嗜睡症，分别是日间多次入睡睡眠检查（MSLT）、夜间睡眠多项生理检查（PSG）和脑脊髓液检测。

- 日间多次入睡睡眠检查（MSLT）：该检查需要于患者在白天的清醒状态时进行。每隔两个小时，检测团队会给予患者一次睡眠机会，每次睡眠时长约 20~35 分钟，共进行 4~5 次。该检查主要是检测患者的睡眠周期，判断患者有多容易进入快速动眼期。
- 夜间睡眠多项生理检查（PSG）：该检查会要求患者在病房内入睡，并且测量患者睡眠时的脑波、眼球活动、肌肉活动力、心跳速率、呼吸及血氧浓度。在检查中，有猝倒症的人很快就会进入梦乡，并且提早进入作梦阶段，通常在晚上会有较多扰醒的经验。多项睡眠检查也能帮助发现其他导致白日嗜睡的可能原因。
- 脑脊髓液检测：脑脊髓液中的下视丘分泌素（又称食欲素）和多巴胺，可调控人类的清醒与睡眠状态。如果患者的下视丘分泌素减少或多巴胺分泌异常，皆可作为判断嗜睡症的指标。目前研究员们认为，下视丘分泌素的减少是因为免疫系统攻击了分泌下视丘分泌素的脑部区域，但并不是所有嗜睡症的患者下视丘分泌素都会减少，且引发免疫系统攻击的原因也尚不清楚。



自 20 世纪末期，人类开始接触嗜睡症以来，我们有了许多新的突破。除了此篇文章所提到的两种疗法以外，研究员们也在尝试将下视丘分泌素注射回脑部当中；也发现目前某些疾病的治疗方法可能会导致嗜睡症的发生；且嗜睡症不仅仅出现在人类身上，有些动物（如狗）也会出现嗜睡症的症状。目前，史丹佛大学对于嗜睡症有着最深入的研究，也在 2014 年发布了《在斯坦福大学的嗜睡症史》，感兴趣的同学可以自行搜索观看。

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# 可导致多种胃部疾病的胃祖细胞分化的分组机制研究

作者 Rachel

胃祖细胞分化缺陷与多种胃部疾病有关，如萎缩性胃炎、肠化生和胃癌。胃体是小鼠和人类腺胃的主要部分，它包含分泌壁细胞酸、主细胞蛋白酶以及凹坑和颈细胞粘液的功能性上皮细胞。这些细胞由胃单位中的干细胞/祖细胞群不断补充，因此胃上皮细胞的分化缺陷与胃部疾病有关。例如，慢性幽门螺杆菌感染可以导致假幽门化生，其中增殖祖细胞和早产细胞表达颈部和主细胞标志物增加，而壁细胞数量减少。

通过超微结构证据，我们知道在健康的胃体组织中，胃单位中上部高度增殖的峡部祖细胞分化为多种上皮细胞谱系，包括凹细胞、颈细胞、壁细胞和内分泌细胞。过去认为主细胞是由颈部细胞分化而来，但最近的研究表明主细胞具有类似干细胞的自我更新能力，用于维持其自身数量。目前，研究人员对祖细胞自我更新和分化之间的紧密协调来维持组织完整性的机制并不是很清楚。为了研究这一过程，科学家们利用单细胞RNA测序技术Quartz-Seq2，分析了健康成年小鼠体组织中祖细胞分化为凹细胞、颈细胞和壁细胞谱系的基因表达动态。

研究结果显示，EGFR-ERK信号传导通路在促进凹细胞分化中起到重要作用，而NF-κB信号传导则维持胃祖细胞的未分化状态。此外，通过药理学抑制体内EGFR，发现凹细胞的数量减少。这一发现让人感到意外，因为在以往的研究中，EGFR信号传导被认为是胃癌发展的主要诱导因素之一。然而，研究人员的研究结果表明，在正常的胃稳态中，EGFR信号传导发挥着促进分化而非促进细胞有丝分裂的功能。

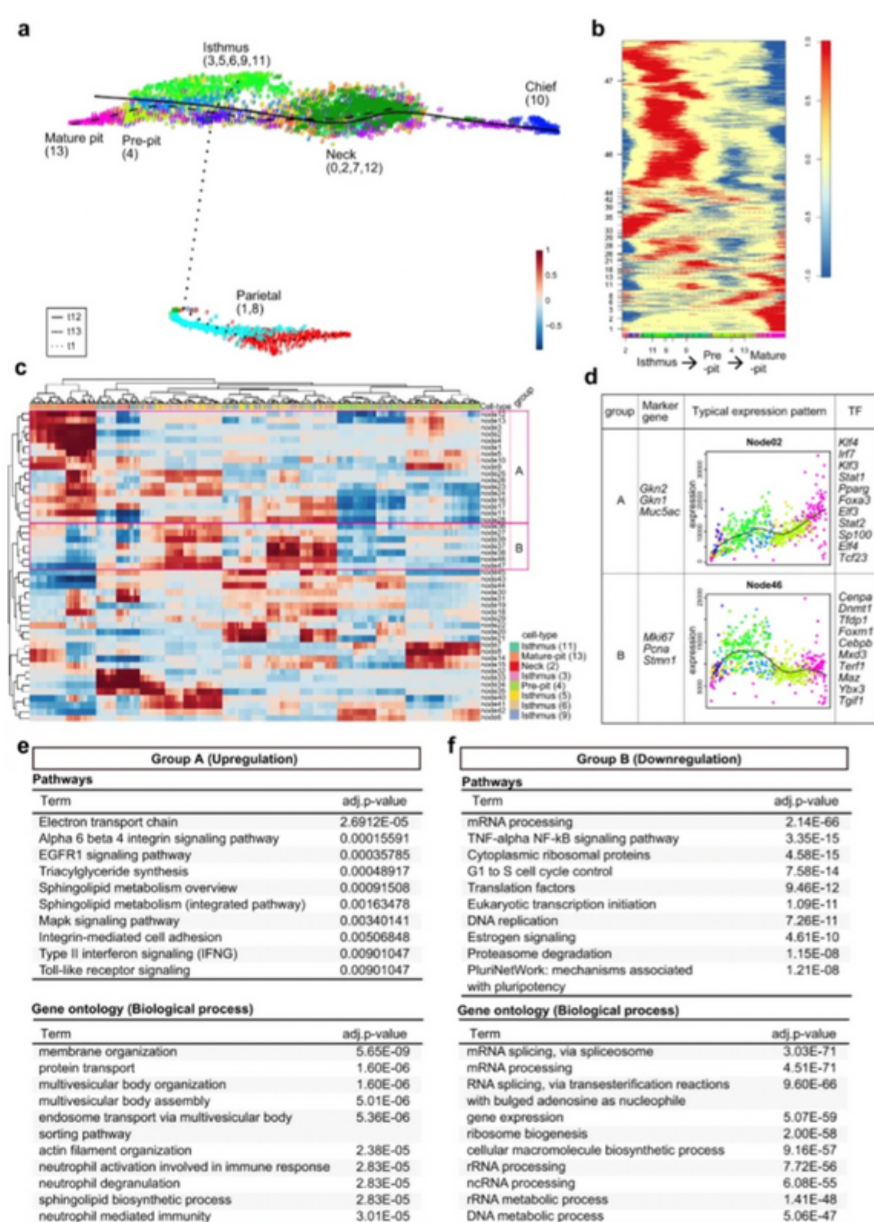
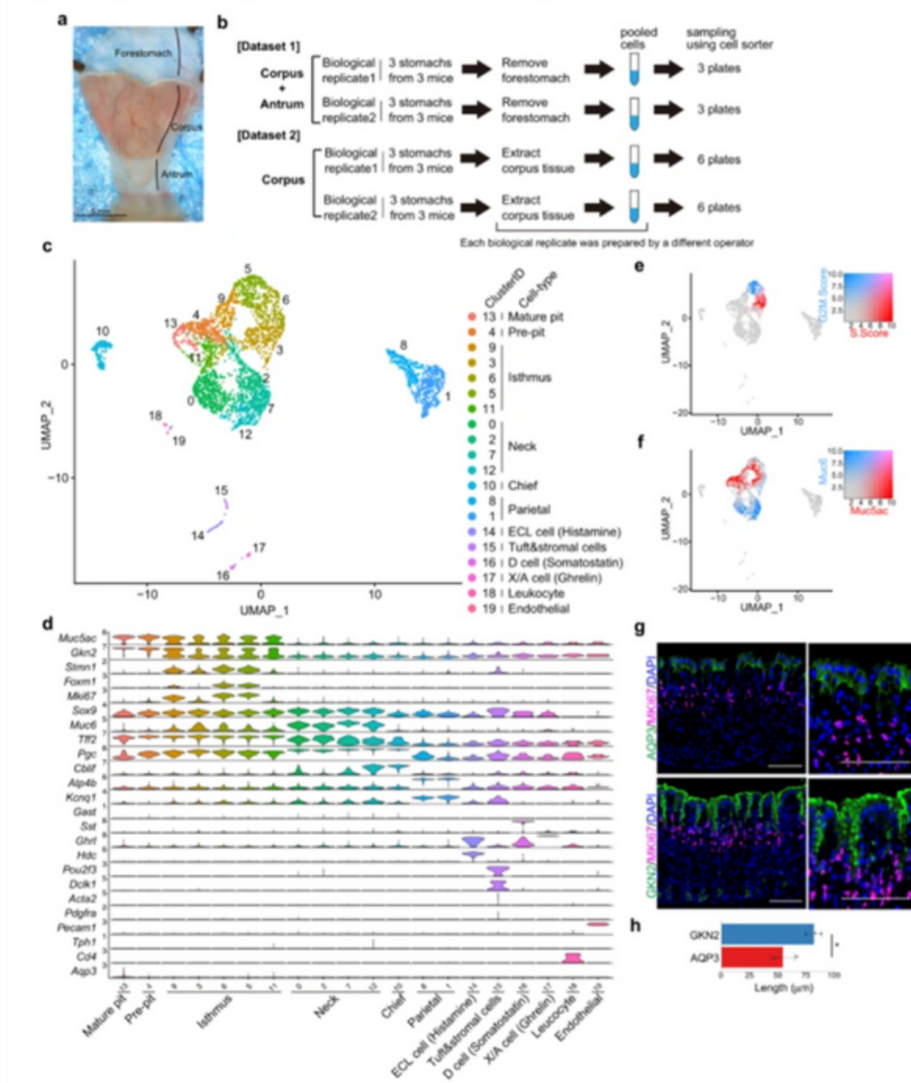
胃腺细胞分化和信号传导研究：研究人员对胃腺细胞的分化过程进行了详细的单细胞分析，并探索了涉及信号通路的调节机制。

图1. 成年小鼠胃体单位的单细胞分析

EGFR 信号传导：EGFR 是一种受体酪氨酸激酶，与 HER2 (ErbB2) 和 EGFR 这些受体在胃癌中过度表达相关。然而，该研究发现，在健康胃腺中，EGFR 信号传导起到促进分化的作用，而不是促进细胞分裂。

图2. 凹坑细胞分化过程的表征

Fig. 1: Single-cell analysis of adult mouse corpus gastric units.

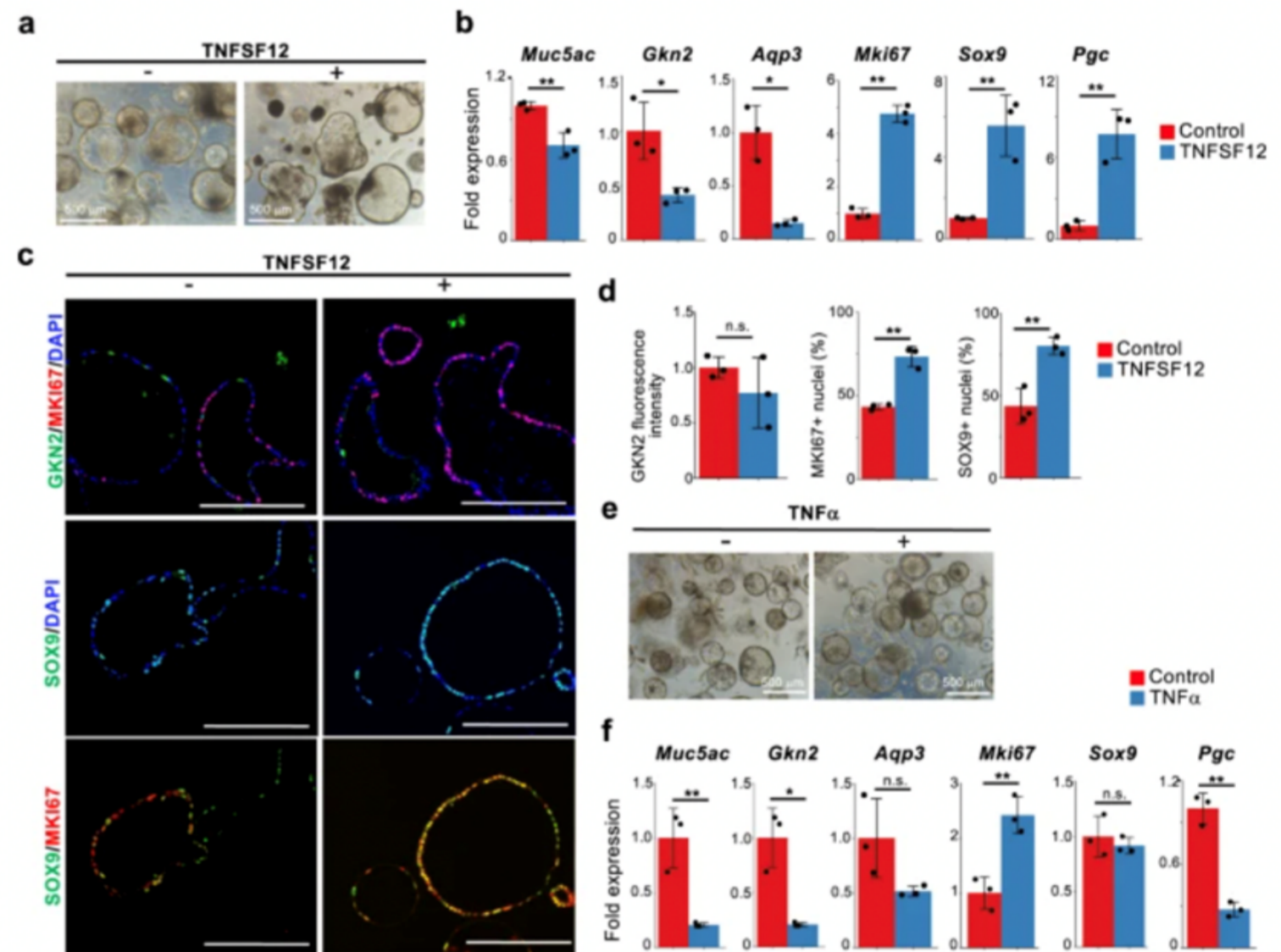
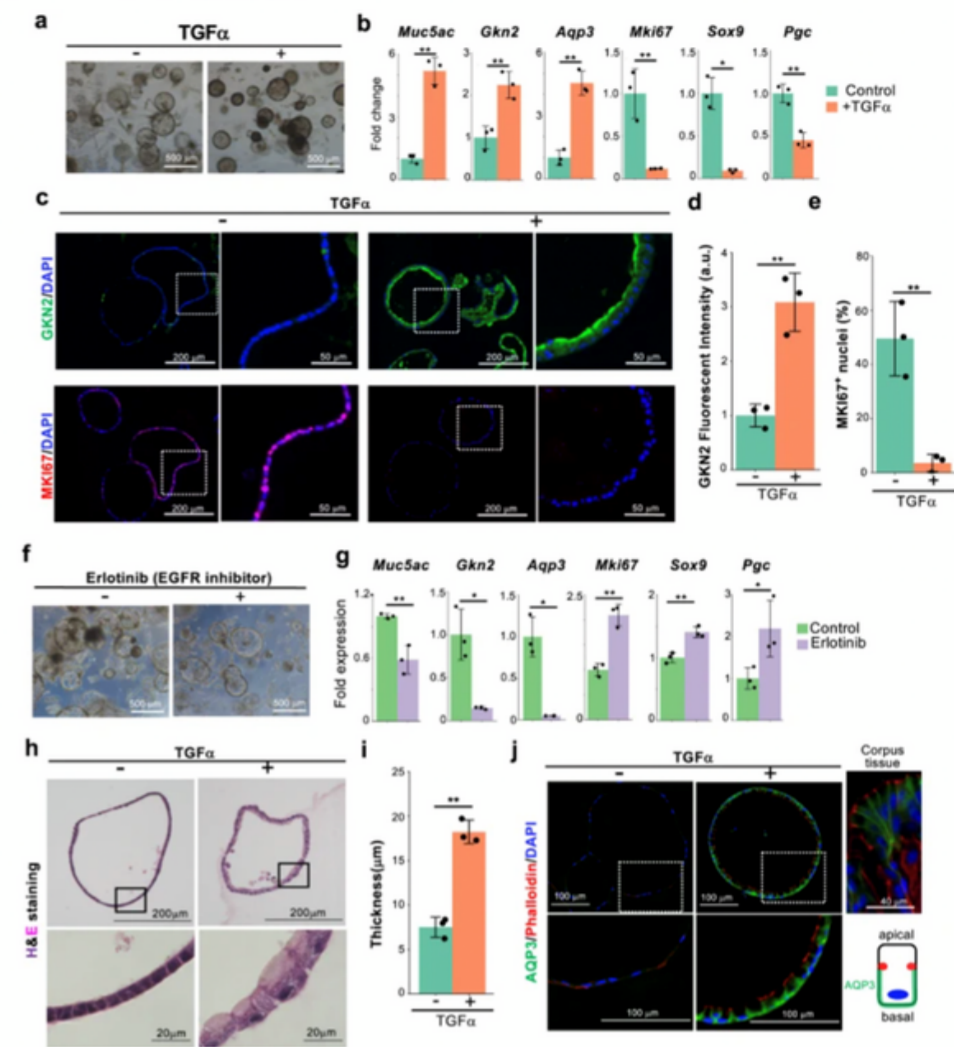


TGFα-EGFR-ERK 信号传导：TGFα 通过 EGFR-ERK 信号传导通路在健康胃腺稳态下促进凹细胞的分化，但抑制凹细胞增殖。

图3. TGFα促进细胞分化

TNFSF12-NF-κB 信号传导：TNFSF12-NF-κB 信号传导在峡部祖细胞维持中发挥作用，维持这些细胞处于未分化状态。

图4. TNFSF2和TNF维持峡部祖细胞处于未分化状态



研究的局限性在于，虽然计算机分析推断出信号网络，但研究还没有验证涉及颈部和壁细胞分化的信号通路。并且，一些细胞标记物在他们的胃类器官中没有被检测到。总而言之，这项研究拓宽了学界对胃祖细胞分化的认识。EGFR-ERK信号传导的活化在胃祖细胞的分化过程中起到积极作用，有助于形成凹细胞。这一发现有助于进一步理解胃部疾病的发生机制，并为开发相关疾病的治疗方法提供了新的思路。然而，仍然需要进一步的研究来揭示胃祖细胞分化的完整机制以及其与疾病之间的关系。

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# 熬夜刷手机的隐患： 手机成瘾的危害浮出水面



在如今互联网高度发达的社会里，手机似乎成为了我们生活必不可少的存在。每每拖着沉重的身子回到家，躺在床上刷手机的短暂欢愉貌似就是一天疲倦的最大慰藉。然而，睡前玩手机真的可以洗净我们的一身疲劳，让我们以崭新的面貌迎接新的一天吗？答案是否定的。近日，来自沙特阿拉伯的拉伊萨-卡兹博士和他的同事们对300名大学生展开了一场横断面研究，并通过问卷调查得到的数据揭露了隐藏在“睡前玩手机”背后不可忽视的风险。

## 数字嗑药

拉伊萨发现，近乎97%的大学生都会不同程度地使用社交媒体软件，其中仅有1%的学生会用这些APP来汲取知识；相对地，35%的学生用社交媒体来聊天交友，43%的人漫无目的地刷着手机来消磨时间，57%的受访者则坦白自己已经或多或少地对社交媒体“上瘾”……更为重要的是，大批的学生承认，社交媒体已经确切地影响到了他们的学业，认为“刷手机”比

学习书本知识有趣太多。

Instagram上的每一个赞，Snapchat上好友回复的一条一条消息，都会促进大脑多巴胺的分泌，让社交软件偶然般有着与各种成瘾性药物相似的生理机制，时时刻刻吸引着年轻人的目光

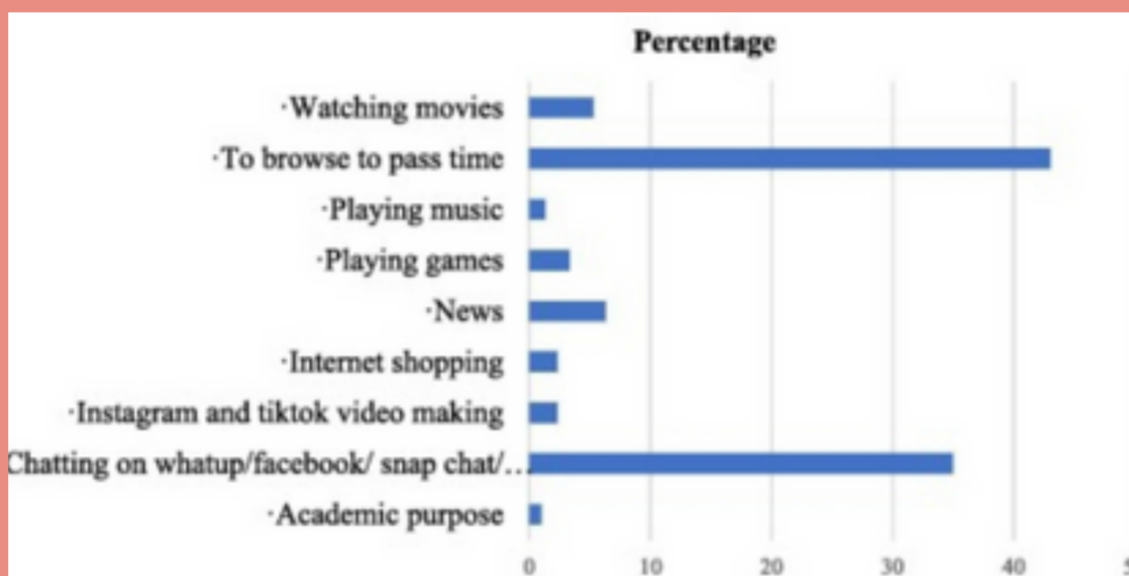


Figure 1. 年轻人用手机的主要原因及百分比。

不难发现，单纯的消磨时间成为了年轻人上网的主要理由。

## 有害成瘾

这种成瘾性并不是完全有害的：它让我们时时刻刻保持着对信息的渴望，愿意观察并记录生活的点滴，并让我们有能力主动窥探他人的生活，从而领略生命不同的光景。然而，其带来的恶果同样让人难以忘怀。拉伊萨通过这次研究发现了一个有趣的现象：93%的大学生都或多或少有着缺觉少觉的烦恼——实际上，这对于需要赶早八的大学生来说称不上稀奇——然而，约有68%的学生都认为，社交媒体是他们睡眠缺失的主要成因。实际上，这便是很多人每天晚上都在经历的“再刷一会儿手机就睡觉，结果不知不觉间天已蒙蒙亮”的科学证明。尽管人们时常浑然不知，但睡眠的匮乏对一名学生的影响却是“致命”的，并且每当人们意识到睡眠时间的减少已经确切地影响到了他们的生活时，往往已经后悔莫及。

## 对于我们的影响

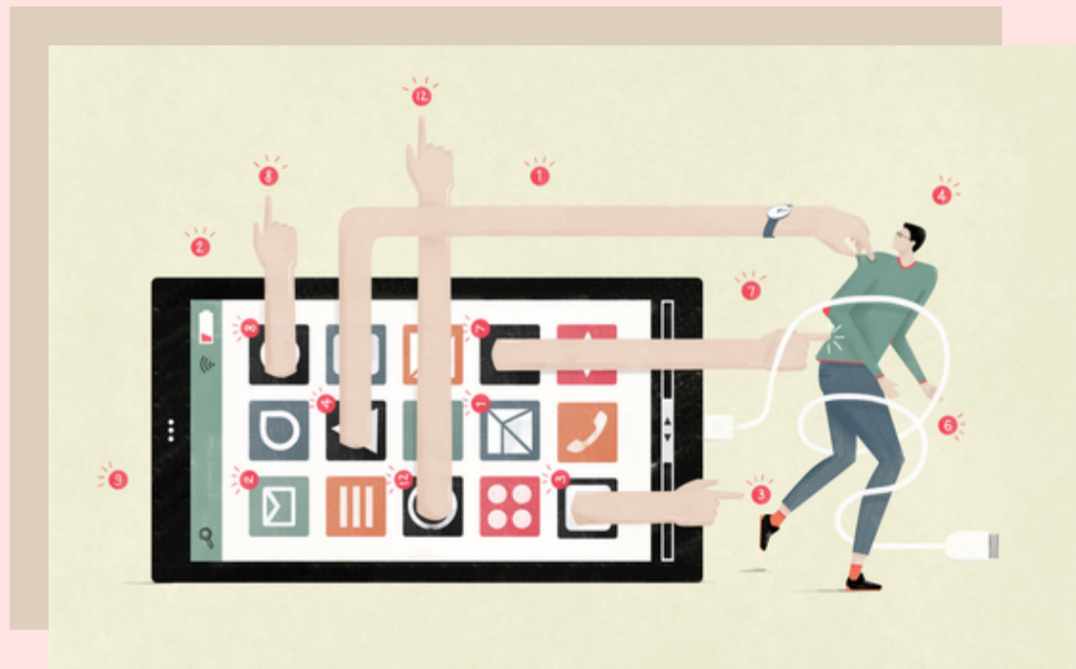
拉伊萨在其发表于近日的文章里，重点剖析了睡前玩手机导致的直接后果——睡眠不足对大学生的不良影响。不难发现，睡眠不足对我们的损害远不止第二天早上的无精打采。与之相反，睡眠的失调带来的恶果是多方面并且长时间的，从而在数天甚至数月后才让我们为当时的短暂放松买单。

无数研究表明，睡前几分钟刷手机并不会对我们的身心健康造成任何改善——这一时的快乐既不会缓解我们现实的压力，也不会让我们忘却生活中的重重烦恼。与之正相反，来自社交媒体或游戏的内容刺激与来自手机的光刺激会诱发睡前过度兴奋，减少褪黑素的分泌，从而让我们更加难以入眠。拉伊萨指出，减少睡前的手机使用可以显著地减少睡眠潜伏期和睡眠前唤醒的发生频率，同时增强人们的工作记忆，使其在面对记忆任务时更加得心应手。

睡眠匮乏同时会影响到我们正常的生理机能，从而引发一系列疑难杂症。例如，睡眠的减少会直接影响人体的新陈代谢速率，从而引发一连串的代谢类疾病，如糖尿病与过度肥胖等。同时，睡眠缺失也会刺激人体的交感神经系统，让人们陷入更加咄咄逼人的压力之中，甚至进一步减少睡眠的时长，进而抑制肾脏的排泄功能，导致诸如尿频尿急等令人生厌的症状。

更有甚者，来自芝加哥大学的克努森博士早在2008年便发现睡眠失调会显著地增加葡萄糖不耐受的几率，使体内胰岛素的敏感度下降，从而大幅提高患二型糖尿病（即后天性糖尿病）的隐患。同时，伴随着睡眠问题出现的内分泌失调也会导致皮质醇、胃泌素等激素浓度的上升及瘦素的大量减少，进一步减少葡萄糖等能量来源的消耗并使患者的食欲激增。因此，许多高度工业的国家那耸人听闻的肥胖率，便在一定程度上可以归因于该国极大的生活成本和压力、人民生活的艰苦，以及由压力带来的睡眠缺失。

实际上，睡眠不足带来的最直观的问题仍然来自我们的认知层面。睡眠时间的减少会直接导致翌日的注意力显著下降，从而让学生们更难聚精会神地专注于课堂内容，导致学习效果不如从前。而睡眠失调导致的精力不足会让学生们无暇顾及现实中的社交活动，在无意识间便把他们熬夜的的初衷本末倒置了：刷社交软件本身便是为了促进朋友之间的感情，而不是因前夜的睡眠不足而致使自己没有功夫应付身边的友人。



## 我们应当

实际上，应对睡眠不足并不是一个难题。既然有像拉伊萨这样的学者专注于睡眠缺失的普遍性及影响，自然会有相应的学者研究如何根除这些不良的后果。例如，无数生理学实验指出，褪黑素的长期使用可以大量降低患者的精神压力，从而让患者更容易入眠。市面上现在已经推出了不少的褪黑素软糖类辅助药物，让失眠的朋友们不至于在床上翻来覆去难以入眠。同时，鉴于睡前玩手机这种现象与各种成瘾类活动的相似性，各式各样的心理学疗法（包括认知行为疗法等）也会有不错的效果。实际上，比起药物和专业治疗，根治睡眠不足的关键仍然在使大众意识到缺觉少觉的危害所在。上有教育机构开展相关的科普论坛，下有家人朋友临睡前的叮嘱，都会让人们意识到足够的睡眠有多么重要，从而选择放下手机，坠入梦乡。相信在不远的将来，当人们身边的种种惨剧让其逐渐意识到睡眠不足的危害，睡前刷手机这种“仪式”将彻底成为过去式，人们也会在充足的睡眠后精神充沛地享受未来的每一天。



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