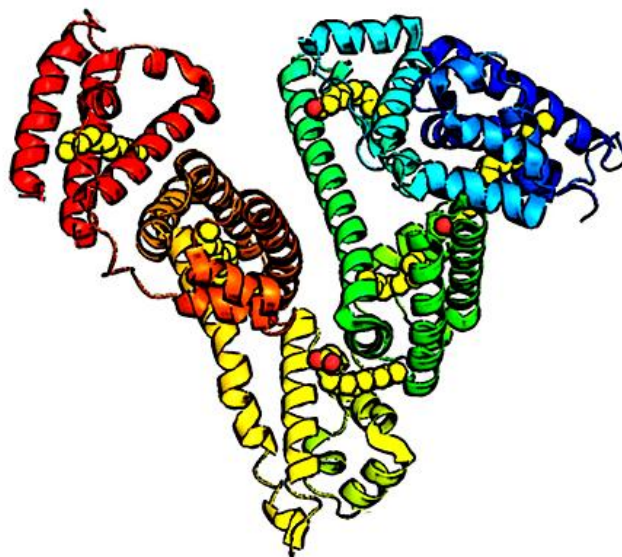


Science INSIGHTS®

The Official Journal of the Bono Academy of Science & Education

<http://www.bonoi.org>

20 December 2013, Volume 5, no. 2



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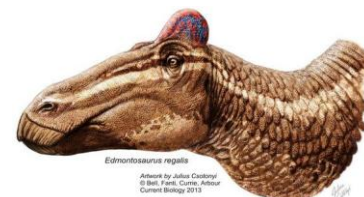
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COVER

High mortality in critically ill patients is a challenge for the intensive care medicine. While different reasons were figured out and corresponding therapeutic protocols were recommended, the actual mortality is still high and it is hard to conquer it and make a big improvement of the overall outcomes. Albumin, the most abundant protein in human blood plasma, plays an essential role in maintaining oncotic pressure, in participating in as an important protein transporter, and in possessing many physiological functions. In the context of critical care medicine, administration of albumin was found benefit patients in increasing their survival rate. However, a more recent study reported that bolus injection of albumin in critically ill pediatric patients increased the mortality. See page 92.

Image: BASE illustrating group

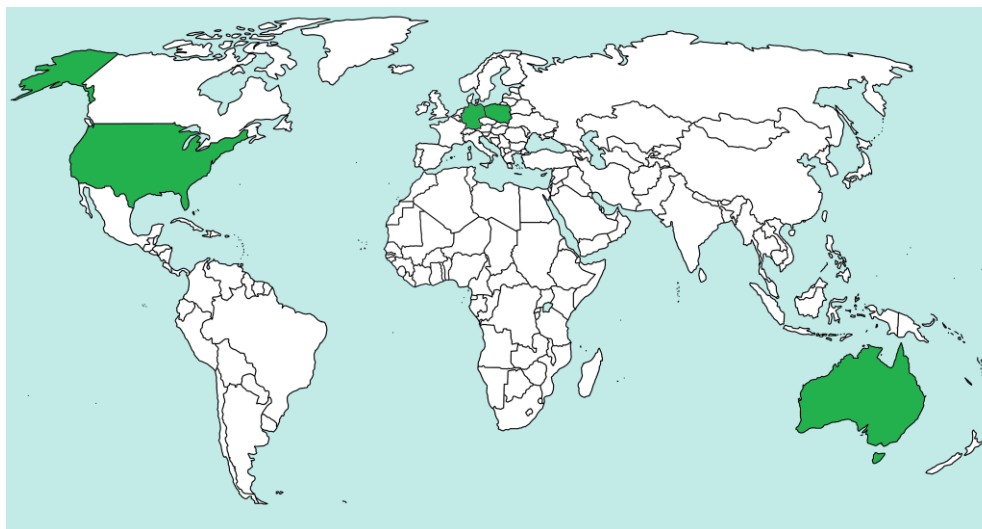
ISSN: 2329-5856

Salt Lake City, USA

Promiscuous Female Mice Have Sexier Sons

Male mouse pheromones, or sex attractants released in urine, attract female mice and increase the male's success rate in mating. Researchers have found that when female mice must compete with one another for mates, they bear sons that produce more urinary pheromones; seductive scents that attract mates and help ensure the mice's genes get passed on. The findings point to a more natural way to breed endangered species in captivity, that means if your sons are particularly sexy, and mate more than they would otherwise, it's helping get your genes more efficiently into the next generation. In fact, this largely belongs to the field of epigenetics, from which scientists can understand how environmental conditions to which parents are exposed affect the traits of their offspring. The only difference between research animals and natural animals is that scientists usually breed mice monogamously, by housing them with only one mate. But in nature, mice must compete for mates within a population. The new presented study mimicked the natural situation and found that sons of promiscuous mothers produced levels of urinary pheromones that were 31% higher than those of sons born to monogamous moms, regardless of whether the father was raised in promiscuous or monogamous conditions. Pheromones, the "cologne" of the animal world, are proteins, and like all proteins, are encoded by DNA. But the environment can cause epigenetic changes to the DNA. For example, a common chemical modification called methylation reduces the expression of a protein. However, producing pheromones comes at a cost: Male mice that make more pheromones have shorter lives because pheromones require a lot of energy to produce. ■

Kiel, GERMANY



Global Warming and Bio-Adaptation

Global warming is a fact we must face every day. Communicating evidence showed the unavoidable effect of global warming on the species and environment. Now, spiny green sea urchins face a new challenge from climate change: As the oceans become more acidic, urchin larvae struggle to digest their food. That means ocean acidification can cause digestive problems for marine animals. As levels of carbon dioxide in the atmosphere increase - driven by the burning of fossil fuels - the oceans act as a sponge, taking up some of the extra carbon dioxide. The result is carbonic acid, which decreases the overall pH of the oceans. Since the Industrial Revolution, the ocean has become about 25-30% more acidic. Acidification eats away at minerals used by corals to build their skeletons and other animals to build their shells. But many marine animals start their



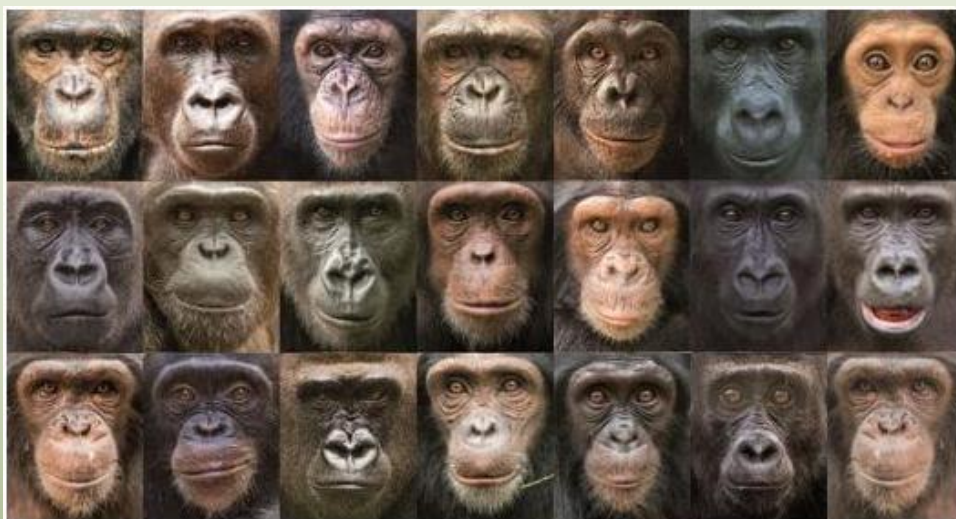
lives as larvae, which are very exposed

to the ocean environment. In particular, the larvae of the green sea urchin have a digestive system that is bathed in ocean water. Humans and other mammals have acidic gastric juices with a pH measurement of around 2, similar to the acidity level of lemon juice. Sea urchin larvae, in contrast, have very basic or alkaline digestive juices - about 9.5 on the 14-point pH scale. Historically, ocean pH was about 8.16 on the pH scale, making it slightly less basic than urchin digestive juices. Because the larval digestive system is exposed to the outside environment, the more acidic water caused a decrease in gastric-juice pH of about 0.3 to 0.5. In the more acidic environment, the enzymes that digest food don't work as well. As a result, the researchers found, urchin larvae in acidic water ate 11 percent to 33 percent more than those in ideal water conditions. ■

Warsaw, POLAND

Nitrous Oxide Emission Control

The United Nations' Environment Programme (UNEP) said that nitrous oxide (N_2O) emissions could almost double by 2050 if more aggressive action is not taken, undermining global efforts to curb climate change. Commonly known as the "laughing gas", N_2O exists naturally in the atmosphere in trace amounts. However, it is the third most potent greenhouse gas after carbon di



Los Angeles, USA

Colorful Faces in Primates

Have you ever seen monkeys and apes in colorful faces? That is the nature of the world, and also is the result of the development and evolution. However what is the underlying reason for this phenomenon? New study found that the primate animals live in larger social groups have complex, colorful facial patterns, whereas those that live in smaller groups have simpler, plainer faces, the study researchers found. Facial diversity might make it easier to identify individuals in bigger groups. For example, mandrills live in groups of up to 800 individuals. Other species are much more solitary - orangutan males travel and sleep alone, and females live only with their young. Still others, such as chimpanzees, have “fission-fusion” societies, living in small groups and occasionally convening in very large groups. And hamadryas baboons have complex hierarchies involving harems, clans, bands and troops. Researchers noted that in Africa, Old World monkeys and apes with darker faces lived nearest to the equator and those with lighter faces lived farther away. Primate species living in more tropical, forested areas also had darker faces. But facial complexity was not related to geographic location or habitat. Instead, complexity appeared to depend on the size of the social group, i.e. species that formed larger groups had more diverse faces. ■

oxide and methane due to human activities such as agriculture, fossil fuel combustion, waste water management and industrial processes. N_2O emissions into the atmosphere are currently around 5.3 million tonnes a year. More efficient use of fertilizers, less meat consumption, and improved waste water treatment are some ways to cut N_2O . Emissions could be cut by 1.8 million tonnes a year from 2020 and the benefits could be worth over \$160 billion annually across sectors such as agriculture, manufacturing, transportation and electricity production. Delegates from around 195 nations are meeting in Warsaw for a UN conference to work on greenhouse gas emission cuts under a new climate pact to succeed an extension to the Kyoto Protocol after 2020. Atmospheric volumes of greenhouse gases blamed for climate change, including N_2O , hit a record in 2012. Although less potent than carbon dioxide or methane, N_2O is often over-

looked and could undermine efforts to prevent the ozone layer depleting. The ozone layer shields the Earth from the sun’s harmful rays and has begun to recover from depletion over the past couple of decades due to curbs on chlorofluorocarbons (CFCs) and other halogenated chemicals. ■

Washington DC, USA

Preserve Historic Moon Landing Sites for Posterity

How does a country preserve its mark on the moon for decades to come? It may not seem like the moon is a busy space-traffic hub these days, but in the not-too-distant future, that could change. On December 01, 2013, China launched a spacecraft designed to land safely on the lunar surface, and some private companies hope to stage launches to the moon as well. If indus-

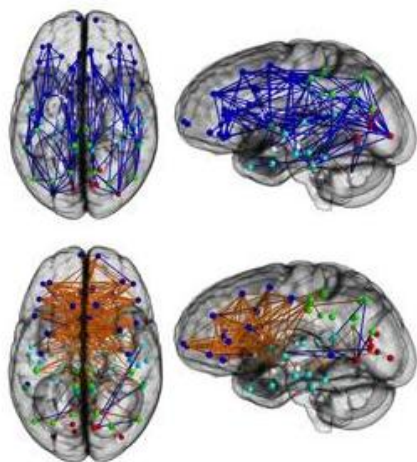
try and other nations aren’t careful, the uptick in lunar traffic might disturb the landing sites from the Apollo era, as well as Russia’s landing sites on the lunar surface. In order to protect the United States’ lunar heritage, U.S. legislators have recently proposed a “moon bill” that would qualify the Apollo landing sites as a national park. However, that could create more problems than it solves, according to a space policy expert. The bill might even violate the United Nations’ Outer Space Treaty, an agreement that prohibits countries from owning territory on the moon and other celestial bodies; the United States, Russia and 126 other nations have ratified the treaty. While the United States and other nations already have lines of communication set up to discuss space matters, sometimes issues still arise. NASA’s newest moon probe, the Lunar Atmosphere and Dust Environment Explorer (LADEE), might run into some issues

when China's Chang'e 3 lander touches down on the moon, kicking up dust that could interfere with LADEE's science. While private enterprise might have particular reasons for reaching the moon, no matter what, they will still need to be affiliated with a government in some way before launching to space, subjecting these companies to international agreements. NASA is already working toward protecting its sites and instrumentation on the moon. ■

Pittsburg, USA

Difference in Brains between Men and Women

Woman came from man, the Lord made it. Of course men are not from Mars and women are not from Venus, but their brains really are wired differently. A new study imaged the brains of nearly 1 000 adolescents and found that male brains had more connections within hemispheres, whereas female brains were more connected between hemispheres suggesting that male brains may be optimized for motor skills, and female brains may be optimized for combining analytical and intuitive thinking. Previous studies have found behavioral differences between men and women. For example, women may have better verbal memory and social cognition, whereas men may have better motor and spatial skills, on average. Brain imaging stud-



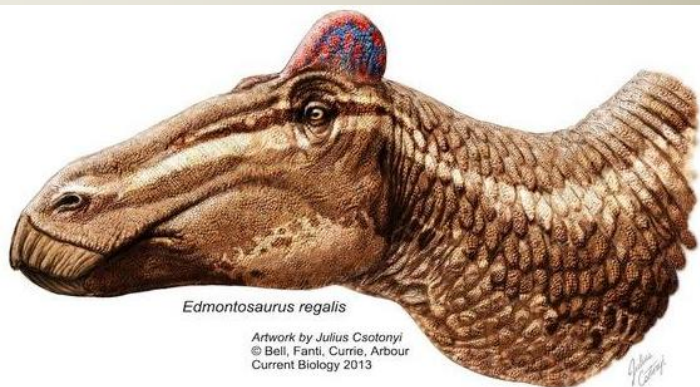
ies have shown that women have a higher percentage of gray matter, the computational tissue of the brain, while men have a higher percentage of white matter, the connective cables of the brain. However, the cerebellum, a part of the brain below the cerebrum that plays a role in coordinating muscle movement, showed the opposite pattern, with males having stronger connections between hemispheres. Roughly speaking, the back of the brain handles perception and the front of the brain handles action; the left hemisphere of the brain is the seat of logical thinking, while the right side of the brain begets intuitive thinking. The findings lend support to the view that males may excel at motor skills, while women may be better at integrating analysis and intuitive thinking. Currently, scientists can't quantify how much an individual has male- or female-like patterns of brain connectivity. Another lingering question is whether the structural differences result in dif-

ferences in brain function, or whether differences in function result in structural changes. ■

Chicago, USA

Harmless Lung Cancer

Harmless lung cancer? Have you ever heard such a declaration? A provocative study found that nearly 1/5 lung tumors detected on CT scans are probably so slow-growing that they would never cause problems. These were not false-positives – suspicious results that turn out upon further testing not to be cancer. These were indeed cancerous tumors, but ones that caused no symptoms and were unlikely ever to become deadly. However, doctors don't know yet how to determine which symptomless tumors found on CT scans might become dangerous, so they automatically treat the cancer aggressively. The findings underscore the need to identify biological markers that would help doctors determine which tumors are harmless and which ones require treatment. More than 200,000 Americans are diagnosed with lung cancer each year, and more than half of them die. Worldwide, there are about 1.5 million lung cancer deaths annually. That would suggest CT scans are finding many early cases of lung cancer that may never advance to the point where they could be spotted on an ordinary chest X-ray. ■



Madgwick, AUSTRALIA

Duck, Rooster, or Dinosaur?

A new fossil discovery reveals the duck-billed dinosaur *Edmontosaurus regalis* sported a fleshy comb on its head, similar to the ones on modern-day roosters. No such comb has ever been discovered before on a dinosaur. "We're never short of being surprised by what these animals looked like," said study researcher Phil Bell, a paleontologist at the University of New England in Australia. ■

PSYCHOLOGY and EDUCATION

Children's Use of Addition to Solve Two-Digit Subtraction Problems

Mathematics needs more logical thinking, and how to guide kids and young students understand well the mathematical problems is a thorny problem. Subtraction problems of the type " $M - S = ?$ " can be solved with various mental calculation strategies. A study group led by Dr. Greet Peters from Centre for Instructional Psychology and Technology, Belgium, investigated fourth- to sixth-graders' use of the subtraction by addition strategy, first by fitting regression models to the reaction times of 32



two-digit subtractions. These models represented three different strategy use patterns: the use of direct subtraction, subtraction by addition, and switching between the two strategies based on the magnitude of the subtrahend. Additionally, the researchers compared performance on problems presented in two presentation formats, i.e., a subtraction format ($81 - 37 = X$) and an addition format ($37 + X = 81$). Both methods converged to the conclusion that children of all three grades switched between direct subtraction and subtraction by addition based on the combination of two features of the subtrahend: If the subtrahend was smaller than the differ-

ence, direct subtraction was the dominant strategy; if the subtrahend was larger than the difference, subtraction by addition was mainly used. However, this performance pattern was only observed when the numerical distance between subtrahend and difference was large. These findings indicate that theoretical models of children's strategy choices in subtraction should include the nature of the subtrahend as an important factor in strategy selection. ■

Brit J Psychol 2013; 104(4): 495

LANGUAGE

Descriptions of Second Language Interaction

As everything becomes more international, we need consider things in a more detailed and analytic manner. Second language (L2) is a popular topic in modern classes due to its reflection of the internationalization. A study headed by Dr. Yo-An Lee from Sogang University, Korea, evaluated the methodological practices on their own terms and to specify what is gained and lost in the respective approaches. It does so by examining and comparing descriptive analyses of L2 conversational interactions in the interactionist paradigm and in conversation analysis (CA). The distinction between language acquisition and language use has been a source of contention among those who study L2 interaction. However, debates have essentially been limited to confirming the presence of discrepancies among different paradigms regarding theoretical content. As a result, where methodological practices are at all discussed they are judged only by the extent to which they realize underlying theoretical positions. The article concluded that, if both approaches were held to a minimum level of descriptive adequacy regarding the respective parties' L2 use, analysts could gain a workable space regarding what can be said and what should be said about actual L2 interactions, including where to end descrip-

tion that is created independent of theoretical positions. ■

Modern Language J 2013; 97(4):853

MEDICINE

Salt Consumption and Hypertension

Salt is an important component of diet supplement, but over-balanced intake of salt is a risk factor of hypertension and cardiovascular diseases. What is the suggestion now on the salt intake from professional staff? A committee named Salt Reduction Committee of the Japanese Society of Hypertension presented the updated recommendation on the salt consumption in a series of reports. In the reports, the committee experts said that excess salt increased the risk of the left ventricular hypertrophy, heart failure, the urinary protein/albumin levels and end-stage renal failure. These diverse beneficial effects of salt reduction are probably because low-salt diet is an effective strategy to decrease BP and body fluid volume but is less effective to ameliorate the other cardiovascular risk factors. In reality, the target levels of salt restriction in men and women were established as less than 9.0 per day and 7.5 g per day, respectively, and in patients with hypertension it should be as less than 6 g per day. Finally, the salt intake needs to be monitored and evaluated using different methods although merits and limitations exist for every method. In special facilities for hypertension treatment, measurement of sodium (Na) excretion with 24-h pooled urine or a survey on dietary contents by dietitians is recommended. In medical facilities in general, measurement of the levels of Na and creatinine (Cr) using second urine samples after waking-up or spot urine samples is recommended. A method to estimate salt intake based on the Na excretion per gram Cr using the Na/Cr ratio in spot urine is simple, but not reliable. ■

Hypertens Res 2013; 36(12): 1009
Hypertens Res 2013; 36(12): 1020
Hypertens Res 2013; 36(12): 1026

Shrimp

By Baishi Qi (1864-1957)



Shrimp, by Qi, Baishi (1864-1957)

The age of creation: 1949; Specifications: 136.8x41.4cm. Material quality : ink and brush
From National Art Museum of China

Albumin versus Saline in Mortality in Critically Ill Children

Yusheng Liu,* Shiqin Xu,* Fuzhou Wang,* †, ^ΔXirong Guo, ‡ Rong Shen, ‡ Xiaofeng Shen*, ^Δ

High mortality in critically ill patients is a challenge for the intensive care medicine. While different reasons were figured out and corresponding therapeutic protocols were recommended, the actual mortality is still high and it is hard to conquer it and make a big improvement of the overall outcomes. Albumin, the most abundant protein in human blood plasma, plays an essential role in maintaining oncotic pressure, in participating in as an important protein transporter, and in possessing many physiological functions. In the context of critical care medicine, administration of albumin was found benefit patients in increasing their survival rate. However, a more recent study reported that bolus injection of albumin in critically ill pediatric patients increased the mortality. Of this report, we analyzed carefully and commented their methodology in performing the study. Some issues were not that clear, and it is difficult to determine the real effect of albumin administration on the mortality in children. It is a challenge to answer one question precisely and in overall, and we herein raise our concerns on this topic to discuss them with other researchers. ■

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Submitted: 22 October 2013
Revised: 10 November 2013
Accepted: 22 November 2013

SCIENCE INSIGHTS 2013; 5(2):92-93.

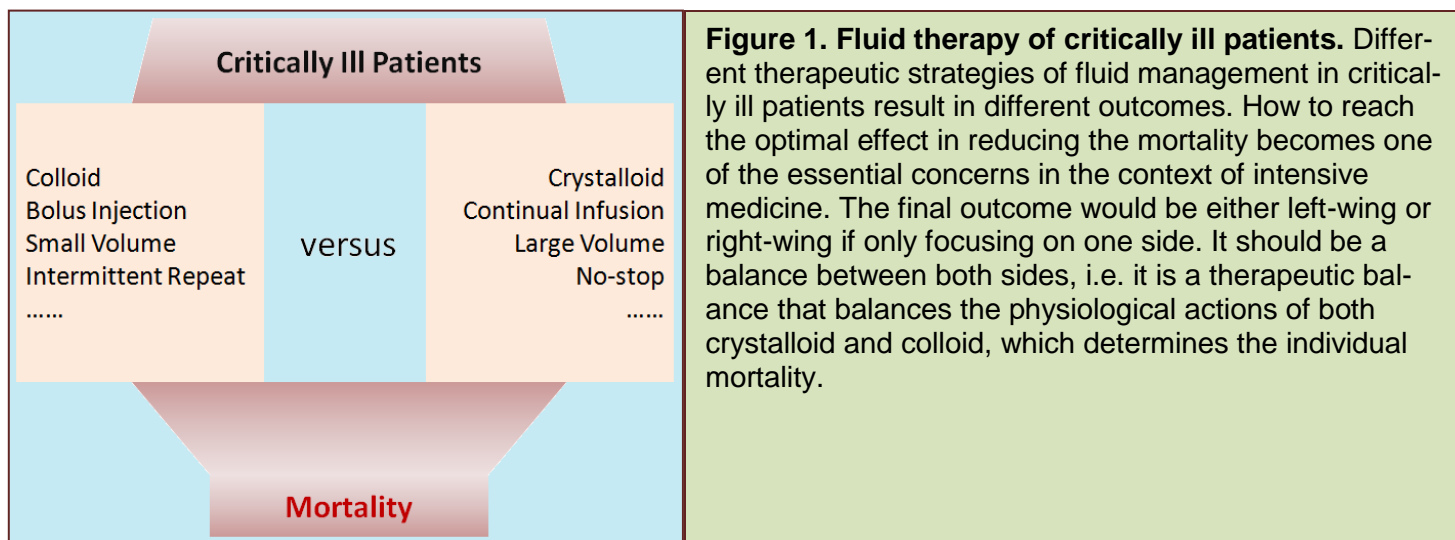
Keywords: Albumin – Mortality – Pediatrics – Critical care

HOW to reduce the mortality of critically ill patients is hot topic in critical care medicine, but it is a challenge for intensive care physicians. Although decades passed, the real situation on this topic did not show substantial change. Fluid therapy was a focus due to the consideration that fluid deficit was a major contribution to the high mortality, whereas the precise mechanisms and potential risks about this treatment are not yet guaranteed. Some studies positively support the

fluid therapy, but some do not. Even though it is beneficial for patients using fluid management, it is hard to determine which type of fluid – colloid versus crystalloid, and what volume – large versus small, and what time it should be given – bolus versus continual infusion, all become the issues need to be clarified (Figure 1).

In a study, Maitland and colleagues reported intriguing results that fluid boluses markedly increased mortality in critically ill children (1). The

study used 20ml of 5% albumin (1g/kg), and the total albumin the patients received at 48 hours was 76.2ml (IQR=40-97ml). So the total albumin given was 3.81g/kg (IQR=2.0-4.85g/kg). Because the paper did not present data regarding the serum levels of albumin before and after fluid interventions, so it is difficult to declare the effect of albumin itself on the patients' overall mortality. Given the decreased albumin is associated with increased death after surgeries (2, 3) and albumin



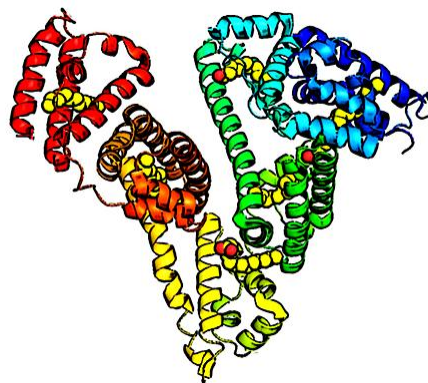
can detect dying risk in pediatric wards (4), the albumin levels and corresponding subgroup analyses are necessary.

Second, given the reciprocal relationship between nutrition and plasma volume (5), the decreased albumin might be because reduce in total volume or diluted by the relatively increased plasma. The reported mid-upper-arm circumference was not enough to indicate the nutrition state. Although fewer patients were of mid-upper-arm circumference ≤ 11.5 cm, it is more when compared with the number of death. So the influence of malnutrition on the mortality is needed to be investigated. ■

ACKNOWLEDGEMENTS

This work is supported in part by the following research grants: National Natural Scientific Foundation of China (NSFC)

81271242 and 81371248; Nanjing Municipal Foundation of Medical Science Development ZKX10018; Nanjing Municipal Young Scientist Grant 201208009 and JQX12009.



CONFLICT OF INTERESTS

None

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