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SCIENCE & LIFE

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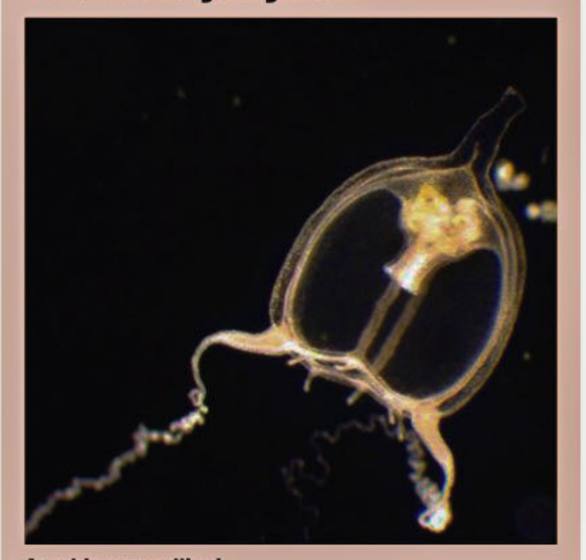
Extreme jellyfish



Amphinema rollinsi

JELLYFISH species have all kinds of offbeat common names: fried-egg jellies, cabbage heads, big reds. But their scientific names can be funky too. Phialella zappai is named in honor of Frank Zappa; the Italian scientist who discovered the jellyfish was reportedly angling for a visit from the famous musician. Likewise, Monterey Bay Aquarium jelly guru Chad Widmer named Amphinema rollinsi after hard-core punk artist Henry Rollins, whose music he admires.

But sometimes a gelatinous namesake can be a dubious honor. Malo kingi is a nod to Robert King, an American tourist who was killed by the jellyfish's sting in Australia in 2002.

Source: Smithsonian Magazine.

BIOTECHNOLOGY

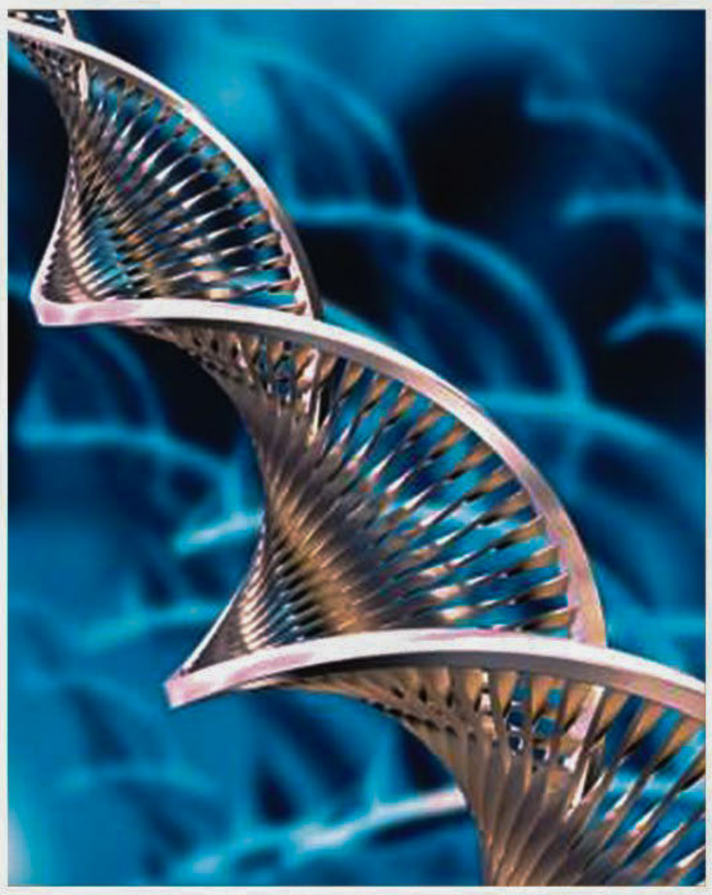
Apex of life science

MD. RIAJUL HOSSAIN

STARTING from the ancient time, Biotechnology has been illuminating its beauty nowadays through the advancement of Genetic engineering. Genetic engineering is the latest branch of Biotechnology which takes into account gene manipulation, genome sequencing and finding solutions to genetic diseases, creating better life forms etc.

Life Science answers questions about nature and life. It searches the origin of life and hypothesizes life's origin in the ancient shallow sea. Biotechnology originates later after life's creation, to benefit life, specially the human being. Biotechnology can be defined as the application of science and engineering to the processing materials by biological agents to provide goods and services for human benefit.

One can find biotechnology in everyday life, from baking of breads to pharmaceutical industries producing life saving drugs. So, biotechnology is not new at all. Man has long been manipulating living things to solve problems and improve his way of life. The biotechnological science can be categorized as Agricultural Biotechnology, Environmental Biotechnology, Microbial Biotechnology, Food Biotechnology, Industrial Biotechnology, Fermentation Biotechnology, Animal Biotechnology, Pharmaceutical Biotechnology, and Medical Biotechnology and, in modern days, Genomics, Proteomics and Bioinformatics.



The DNA molecule which is the molecule of life governs all the characteristics of a living being having all the information encoded in it to do so

The ancient Egyptians made wine using fermentation techniques based on microorganisms 4000 years ago and they applied yeast to make dough rise during bread making. Apart from this very ancient example of beer production, agricultural biotechnology came second place to meet the need of food. The selective breeding techniques were common among farmers as they were in search of better varieties of crops which give higher yield and in this way, food production was being increased with the population growth, especially in developing countries. Then genetic engineering became necessary to shorten the time of getting better varieties with a combination of high yield, drought tolerance, salt tolerance, pest resistance, flood tolerance and so on. Without these technologies, it would have been really difficult, if not impossible, to cope with the increasing demand of food and meet the need of this hunger-stricken world.

Food and Fermentation Biotechnology fall among the ancient biotechnological solutions. Early agriculture concentrated on producing food. Animal agriculture was done also for better meat quality and higher milk production by conventional breeding among better varieties.

Environmental Biotechnology helps us to find ways of minimizing pollution by applying bioremediation and other techniques. It finds clean energy sources to make a greener world.

Microbial Biotechnology comes with the thought of applying them and their products for human welfare. SCP (Single Cell Protein) can be a solution to increasing protein demand.

Animal Biotechnology provides us with better fish, meat and milk by biofarming. Some animals even can be used as bioreactors to produce useful proteins to be used as drugs and inside the animals, the proteins are targeted to be secreted in urine, blood and milk and finally extracted and purified to be prescribed for human.

Medical Biotechnology with the extraction of valuable compounds from plants and production of chemical compounds from microorganisms such as bacteria, fungi and ascomycetes, helped us to lead a better life and increased our life expectancy.

Pharmaceutical Biotechnology provides life saving drugs like insulin and blood clotting factors. These are now produced commercially and in a cost-efficient manner to make these accessible to more patients.

Bioinformatics, representing a marriage between Information Science and Biotechnology, has emerged as the latest branch of genetic engineering where numerous biological data can be analyzed in silico and helps in genome sequencing, creating synthetic drugs and modeling biological systems. All these sciences emerged from Biotechnology and rightly so Biotechnology is reaching the apex of Life Science in this century.

The writer is Lecturer, Biotechnology Dept, BRAC University.

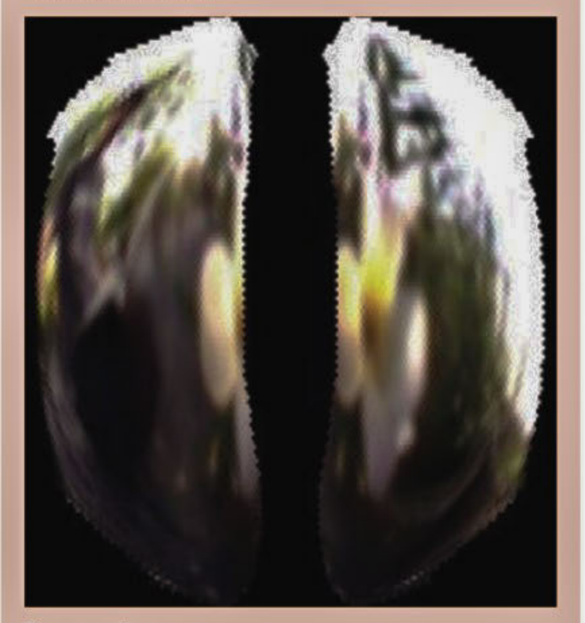
Insect's visual world

DESPITE their tiny brains, bees have remarkable navigation capabilities based on their vision. Now scientists have recreated a light-weight imaging system mimicking a honeybee's field of view, which could change the way we build mobile robots and small flying vehicles.

New research published Aug. 6 in IOP Publishing's Bioinspiration & Biomimetics, describes how the researchers from the Center of Excellence 'Cognitive Interaction Technology' at Bielefeld University, Germany, have built an artificial bee eye, complete with fully functional camera, to shed light on the insects' complex sensing, processing and navigational skills.

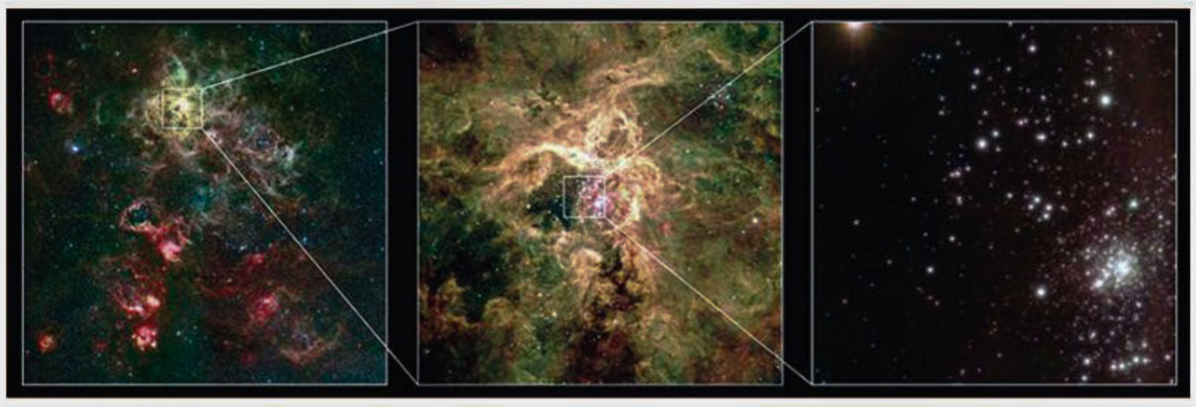
Consisting of a light-weight mirror-lens combination attached to a USB video camera, the artificial eye manages to achieve a field of vision comparable to that of a bee. In combining a curved reflective surface that is built into acrylic glass with lenses covering the frontal field, the bee eye camera has allowed the researchers to take unique images showing the world from an insect's viewpoint.

Source: Science Daily



Bee eye view

Universe's biggest star discovered



Using a combination of instruments on ESO's Very Large Telescope, astronomers have discovered the most massive stars to date. This montage shows a visible-light image of the Tarantula nebula as seen with the Wide Field Imager on the MPG/ESO 2.2-metre telescope (left) along with a zoomed-in visible-light image from the Very Large Telescope (middle). A new image of the R136 cluster, is shown in the right-hand panel, with the cluster itself at the lower right.

OBAIDUR RAHMAN

OUR 15 billion year old universe is one of absolute wonder! The latest addition to this wondrous cosmos is R136a1, the most massive star. A team of European researchers with the aid of European Southern Observatory's (ESO) Very Large Telescope, located on the mountain Paranal in Chile as well as analyzing data from NASA's Hubble Space Telescope very recently discovered this blue hyper-giant star which has an estimated 265 solar masses, that is a mass 320 times greater than our very own Sun. This heaviest known star is a valued member of R136, a Super star cluster near the center of the 30 Doradus complex which is also known as the Tarantula Nebula in the Large Magellanic cloud, a small "satellite" galaxy that orbits the Milky Way which is 165,000 light-years away. Previously the heaviest known stars (Pistol Star and Eta Carinae) were around 150 times the mass of the Sun and this was believed to be the cosmic size limits of stars. It is also known that as stars get more massive the amount of energy created in their cores grows at a faster rate than that of the force of gravity which holds them together.

Eventually the torrents of energy produced become so powerful that the stars are torn apart and this is known as the "Eddington Limit". And it is believed that R136a1, which has been shedding large portions of its mass in violent outbursts, sits above the "Eddington Limit" and it is also estimated that at its birth, the gigantic star held 320 solar masses and has been losing 50 solar masses every few million years. According to Paul Crowther, Professor of Astrophysics, University of Sheffield, who is also the team leader, "Unlike humans, these stars are born heavy and lose weight as they age. Being a little over a million years old, the most extreme star R136a1 is already 'middle-aged' and has undergone an intense weight loss programme, shedding a fifth of its initial mass over time, or more than 50 solar masses". Published in the latest edition of the scientific journal The Monthly Notices of the Royal Astronomical Society, the findings also state that R136a1 which is close to 10 million times greater than the Sun also has the highest luminosity, a blinding 8,700,000 times the luminosity of the good old Sun.

So just how big is this R136a1 star? Well, if R136a1 is replaced the Sun in our Solar System, it would outshine the Sun by as much as the Sun currently outshines the full moon. In the words of Dr. Raphael Hirschi of Keele University, UK, who is also a team member of the study, "Its high mass would reduce the length of the Earth's year to three weeks, and it would bathe the Earth in incredibly intense ultraviolet radiation, rendering life on our planet impossible".

And how would the biggest star of universe drop its final curtain? It is believed that since these massive giant stars tear through their energy reserves far faster than their smaller counterparts, it is very likely that R136a1 will live fast and die young quickly shedding huge amounts of material and burning themselves out in what are thought to be spectacular explosions, the stellar of all supernovae!

The contributor is a freelance science writer.

MARINE CENSUS FINDS

New life-forms popping up

10-year, 2,700-scientist effort to find and record marine life estimates that 60 to 80 percent of sea species remain undiscovered.

The international Census of Marine Life has so far described 1,200 new species, with more on the way. And census scientists have tallied an average of 10,000 known marine species in each of 25 important ocean zones. The census was big, but the message emerging from 12 new papers in PLoS ONE: Ocean life is staggeringly bigger.

Based on the ease with which scientists are still finding new species, researchers suggest that much of the oceans' diversity remains unknown.

"There is a lot more to do, but most of the big stuff is known," says Ron O'Dor of Dalhousie University in Halifax, Canada, who served as senior scientist for the census.

Big stuff, however, such as species of whales or turtles or sea lions, barely amounts to a drop in the oceanic bucket. Census data indicate that crustaceans are the largest chunk of known marine creatures, including crabs, shrimp and the unsung but ecologically crucial krill.

Formal census efforts will come to an end in October 2010 when researchers unveil their final results. But a first set of papers on regional efforts appears online during the week of August 1.

In the current tally, Australian and Japanese ocean waters, each with about 33,000 species, top the list for highest diversity among the 25 regions surveyed. The Gulf of Mexico, examined before the 2010 oil spill, ranked in the top five with 15,374 species. (The other two high-scoring zones: China with 22,365 and the Mediterranean with 16,848.)

Other areas with lower totals, such as the waters off South Korea, were rich in species for their seabed area.

Census scientists also ranked the biggest threats to sea life. Overharvesting tops the list, O'Dor says, with fisheries such as cod collapsing dramatically in recent decades. Next come habitat destruction from coastal development, pollution, trawling and other human activities. Climate change presents a major challenge too, with perils of altered seawater chemistry.

The census is a historic effort that gives "the first integrated look at the diversity and distribution of life in the oceans," says marine ecologist Daria Siciliano of Sea Web in San Francisco. "In the wake of an oil spill in US waters that is likely the worst environmental disaster in history, I hope the public is more likely to pay attention to what happens to the oceans."

Source: Science News

A 10-year census of marine life turned up more than 1,200 new species, including this amphipod crustacean found off Elephant Island near Antarctica

Sponge genes surprise

THE common ancestor of all animals may have resembled a certain absorbent, yellow, porous someone who lives in a pineapple under the sea.

A complete genetic catalog of the sponge Amphimedon queenslandica suggests that the first animals already had a complex kit of genetic tools at their disposal. Sponges harbor between 18,000 and 30,000 genes roughly the same number as humans, fruit flies, roundworms and other animals, an international team of researchers reports in the Aug. 5 Nature.

Comparison of the sponge's genetic blueprints with those of other animals reveals that sponge genes are lined up in the same way as those of other animals. Analyses in the new study also support the idea that sponges form the base of the animal branch of the evolutionary tree, says April Hill, an evolutionary developmental biologist at the University of Richmond in Virginia who was not involved in the work.

Source: Science News

Scientists have deciphered the genetic makeup of a sponge living inside a coral

What is the full form of SPA?

SPA is an acronym originating during the Roman Empire, when battle-weary legionnaires found a way to recover from their military wounds and ailments. They sought out hot springs and built baths so they could heal their aching bodies; calling these places 'aquae' and naming the treatment there 'Sanus Per Aquam' (SPA) - meaning 'health by or through water'. During this period, the town Spa in Belgium was founded.