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Histamine fish poisoning
Natural and Anthropogenic Threats to Coral Reefs
Nutraceutical potentials of Seaweeds
New species of marine worm discovered in Antarctica
Nature (Seagrass) Cures Human Diseases

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KNOW THE FACTS

Histamine fish poisoning

Histamine fish poisoning is a food borne chemical intoxication caused by the consumption of spoiled or contaminated fish and fishery products. The out breaks of histamine food poisoning occurred every year in different geographical locations, source and period in various countries. More histamine outbreaks were reported from 2004 to 2007. Total victim of histamine illness were 1858 people throughout the world. Histamine production in fish is related to the histidine content of the fish and fishery products, the presence of bacterial histidine decarboxylase (HD) and the environmental conditions. The symptoms of histamine occur from several minutes to several hours after ingestion of the spoiled fish and fishery products. The primary symptoms, rash, urticaria, oedema, inflammation, nausea, vomiting, diarrhoea, hypotension, hypertension, headache, palpitations, tingling, burning and itching. Storage of fish immediately after death in lower temperature would help to reduce histamine fish poisoning.

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Natural and Anthropogenic Threats to Coral Reefs

Coral reefs face numerous threats. Weather-related damage to reefs occurs frequently. Large and powerful waves from hurricanes and cyclones can break apart or flatten large coral heads, scattering their fragments. Reefs also are threatened by tidal emersions. Long periods of exceptionally low tides leave shallow water coral heads exposed, damaging reefs. The amount of damage depends on the time of day and the weather conditions. Corals exposed during daylight hours are subjected to the most ultraviolet radiation, which can overheat and dry out the coral's tissues. Increased sea surface temperatures, decreased sea level and increased salinity from altered rainfall can all result from weather patterns such as El Niño. Together these conditions can have devastating effects on a coral's physiology (Forrester, 1997.) During the 1997-1998 El Niño seasons, extensive and severe coral reef bleaching occurred in the Indo-Pacific and Caribbean.

Approximately 70 to 80 percent of all shallow-water corals on many Indo-Pacific reefs were killed. Approximately 90 percent of the corals were destroyed.

In addition to severe weather, corals are vulnerable to attacks by predators.

Human-caused or anthropogenic activities are major threats to coral reefs. Pollution, overfishing, destructive fishing practices using dynamite or cyanide, collecting live corals for the aquarium market and mining coral for building materials are some of the many ways that people damage reefs all around the world every day. When some pollutants enter the water, nutrient levels can increase, promoting the rapid growth of

algae and other organisms that can smother corals. Coral reefs also are affected by leaking fuels, anti-fouling paints and coatings, and other chemicals that enter the water. In many areas, coral reefs are destroyed when coral heads and brightly-colored reef fishes are collected for the aquarium and jewelry trade. Other damaging fishing techniques include deep water trawling, which involves dragging fishing net along the sea bottom, and muro-ami netting, in which reefs are pounded with weighted bags to startle fish out of crevices.

Debris like this plastic bag can quickly damage the corals

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Nutraceutical potentials of Seaweeds

Fresh and dry seaweeds are traditionally consumed as a sea vegetable in Asia (Japan, China and Korea) for their nutritional quality. About 221 seaweeds are utilized commercially world- wide of which 65% are used as human food. They possess high nutritional value and the quality of protein and lipid are comparatively better than other edible plant materials. They are also used for animal nutrition as feed and as fertilisers for soil conditioning. Although, brown, red and green seaweeds found bioactive compound that act as antioxidants, anti-inflammatory, anticoagulation, ant proliferation and antibiotic, they have not been thoroughly explored in India. More recently marine algae have been utilized in Japan as raw materials for many seaweed based food products, such as jam, cheese, wine, tea, soup and noodles and in the Western countries, mainly as a source of polysaccharides (agar, alginates, and carrageenans) for food and pharmaceutical uses. Mineral content is generally high (8-40%) and the essential minerals and trace elements needed for human nutrition are present in seaweeds. This wide range in mineral content, not found in edible terrestrial plants, is related to factors such as seaweed phylum, geographical origin and seasonal, environmental and physiological variations. Edible seaweed is a renewable natural resource existing in large quantities all along the Indian coast. Nevertheless, there has been little exploitation and exploration of seaweeds, despite potential industrial and agricultural application.

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FLASH NEWS

CLIMATE CHANGE ALTERING SOME BELUGA WHALE MIGRATION

Written by Emily in Marine Life, Whales & Dolphins

A new study from the University of Washington reveals that Arctic sea ice loss impacts the migration of some beluga whales, while the migration of others remains the same.

Beluga Whales in Chukchi. Photo credit: Laura Morse, NOAA NMFS.

Researchers studied two distinct beluga whale populations in the Arctic. The both spend winters in the Bering Sea and swim north in the early summer as ice melts and they gain access to the Beaufort and Chukchi seas. Both populations feed in the summer and migrate back to the Bering Sea in the fall. As Arctic sea ice takes longer to freeze up each fall (thanks to climate change), the Chukchi population delays its annual southward migration by up to a month. However, the Beaufort population hasn't altered its migration pattern. This suggests that the Chukchi population is feeding later into the fall, which could be good or bad. It's good because the whales have more food, but it could be bad if the ice unexpectedly freezes up and closes the whales in. "The biggest take-home message is that belugas can respond relatively quickly to their changing environment, yet we can't expect a uniform response across all beluga populations," said lead author Donna Hauser, a postdoctoral researcher at the UW's Polar Science Center. Hauser explains that the Beaufort population's "apparent indifference to sea ice timing" is surprising, given that the two populations have such similar life histories.

"If we're trying to understand how these species are going to respond to climate change, we should expect to see variability in the response across populations and across time," Hauser said. "That may complicate our predictions for the future."

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Scientists just measured a rapid growth in acidity in the Arctic Ocean, linked to climate change

Ice floes in Baffin Bay above the Arctic Circle, 2008

The Arctic is suffering so many consequences related to climate change, it's hard to know where to begin anymore. It's warming more rapidly than almost any other part of the planet; its glaciers are melting and its sea ice is retreating; and its most iconic wildlife, including polar bears and walruses, are suffering. But that's not all — a new study Climate Change, indicates that the Arctic Ocean is also becoming more acidic, another consequence caused by greenhouse gases in the atmosphere. It's

a process that occurs when carbon dioxide dissolves out of the air and into the sea, lowering the water's pH in the process.

Scientists believe acidification is occurring at varying rates all over the world. that's dangerous for some marine organisms. The new research focuses on the water concentrations of a mineral called aragonite, which is a form of calcium carbonate, a chemical compound that plankton, shellfish and even deep-sea corals use to build their hard outer shells. When ocean water becomes more acidic, chemical reactions occur that impede the formation of calcium carbonate and lower its concentration in the water, which can be a major threat for these marine animals.

These aragonite levels are a "very important parameter" which can be an indicator of how much carbon dioxide is dissolving into the sea, according to Liqi Chen, a scientist with China's State Oceanic Administration and a co-author on the new study.By analyzing data collected from the ocean during expeditions between 1994 and 2010, the scientists have found that some parts of the western Arctic Ocean are undersaturated with aragonite — in other words, their concentrations are lower than they could be. And these areas have expanded more than sixfold since the 1990s. In 1994, the data suggested that about 5 percent of the water between 70 and 90 degrees north latitude was undersaturated with aragonite. The researchers point out that the levels of aragonite in these areas are below the point scientists believe is a threat to marine organisms. For one thing, carbon dioxide tends to dissolve more easily in cold water. As the Arctic continues to warm, melting both from floating sea ice and from glaciers on the Greenland ice sheet provides an influx of cold, fresh water to the ocean, which may make acidification easier. Additionally, the less sea ice there is on the surface of the ocean, the more liquid water is exposed to carbon dioxide in the atmosphere. Recent research has also shown that Pacific Ocean water is increasingly intruding into the Arctic. The researchers note that this Pacific water has certain chemical properties — for instance, lower salt content and a higher level of dissolved, carbon-rich organic material — that may be contributing to the increase in acidification. The reasons for this are complex, "Models indicate that sea ice will continue to decrease and the prediction is that the Arctic Ocean may be ice-free in the summer by 2030," the study highlights the interconnected nature of climate consequences in the Arctic — the way that greenhouse gas emissions, rising temperatures, ice melt and ocean acidification are all linked and help to reinforce one another. And it points to yet another example of a climate effect that's not just a concern for the future, but is already an issue — and a growing one — today.

Reference

The Washington Post (Energy and Environment) Chelsea Harvey, New york

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ORIGIN STORIES: CANCER IN BIVALVES

Written by Contributing Writer in Marine Life, By Astrid Hsu

What if cancer spread the like common cold? A hug, a cough, or sharing food would put the entire population at risk. Luckily, humans are currently safe from such a scenario. Unfortunately, the same cannot be said for our marine bivalve friends.

Cockles, *Cerastoderma edule*. Photo credit: Féron Benjamin – Flickr, CC BY-SA 2.0.

Initially discovered in soft-shell clams (*Mya arenaria*), a contagious cancer called disseminated neoplasia (similar to leukemia) was found in mussels (*Mytilus trossulus*), cockles (*Cerastoderma edule*), and golden carpet shell clams (*Polititapes aureus*) in a recent study. Researchers concluded that cancer in these species was contagious because the DNA of tumor cells were distinct from that of their host but nearly identical to each other. Each species has a different origin story of how their cancer came to be.

For the soft-shell clam, all infected members have same tumor cell, implying that the disease sprouted from one unfortunate individual of *M. arenaria*. Mussels and cockles echo this pattern, with cancer cells derived from one original host, respectively. However, analysis on golden carpet shell clams discovered that while the disease was clearly transmissible, the genetic structure of tumor cells was strikingly similar to that of *P. aureus*' neighbor, the pulled carpet shell (*Venerupis corrugata*). These two species reside in the same region—even in the same beds—and this proximity and genetic evidence indicate that not only is cancer transmissible within a species but that it can cross to other species. However, further confounding scientists, there has been little incidence of leukemia-like cancer in the pulled carpet shell despite monitoring since 1990.

The cancerous bivalves present not only health conundrums but also threaten the seafood industry and ecological state. Shellfish is a $329 million industry in the US alone and represents two-thirds of the nation's aquaculture industry. Bivalves also perform countless ecosystem services, from stabilizing habitats and promoting fish diversity to filtering water and acting as carbon sinks. Thus, transmissible disease has the power to heavily damage economies and ecosystems tied to shellfish. But with researchers working to understand the genetic and ecological factors, there is hope that conservationists will help bivalves beat cancer into remission and conserve the ecosystem and market.

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TRIGGER FISH ARE PRETTY GOOD AT DIFFERENTIATING COLORS

Written by Emily in Fish, Marine Life

Mantis shrimp aren't the only creatures with extreme colour vision! Researchers from the University of Queensland recently determined that reef fish can see colours that humans can't.

Triggerfish in the Gulf of Mexico. Photo credit: NURC/UNCW and NOAA/FGBNMS.

"Coral reefs are the most colourful environments in the world, and it's now become clear that reef fish see colours we can't," Professor Justin Marshall of the Queensland Brain Institute said in a news release. While previous studies have examined the colours goldfish see, this is the first to examine reef fish. Researchers studied triggerfish by subjecting them to a series of behavioural tests where they were rewarded for discriminating against similar colours. They found that the fish were able to see some colours better than humans. "Some reef fish, such as the anemone fish 'Nemo' and other damselfish can see the UV wavelengths we protect ourselves from," Marshall said. "Triggerfish, on the other hand, see more or less the same colour range we do but their colour discriminations are different. Thinking about it, this is no big surprise. Their colour tasks are blue-biased, as they live in a blue ocean. Ironically, as the colours of the reef change and disappear because of climate change, we are just beginning to understand how reef inhabitants see and experience their vibrant world." In addition to providing more information about the intricacies of coral reefs, studies like this one can also lend insights to other disciplines. Comparative colour vision research can be used for studies ranging from data storage to cancer detection.

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NASA IN THE GREAT BARRIER REEF

Written by Emily in Coral Reefs, Technology

NASA recently began a new mission in the Great Barrier Reef to "transform our understanding of Earth's valuable and ecologically sensitive coral reefs."

Bleached and stressed coral on the Great Barrier Reef.
Photo credit: NASA/JPL-Caltech/BIOS.

The Coral Reef Airborne Laboratory (CORAL) mission is a three-year mission that combines aerial surveys with in-water sampling."CORAL offers the clearest, most extensive picture to date of the condition of a large portion of the world's coral reefs," CORAL Principal Investigator Eric Hochberg of the Bermuda Institute of Ocean Sciences (BIOS), said in a news release. "This new understanding of reef condition and function will allow scientists to better predict the future of this global ecosystem and provide policymakers with better information for decisions regarding resource management." CORAL will collect data and generate a uniform data set for a

large sample of reefs across the Pacific. The data will be used to provide new models for analyzing reef ecosystems, allowing scientists to search for trends between reef conditions and natural and human-produced factors. "Virtually all reef assessments to date rely on in-water survey techniques that are laborious, expensive and limited in spatial scope," Hochberg said. "Very little of Earth's reef area has been directly surveyed. More importantly, there are no existing models that quantitatively relate reef conditions to the full range of biological and environmental factors that affect them — models that can help scientists better understand how coral reefs will respond to expected environmental changes. CORAL addresses an urgent need in the face of ongoing worldwide reef degradation, and also serves as a pathfinder for a future satellite mission to globally survey the world's reefs."

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What is what?

HOLOTHURIA SPINIFERA

Kingdome – Animalia, Phylum – Echinodermata, Order – Aspidochirotida, Class – Holothuroidea, Family – Holothuriidae Genus – Holothuria, Subgenes – Heelothuria Species – *H. spinifera,* Binomial Name – *Holothuria spinifera*

The *Holothuria spinifera* is also called as sand fish, it is a species of sea cucumber and family is Holothuriidae. It is placed in the subgenus Theelothuria, making its full name *Holothuria spinifera.* In India it is known as "Cheena attai" or "naju attai". It lives in tropical regions of the west Indo Pacific Ocean at depths ranging from 32 to 60 meter (105 to 197ft). It is fished commercially to produce "beche-de-mer". It has a cylindrical body, dark brown on the upper side and pale brown beneath. The skin is densely covered with sharp conical protuberances. It can grow to a length of 30 centimetres (12 inch). *Holothuria spinifera* is a scavenger, it is sifting through the sediment on the seabed with its tentacles. It usually spends the day buried in the sediment and emerges at night. Research has been undertaken into the reproduction and life cycle of *Holothuria spinifera* with a view to breeding it commercially for aquaculture or for sea ranching. In a study in India, several adults were caught by hand and placed in a tank. Spawning took place spontaneously with a male liberating sperm in a white stand. A female responded by producing a spurt of eggs that were fertilized in the water column. The larval were pelagic and developed rapidly, being fed on microalgae for the first ten days for the next four days they passed through the non-feeding, barrel-shaped, dolialaria stage and moved about in the tank. They then settled on the bottom and underwent metamorphosis into pentactula larvae with five short tentacle at the front and two tube feet at the back. By the day twenty, the tentacles are feet were visible on the body. In the study, mortality of the larvae was about 95%, but this high rate was partly due to

predation by copepods which the researchers were unable to eliminate from the tank. Other studies have investigated now best to stimulate spawning and the optimum conditions of temperature, P^H and salinity for rearing the larvae the best diet to feed and how to stimulate them to settle. It is filter feeder and extracts nourishment from sediment that is present in the bottom level of sea. They used to be an important article of trade but the volumes exported have diminished over the gleans. The sea cucumbers are easy to gather, slow to mature and need to congregate for successful reproduction and over exploitation have reduced population. Further research has been undertaken into the natchry technology necessary for successful rearing and it is hoped to use juveniles to seed suitable areas of the sea bed to increase the size of populations.

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New species of marine worm discovered in Antarctica

A team of scientists has discovered a new species of polychaete, a type of marine annelid worm, 9-meters deep underwater near Japan's Syowa Station in Antarctica, providing a good opportunity to study how animals adapt to extreme environments. A team of Japanese scientists has discovered a new species of polychaete, a type of marine annelid worm, 9-meters deep underwater near Japan's Syowa Station in Antarctica, providing a good opportunity to study how animals adapt to extreme environments. International efforts are currently underway in Antarctica to build long-term monitoring systems for land and coastal organisms from an ecological conservation standpoint. To this end, the accumulation of continent-wide fauna information is essential, but Japan is lagging behind in gathering and analyzing such data around Syowa Station, particularly in regard to coastal marine life. To address this problem, in 2015 a team of researchers, including Keiichi Kakui, a lecturer at Hokkaido University, and MegumuTsujimoto, a postdoctoral researcher at Japan's National Institute of Polar Research, started researching marine specimens stored at the institute, as well as newly collected specimens. As a part of this process, they conducted microscopic analyses to examine two annelid worms that scuba divers collected 8-9 meters deep on January 16th, 1981, at Nishinoura near Syowa Station.

The worm found 9 meters deep turned out to be a new, unnamed polychaete -- a variety with a thick, gel-like coat and conspicuous, long notochaeta. The team named the new species Flabegravierafujiae, taking after the icebreaker ship "Fuji" used in the expedition in 1981. The specimen collected 8 meters deep was recognized as Flabegravieramundata, and was deemed to have been collected at the shallowest depth ever recorded for the Flabegraviera genus.

"This study is a major step forward in understanding marine life in the coastal region near Syowa Station," says Dr. Keiichi Kakui, "The Flabegraviera genus, to which the three

species belong, is unique to the Antarctic and considered a good example for studying how polychaetes adapt to extreme environments." Now that it has become clear that polychaetes inhabit depths reachable by scuba divers, the researchers hope to conduct experiments using living specimens to gain a deeper understanding of marine life in the area, helping to create an information infrastructure vis-à-vis local biodiversity. The present study forms a part of research carried out on polychaetes by Naoto Jimi, a first-year doctoral candidate at Hokkaido University.

Two species of the Flabegraviera genus: Flabegraverafujiae (left), the new species discovered in the study, and Flaberavieramundata (right). Scale bar: 1cm.

Credit: Image courtesy of Hokkaido University

Journal Reference: Hiroshi Kajihara et al. **A new species and the shallowest record of Flabegraviera Salazar-Vallejo, 2012 (Annelida: Flabelligeridae) from Antarctica**. *Zootaxa*, 2017; 4221 (4): 477 DOI: 10.11646/zootaxa.4221.4.4

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NATURE (SEAGRASS) CURES HUMAN DISEASES

Photo credit: Courtesy Science Daily 16th February, 2017

Bountiful underwater gardens that nestle close to shore and are the most common coastal ecosystem on Earth -- can reduce bacterial exposure for corals, other sea creatures and humans, according to new research.

"The seagrass appear to combat bacteria, and this is the first research to assess whether that coastal ecosystem can alleviate disease associated with marine organisms," said lead author Joleah Lamb of Cornell University's Atkinson Center for a Sustainable Future, where she is a Nature Conservancy NatureNet fellow. Senior author Drew Harvell, Cornell University professor of ecology and evolutionary biology and an Atkinson Center Fellow, had been running an international workshop and examining the health of underwater corals with colleagues near small islands at Spermonde Archipelago, Indonesia. But after a few days, the entire research team fell ill with dysentery, and one scientist contracted typhoid. "I experienced firsthand how threats to both human health and coral health were linked," Harvell said.

Lamb returned with an international team armed to test the waters. On these small islands freshwater is sparse, surface soil is thin and just off shore the marine environment teems with solid waste, sewage and wastewater pollution. Generally, the islands -- though filled with people -- do not have septic systems. The group used *Enterococcus* assays, the U.S. Environmental Protection Agency standard of health risk levels for wastewater pollution in recreational waters, to see whether seagrass meadows influenced bacterial levels. Water samples taken near the beaches exceeded exposure levels by a factor of 10. But, Lamb's team found threefold lower levels of *Enterococcus* in seawater collected from within seagrass meadows.

"The genetic sequencing work pinpointed the kinds of bacteria -- all in difficult, arduous conditions," said Harvell. "It showed exactly what was in the water. The beautiful oceanside water looked blue-green, but truly it was filled with dangerous pollution -- some really bad stuff in the water close to shore." While research is beginning to reveal the mechanisms driving bacterial-load reductions in these ecosystems, it is evident that an intact seagrass ecosystem -- home to filter-feeders like bivalves, sponges, tunicates (marine invertebrates) -- removes more bacteria from water.

As seagrass meadows and coral reefs are usually linked habitats, Lamb's team examined more than 8,000 reef-building corals for disease. The researchers found lower levels -- by twofold -- of disease on reefs with adjacent seagrass beds than on reefs without nearby grasses. "Millions of people rely on healthy coral reefs for food, income and cultural value," said Lamb.Harvell, Lamb and their colleagues agree that these findings are key to conserving seagrass ecosystems. "Global loss of seagrass meadows is about 7 percent each year since 1990," said Lamb. "Hopefully this research will provide a clear message about the benefits of seagrasses for human and marine health that will resonate globally." Regions around the world promote aquaculture to help feed populations, as diseases for many ocean-dwelling plants and animals increase, Harvell said, "Our goal is to stop measuring things dying and find solutions. Ecosystem services like seagrass meadow habitats are a solution to improve the health of people and the environment. Biodiversity is good for our health."

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Understand the Meaning?

Mordant [From L. Mordeo – to bite]- A substance capable of combining with a dye and the material to dyed there by increasing the affinity or binding of the dye. Alum is commonly used as a mordant to promote staining with hemotoxylin.

Poison-[From potio-potion draught]- Any substance (either taken internally or applied externally) that is injurious to health or dangerous to life

Toxin-[From toxicon—poison]- A noxious or poisonous substance that

i. Is an integral part of the cell or tissue, or

ii. Is an extracellular product [Exotoxin], or

iii. Represents a combination of the two situations, formed or elaborated during the metabolism and growth of certain microorganisms as well as some of the higher plant and animal species, in general toxins are relatively complex antigenic molecules and the chemical compositions are usually not precisely unknown.

Referred from Medical dictionary, 23rd edition [Indian Edition]5th reprint .S. Chand and Company Ltd, New Delhi,1989 (Editor not stated)

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MODEL PRE-PH.D ENTRANCE OBJECTIVE TYPE QUESTIONS

1. Ocean is an example of ------- ecosystem
   a) Micro b) Mega c) All the above d) None of the above
2. Phar macophorre is a -------
   a) Section of a drug b) Protein c) receptor d) All of the above
3. One of the following is not a Bioactive compounds
   a) Protein b) Polysaccharides c) Toxins d) none of the above
4. The following is a drug of marine origin
   a) Paracetamol b) Amoxycylin c) Discodermalide d) All of the above
5. Why medicines from natural products are not popular in India
   a) Expensive b) Less resource potential c) Traditional method of pharmacology d) Reverse pharmacology
6. Which of the following is recommended for selection of drug discovery
   a) Marine fauna and flora b) Terrestrial fauna and flora c) Microorganisms d) None of the above
7. Which of the phylum is recommended for selection of drug discovery
   a) Protozoa b) Cnidarians c) Porifera d) Echinodermata

8. The other name for cold extraction is ----------
   a) Using cold water b) extraction under cold storage c) percolation d) All of the above
9. The following is not a model organisms for drug discovery
   a) Drosophilla b) Rat c) C. elegans d) Elephant
10. Authetication in drug discovery means
   a) Perfect b) Complete c) Proof d) All of the above

ANSWER

1- b; 2- d; 3-d;4-c;5-c;6-c;7-c;8-c;9-d;10-d

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