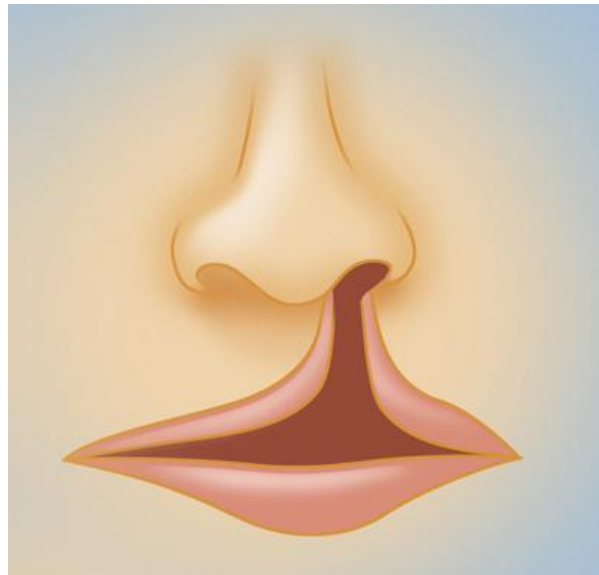


# Science INSIGHTS®

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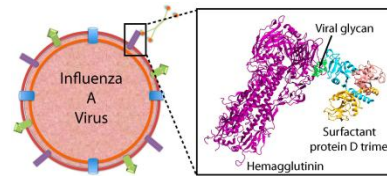
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**COVER**

Surgical repair is the only method of treatment for patients with cleft lip or/and palate. The cleft lip surgery is usually done when the child is 3 to 6 months old, while cleft palate repair is done between 2 and 3 years old in order to allow the palate to change as the child grows. Here we reported our experience of simultaneous surgeries for both cleft lip and cleft palate with satisfactory results in 48 patients who have not done cleft lip repair at early age. It reduced the treatment time, the patients’ pain, as well as the financial burden of the patients’ family by one operation. See page 79.

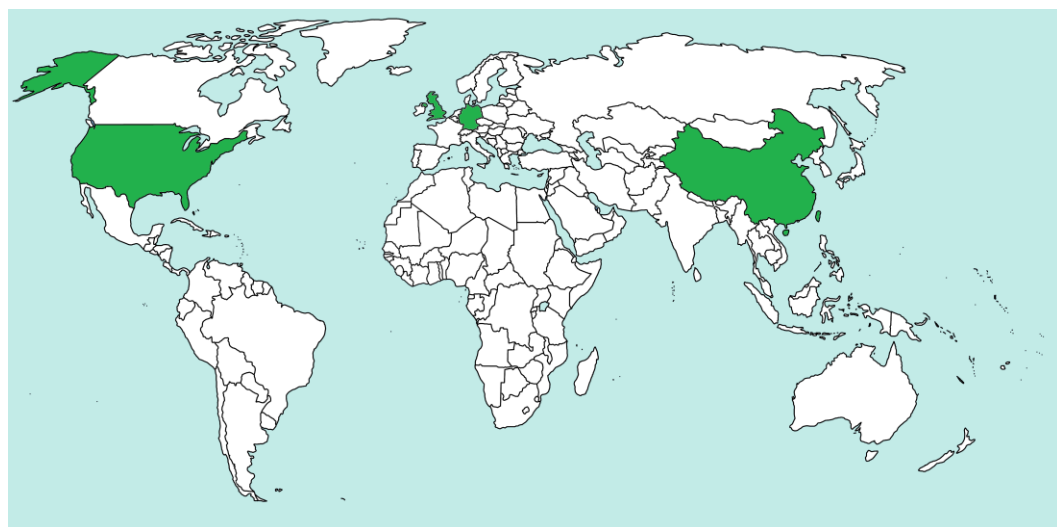
*Image: BASE illustrating group*

**Durham, USA****Ancient Bees Disappeared with the Dinosaurs**

How many species originally inhabit on this earth? How many disappeared, and how many appeared every minute? Maybe it is so common for specie to be wiped out. Who knows? A research group from the University of New Hampshire said the ancestors of modern carpenter bees may have vanished from Earth roughly 65 million years ago, around the same time the dinosaurs were wiped out. This group examined the DNA of four types of carpenter bees from every continent, except Antarctica, to search for clues about their evolutionary relationships. The end of the Cretaceous Period, corresponding to the beginning of the Paleogene Period, was already known to be a dynamic time in history. It is commonly thought that a massive asteroid or comet slammed into Earth 65 million years ago, wiping out the dinosaurs and killing up to 80 percent of all species. Since there are no reliable fossil records for carpenter bees, the researchers used a technique called molecular phylogenetics. This involves analyzing DNA sequences and searching through the data for evolutionary insights. To understand where in time evolutionary changes were happening, the researchers used fossils of other types of bees as reference points. As said by Dr. Rehan, the leading researcher of the



group, that bees had gone through hard times, and negative effects have occurred. If we could understand what happened in the past, it can help us understand the current perturbations and loss of diversification. ■

**Cologne, GERMANY****Ancient Magician's Curse Tablet**

It is time the Lord reveals the clues of the earth and people. Archaeologists found a lead curse tablet that can be dated back around 1 700 years and likely written by a magician in Jerusalem. Of the collapsed Roman mansion located in what is known as the "City of David", is an area that holds at least 6,000 years of human occupation. The mansion itself covers at least 2,000 square meters (about half an acre) and contains two large open courtyards adjacent to each other. It was in use between the late third century and A.D. 363, when it was destroyed in a series of earthquakes. The text is written in Greek and, in it a woman named Kyrilla invokes the names of six gods to cast a curse on a man named Iennys, apparently over a legal case. "I strike and strike down and nail down the tongue, the eyes, the wrath, the ire, the anger, the procrastination, the opposition of Iennys," part of the curse reads in translation. Kyrilla asks the gods to ensure that "he in no way oppose, so that he say or perform nothing adverse to Kyrilla ... but rather that Iennys, whom the womb bore, be subject to her...". To obtain her goal Kyrilla combined elements from four religions. Of six gods invoked, four of them are Greek (Hermes, Persephone, Pluto and Hecate), one is Babylonian (Ereschigal) and one, Abrasax, is Gnostic, a religion connected to early Christianity. Additionally, the text contains magic words such as "Iaoth" that have a Hebrew/Judaism origin. A professional magician likely created the curse for Kyrilla, who may have literally used a hammer and nails to perform a magical rite that enhanced the

effectiveness of the curse. Kyrilla and her curse-recipient, both probably members of the Roman middle or upper class, were likely in some legal dispute, as the curse tablet bears similarities to others found in Cyprus that are known to have been used in legal cases. ■

**Beijing, CHINA****Hospital Attack in China**

Medicine is a holy science. Medicine is for our life. Unfortunately, who understands it in heart? On 25 October 2013, a Chinese physician was attacked death by a man due to the unhappy with the results of an operation on his nose. The 33-year-old man carried out the attack at a hospital in Wenling city in the eastern province of Zhejiang. Earlier in the week, a man killed himself by jumping from a hospital building after stabbing a doctor six times in northeastern Liaoning province after a disagreement over complications from surgery on his arm. Also, two doctors were also beaten up by angry family members of a patient who died in hospital in southern China's Guangdong province. China government has promised to protect her medical workers after these thought-provoking attacks. Although China has spent \$120 billion on health care last year in recognition of official concern about a key driver of social resentment, hospitals are still overwhelmed with patients, and doctors are badly paid leading to corruption and a suspicion that staffs are more interested in making money by prescribing unnecessary drugs and treatment than tending the sick. The government this year has launched a sweeping crackdown on med-

ical corruption, targeting foreign drug makers in particular. In China, a large body of patients is unable to afford health care at all, despite government efforts to provide a basic safety net, which has also prompted attacks in the past. The Health Ministry announced plans to provide better security at hospitals, saying that last year seven people were killed and 28 injured in assaults on medical staff. Ministry data shows that violent attacks directed at doctors and other health care workers in the form of beatings, threats, kidnappings, verbal abuse and murder reached 17 243 cases in 2010, the latest year for which such figures are available. ■

### Providence, USA

## Can Animals Born In Space Live a Normal Life on Earth?

What is gravity? What happened if without gravity? It is not confusing for humans when we returned from space, but it is not that good for jellyfish. Sending jellyfish to space might seem silly, but these simple animals have given scientists plenty of insight into the effects long-term zero gravity exposure. If humans colonize space, it is possible that children could eventually be born and raised in zero gravity. This could mean that humans born in space never develop a normal sense of balance or normal muscle response to gravity. Even though they don't have legs and live in the ocean, jellyfish are sensitive to gravity just like humans. So scientists bred jellyfish in space and brought their babies back to Earth to see how they fared. Jellyfish are full of graviceptors, small crystals of calcium sulfate stored in pockets surrounded by sensitive hair cells. It is gravity that has to be present for these crystals to work. When they baby jellies returned to Earth, they had a hard time getting around. The space jellyfish had more trouble orienting themselves and moving around than their Earth-born relatives. The human inner ear contains fluids and crystals that function in a similar way to jellyfish graviceptors. The inner ear crystals signal what angle our head is at and give us a sense of our forward momentum. Like the space born jellyfish, humans raised in zero gravity may have trouble moving around nor-

mally if they returned to Earth. Others like fish and tadpoles swam in loops instead of straight lines when they were taken to space. The baby rats born in space were unable to flip themselves right side up when they were dropped in water, but eventually recovered a normal sense of gravity. When the space snails were tilted or turned upside down, they actually started trying to turn themselves right side up faster than their Earth-born relatives, but not always in the right direction suggesting that being born in space made the snails more sensitive to gravity changes, but they could not tell which way was up. More research is needed before we can fully understand how growing up in space could impact a human. ■

### East Lansing, USA

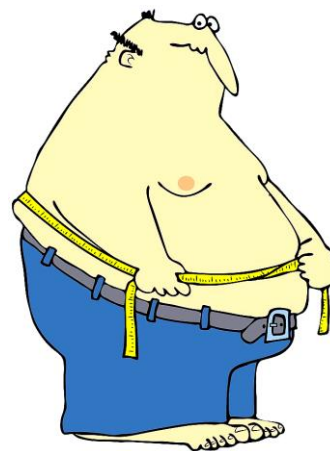
## Scorpion-Eating Mice Feel No Sting

Can you stand the sting of the Arizona bark scorpion? It is so fierce that humans say the pain is like being hit by a hammer. Yes, there are some species can bear the pain. The tiny grasshopper mouse shakes off the sting like it's nothing. New studies showed that instead of causing pain, the scorpion venom blocks it, a fact that could lead to the development of new pain-blocking drugs for people. Southern grasshopper mice are carnivorous desert-dwellers. Among their favorite meals are the Arizona bark scorpions. The scorpions' sting would kill any other rodent the size of the grasshopper mouse, but the little rodent can absorb many stings in the course of attacking a scorpion. Nerve cells communicate pain to the brain by translating stimuli into electric pulses. To do so, tiny channels in the cell membrane, called ion channels, open and close. One ubiquitous type of ion channel, the sodium/potassium channel, is present in cells throughout the body. This channel makes critical bodily functions, from breathing to muscle contractions, possible. Typically, scorpion venom acts directly on sodium/potassium channels in nociceptors to create the sensation of pain. A specialized channel known as channel 1.7 is responsible for picking up the pain signal, whereas a channel called channel 1.8 carries it to the brain. ■

### Cambridge, UK

## Genetic Mutation in Obesity

Obesity is a thorny issue today we face. Is there any special link that underlies the obesity? According to the report from the Centers for Disease Control and Prevention, the incidence of obese U.S. youngsters between 6 and 11 years old has jumped from 7% in 1980 to almost 18% in 2010. Among adolescents, the rate skyrocketed from 5% to 18%. A new study led by British researchers from University of Cambridge found a link between human obesity and a mutation of a specific gene associated with hunger. The gene known as KSR2 could be responsible for the hunger pangs described by many obese patients. It could also be responsible for slowing their metabolism so that they burn calories less efficiently than other individuals. Prior studies showed that when researchers deleted the KSR2 gene in mice, the rodents became obese. The goal of the UK



researchers was to determine if the same thing happened in human beings. When the British team compared the genetic se-

quences of the obese youngsters with those of children at a healthy weight, they made a startling discovery. The subjects who showed a mutation in KSR2 also showed signs of a heightened appetite, slower metabolism, slower heart rate, and severe insulin resistance when compared to those who had a normal gene. Additional work showed that KSR2 mutations interfered with metabolic processes, like oxidation of glucose and fatty acids. These outcomes demonstrated that genes can have a role in the development of obesity by reducing the body's metabolic rate. An affected individual cannot burn calories as efficiently as someone without the mutation. ■

## MEDICINE

## Oxytocin in Placebo Analgesia

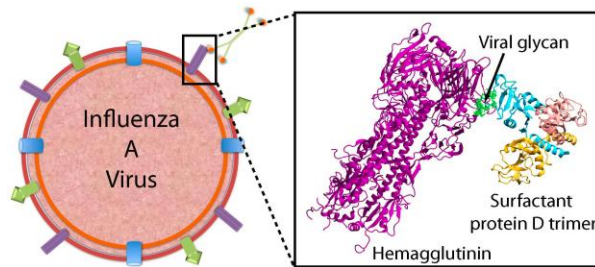
Psychological analgesia is a complication-free method in controlling pain, and is the basis of placebo analgesia. The pharmacological enhancement of placebo responses may have the potential to increase treatment benefits. The neuropeptide oxytocin, also known as the love hormone, may mediate processes such as empathy, trust, and social learning. These are key elements of the patient-physician relationship, which is an important mediator of placebo responses. Cumulating evidence indicated that oxytocin in the nervous system plays an important role in regulating nociceptive responses in different animal models. A new study led by Dr. Ulrike Bingel from University Duisburg-Essen, Germany, revealed that placebo analgesia can be pharmacologically enhanced by the application of intranasal oxytocin. For this effect, the researchers did not explain it using a general effect of oxytocin on pain sensitivity. However, they thought that such enhancement could be used to support-not replace-active treatments through placebo mechanisms. Based on its effects on trust and empathy, we hypothesize that oxytocin might have increased the believability of the instructions by the study physician. Furthermore, the potential of oxytocin to reduce stress and anxiety might have increased responsiveness to the placebo manipulation. Further studies are needed to replicate our findings in larger clinical populations, identify the underlying mechanisms, and explore moderating variables such as sex or aspects of patient-physician communication. ■

JAMA 2013; 310(16):1733

## MATHEMATICAL PHYSICS

## Compressed Modes for Variational Problems

Great progress has been recently made in a variety of fields of information science using ideas centered on sparsity, and one of the important features of these achievements is the use of a variational formulation with a constraint or penalty term that is an L1 or related norm. The “short-sighted” is a common phenomena in physics, chemistry, and materials science, namely the perturbation in a



small spatial region only affects its immediate surroundings. In mathematics, it is described by functions of finite range. In a study led by Dr. Stanley Osher from the University of California in Los Angeles, USA reported a general formalism for obtaining spatially localized solutions to a class of problems in mathematical physics, which was recast as variational optimization problems, such as the important case of Schrödinger's equation in quantum mechanics. Sparsity was achieved by adding an L1 regularization term to the variational principle, which was shown to yield solutions with compact support. Linear combinations of those modes approximate the eigenvalue spectrum and eigenfunctions in a systematic manner and the localization properties of compressed modes make them an attractive choice for use with efficient numerical algorithms that scale linearly with the problem size. These findings hold the key for developing efficient methods for solving partial differential equations of mathematical physics. ■

PNAS 2013;

doi/10.1073/pnas.1318679110

## IMMUNITY

## Influenza A Expedites

## Staphylococcus aureus Pneumonia

It is the flu shot season again. Could the vaccination prevent the spread of the virus and also reduce the incidence of pneumonia subsequent to the infection? Are there any specific association between the flu virus and bacterial pneumonia? Study headed by Dr. John F. Alcorn from the Children's Hospital of Pittsburgh of University of Pittsburgh Medical Center, USA found that influenza A inhibits *Staphylococcus aureus*-induced IL-1 $\beta$  production, resulting in attenuation of Type 17 immunity and increased susceptibility to bacterial infection. In this study, the researchers used mice

to investigate their hypothesis that preceding influenza attenuated the Type 17 pathway, increasing the lung's susceptibility to secondary infection. Mice were challenged with *Staphylococcus aureus*, with or without preceding Influenza A/PR/8/34 H1N1 infection. IL-1R1<sup>-/-</sup> mice had significantly higher *Staphylococcus aureus* burden, increased mortality, and decreased Type 17 pathway activation following *Staphylococcus aureus* challenge. Coinfected mice had significantly decreased IL-1 $\beta$  production versus *Staphylococcus aureus* infection alone at early time points following bacterial challenge. Preceding influenza did not attenuate *Staphylococcus aureus*-induced inflammasome activation, but there was early suppression of NF- $\kappa$ B activation, suggesting an inhibition of NF- $\kappa$ B-dependent transcription of pro-IL-1 $\beta$ . Furthermore, overexpression of IL-1 $\beta$  in influenza and *Staphylococcus aureus*-coinfected mice rescued the induction of IL-17 and IL-22 by *S. aureus* and improved bacterial clearance. Finally, exogenous IL-1 $\beta$  did not significantly rescue *S. aureus* host defense during coinfection in IL-17RA<sup>-/-</sup> mice or in mice in which IL-17 and IL-22 activity were blocked. ■

J Immunol 2013;191(10):5153

# Sabbath

By Jankel Adler



**Sabbath** was done in 1927/28 during the artist's brief period of success in Düsseldorf. At that time he was at the center of a small Jewish art community that probably included Düsseldorf lawyer Joseph Gottlieb. 1927/1928, Mixed media, oil, sand on canvas, 120 x 110 cm. From the Jewish Museum Berlin.



# Combined Repair Surgery for Cleft Lip and Cleft Palate: A 4-Year Clinical Experience

Xu Wang<sup>\*Δ</sup>

**Surgical repair is the only method of treatment for patients with cleft lip or/and palate. The cleft lip surgery is usually done when the child is 3 to 6 months old, while cleft palate repair is done between 2 and 3 years old in order to allow the palate to change as the child grows. Here we reported our experience of simultaneous surgeries for both cleft lip and cleft palate with satisfactory results in 48 patients who have not done cleft lip repair at early age. It reduced the treatment time, the patients' pain, as well as the financial burden of the patients' family by one operation.**

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Keywords: Children - Cleft lip - Cleft palate - Combined repair

**C**LEFT lip and palate are congenital maxillofacial deformities with a high birth prevalence in the world (1, 2). In China, this common malformation occurs at a rate of 1.6 per 1000 live births (3). Genetics can play a part, but most often the reason a baby is born with a cleft is unknown (3-6). A cleft affects a child's appearance but can also interfere with important bodily functions such as nutrition, speech, and hearing (1, 2). For the treatment, surgical repair is still the only method (7, 8). Usually cleft lip and palate surgeries are separated and are rarely performed simultaneously (7, 8). In China, in most times, cleft lip repair is done when the child is 3 to 6 months old, and cleft palate repair is done when the child is older, between 2 and 3 years old (9). This age appears to be advantageous partially because healing times are fast, the patient's memory of the recovery process is short, and the area around the cleft hasn't had much of

a chance to develop surrounding tissues in an abnormal manner (9). However, some parents bring their children to the hospital when they are older than 3 years old due to financial problem, lack of knowledge, and other reasons. Since 2008, we have seen 48 patients who have not done cleft lip repair at early age. We have performed simultaneous surgical repair for these patients of congenital cleft lip and palate with good results, and here we reported our experience with these patients.

## CLINICAL DATA

Data was collected from 48 patients with congenital cleft lip and palate in the Department of Stomatology, Juancheng People's Hospital, China, collected from May 2008 to May 2012. They included 27 cases of unilateral complete cleft lip with unilateral complete cleft palate and 21 cases of bilateral cleft lip with unilateral complete cleft palate (Table 1). The patient age is

2.5-6 years old with the average age of 4.1 years old. (Table 1)

## METHODS

The antibiotics, 0.25% chloramphenicol nasal drops, were used for pre-operative prophylactic purpose. The surgeries have been done with oral intubation and under intravenous sedation/general anesthesia. Cleft palate repair has been done first using the techniques of von langenbeck (two-flap method) and palatopharyngeal ring tied operation. Unilateral cleft lip repair has been down using Triangular Flap Method. Bilateral cleft lip repair has been down using straight line repair and rectangular flap repair methods. An iodoform gauze packing is inserted in the relaxation incision to support the mobilized soft palate and to cover up the exposed bone area. Labial arch was used for tension releasing and fixing. Antibiotics were used after surgery to prevent infections. Lip sutures were

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Table 1: Demographic characteristics of patients.

	Male (n=23)	Female (n=25)
Age (yr)	4.1±1.2	4.0±1.1
UCL with UCP	11 (48%)	16 (64%)
BCL with UCP	12	9
Surgical time (min)	160±43	161±57
Blood loss during surgery (ml)	145±35	142±42
Postoperative problems	2 cases of perforation	no

UCL: unilateral cleft lip; UCP: unilateral cleft palate; BCL: bilateral cleft lip

removed in five days, and the iodoform gauze was removed in 7-10 days after surgery. Palate sutures were removed at day 14 after surgery. Liquid diet was given for two weeks after surgery and then changed to semi-solid food for two more weeks. Regular food and voice training were given one and two months after surgery respectively.

## RESULTS

The average operation time was 160 ± 52 min. The average intraoperative blood loss was about 143 ± 39 ml (Table 1). There were no intraoperative or postoperative blood transfusions needed. Postoperative incision healed with no complications in 46 cases. Only two patients had a perforation in the junction of the hard and soft palate, and the diameter of the hole was about 0.3 cm. One year late after surgery, the voice and pronunciation was evaluated by the methods that are used in China and were previously reported (10). It showed that the voice and pronunciation was significantly improved one year after surgery compared with that before surgery.

## DISCUSSION

The fastest stage of language development in child is 0-3 years old. The functional speech has been basically established in five years old. In China, in most times, cleft lip repair is done when the child is 3 to 6 months old, and cleft palate repair is done when the

child is older, between 2 and 3 years old (9). This allows the palate to change as the baby grows. Doing the repair when the child is in this age will help prevent further speech problems as the child develops. However, many children with clinical findings in our country seek for treatment usually over three years old. If the cleft palate repair and cleft lip repair are separated, and the cleft palate repair is performed one year later after cleft lip repair, it would be more difficult for speech recovery and training. In this report, we simultaneously repaired cleft lip and cleft palate and the results showed that the effects of surgery were satisfied. It reduced the treatment time, the patients' pain, as well as the financial burden of the patients' family by one operation. ■

## CONFLICT OF INTERESTS

None

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