Thank You

PROF. IR. DR. NOOR AZUAN BIN ABU OSMAN

KUALA NERUS, TERENGGANU 28 OCTOBER 2020

Respected warga UMT—

I wish I had the time to thank everyone individually, but as that is not possible.
I thank you for your valuable friendship, support, and endless belief in me and have helped me a lot.
I couldn’t have done it without your help.

Thank you and good bye all.

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HOMOTHERIUM
A DEADLY LONG-DISTANCE HUNTER: DNA STUDY REVEALS NEW INSIGHTS ABOUT THE SCIMITAR-TOOTHED CAT

Dr Nobuyuki Yamaguchi, Institute of Tropical Biodiversity and Sustainable Development, UMT, is part of an international collaboration led by the University of Copenhagen that mapped the entire nuclear genome of a sabre-toothed cat. The genetic study that is recently published in the Current Biology reveals new insights about a socially intelligent pack animal, specialised in endurance-based hunting over long distances.

Along with the woolly mammoth and the giant ground sloth, the sabre-toothed cats were probably among the most famous animals that lived during the Pleistocene Epoch and went extinct before the end of last ice age. Over the years, sabre-toothed cats have also been the subject of many research projects.

Now, for the first time, researchers have succeeded in mapping the entire nuclear genome of a sabre-toothed cat Homotherium latidens. Their DNA study reveals what genes were highly selected upon and important in evolution of the species.

“Their genetic makeup hints towards H. latidens being highly skilled hunters. They likely had very good daytime vision and displayed complex social behaviours. They had genetic adaptations for strong bones and cardiovascular and respiratory systems, meaning they were well suited for endurance running. Based on this, we think they hunted in a pack until their prey reached exhaustion with an endurance-based hunting-style during the day light hours” says Dr Yamaguchi.

Abundant species
The researchers extracted DNA from a H. latidens fossil recovered from Pleistocene permafrost sediments near Dawson City, Yukon Territory, Canada. This specimen was so old it could not be dated using conventional radio-carbon dating meaning that it was at least 47.5 thousand years old.

They then used a variety of modern genomic sequencing techniques to map the entire genome of the fossil. They used complex comparative analyses to modern living cat species such as lions and tigers and showed that H. latidens was very genetically diverse, relative to modern cat species.

Synergies with medical research and bioinformatics
Their analysis also showed that H. latidens is very distantly related to all modern cats. They diverged from them around least 22.5 million years ago. Homotherium was part of an extremely successful family of cats. They were present on five continents and roamed the earth for millions of years before going extinct. The current geological period is the first time in 40 million years that earth has lacked sabretooth predators.

Read the entire study: “Genomic adaptations and evolutionary history of the extinct scimitar-toothed cat, Homotherium latidens” (https://www.cell.com/current-biology/fulltext/S0960-9822(20)31421-4?fbclid=IwAR3HW075I1J8ULsrMpr8HBJ4Jleku25uu6negSi20O-iOb94NOrQa_xkaw).

Figure: A couple of Homotherium chasing a wild horse in Yukon (art by Velizar Simeonovski).
STEM Foundation Center, UMT has conducted a student development program titled “Membina Potensi Diri” on 16th September 2020 at Auditorium 1 & 2, from 9 am – 1 pm. The speakers of this program were Prof Madya Dr Sabri bin Ahmad who is an active motivator and also a lecturer at STEM Foundation Center along with Madam Nurul Syahida Abu Bakar.

The presenter himself is a source of motivation for students as he gave encouraging examples from his own life and give some tips on how to manage their precious time. Another interesting activity held during the program was personality test where participants got to know and understand their strengths and weaknesses. It is good to know someone’s personality before we can blend with the person. On top of that, this test has opened the students’ eyes on how important it is to know others personality especially when deciding teammates for group assignment. This is crucial since the participants came from various background and they never work in a group before.

This program has helped students to be guided by a positive mind and driven by self-motivation. A total of 222 STEM Foundation students from cohort 3 attended this program. This program was enlivened with the presence of the Director of STEM Foundation Center itself, Assoc. Prof. Dr Laili Che Rose.

Sources: Assoc. Prof. Dr. Laili Che Rose, laili@umt.edu.my; Prof Madya Dr Sabri Ahmad, sabri@umt.edu.my; Nurul Syahida Abu Bakar, nsab@umt.edu.my; STEM FOUNDATION CENTER
There is nothing worse than being stripped of one’s free will. However, this is exactly what happens to the mud crabs after they are infected with rhizocephalan parasites. Rhizocephalans are a unique group of crustacean parasites that infect other crustaceans, including crabs and shrimps. Generally very minute in size (less than 300 µm), their adult forms are extremely simplified with no appendages and internal organs except for their reproductive organs, some muscle tissue, and a simple nervous system. Only the female infects other crustacean host during her cyprid stage while the male is free living. After injecting parasitic materials into the host, a rootlike structures called interna will developed throughout the host body, absorbing nutrient and gaining control over the host. When the time is ready, externa (the female reproductive organ) will emerge from the ventral side of the host abdomen. The infected host will exhibit feminisation in their morphological characters, castration, unable to moult and display behaviours typical to egg-bearing females, thinking that the externa of the parasite is his/her own eggs.

Thus far, we have documented the occurrence of rhizocephalan parasite *Sacculina beauforti* in the economically important mud crab *Scylla olivacea*, but only from a specific population in Sabah. It is fascinating how such a tiny organism, with almost no organs or rigid structures, can take control of another organism and cause such tremendous effects.

For further reading, kindly refers to:

Figure 1. The differences in the abdomen and gonopod length of normal and infected males. The external abdomen morphology of (a) normal male, (b) infected male without externa, (c) infected male with externa and their respective internal abdomen morphologies in (d), (e) and (f). Red arrows show the gonopods and black arrow shows the externa of S. beauforti.

Figure 2. The differences in the abdomen and pleopod length of normal and infected females. The external abdomen morphology of (a) normal female, (b) infected female without externa, (c) infected female with externa and their respective internal abdomen morphologies in (d), (e) and (f). Red arrows show the pleopods and black arrow shows the externa of S. beauforti.

Sources: Dr. Khor Wai Ho, waiho@umt.edu.my; Dr. Mohd Fazhan Mohd Hanafiah, azhan@umt.edu.my; Prof. Dr. Mhd Ikhwanuddin Abdullah, ikhwanuddin@umt.edu.my; INSTITUTE OF TROPICAL AQUACULTURE AND FISHERIES
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