Press Release

EMBL

A hot species for cool structures

Complex proteins in 3D thanks to simple heat-loving fungus

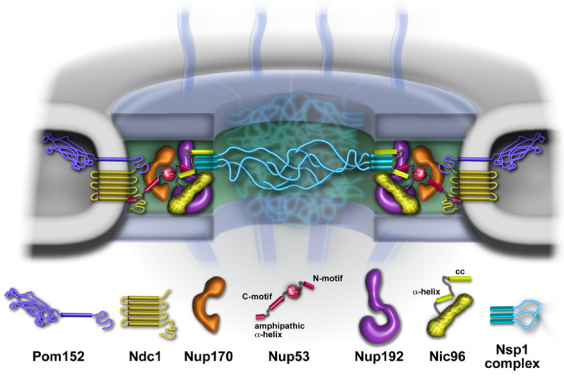
Heidelberg, 22 July 2011 – A fungus that lives at extremely high temperatures could help understand structures within our own cells. Scientists at the European Molecular Biology Laboratory (EMBL) and Heidelberg University, both in Heidelberg, Germany, were the first to sequence and analyse the genome of a heat-loving fungus, and used that information to determine the long sought 3-dimensional structure of the inner ring of the nuclear pore. The study was published today in *Cell*.

The fungus *Chaetomium thermophilum* lives in soil, dung and compost heaps, at temperatures up to 60°C. This means its proteins – including some which are very similar to our own – have to be very stable, and the Heidelberg scientists saw this stability as an advantage.

"There are a number of structures that we couldn't study before, because they are too unstable in organisms that live at more moderate temperatures," explains Peer Bork, who led the genome analysis at EMBL. "Now with this heat-loving fungus, we can."

The scientists compared the fungus' genome and proteome to those of other eukaryotes – organisms whose cells have a nucleus – and identified the proteins that make up the innermost ring of the nuclear pore, a channel that controls what enters and exits a cell's nucleus. Having identified the relevant building blocks, the scientists determined the complex 3D structure of that inner ring for the first time.

"This work shows the power of interdisciplinary collaborations," says Ed Hurt, who led the structural and biochemical analyses at Heidelberg University: "the nuclear pore is an intricate biological puzzle, but by combining bioinformatics with biochemistry and structural biology, we were able to solve this piece of it for the first time."



Model of the inner ring (green) of the nuclear pore, showing its components.

The scientists have made *C. thermophilum*'s genome and proteome publicly available, and are confident that these will prove valuable for studying other eukaryotic structures and their interactions, as well as general adaptations to life in hot places. Such knowledge could potentially lead to new biotechnology applications. ●

Source Article
Amlacher, S., Sarges, P., Flemming, D., van Noort, V., Kunze, R., Devos, D.P., Arumugam, M., Bork, P. & Hurt, E. Insight into Structure and Assembly of the Nuclear Pore Complex by Utilizing the Genome of a Eukaryotic Thermophile. *Cell*, 22 July 2011.

Contact:
Sonia Furtado, EMBL Press Officer, Heidelberg, Germany, Tel: +49 6221 387 8263, www.embl.org, sonia.furtado@embl.de

About EMBL

The European Molecular Biology Laboratory is a basic research institute funded by public research monies from 20 member states (Austria, Belgium, Croatia, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom) and associate member state Australia. Research at EMBL is conducted by approximately 85 independent groups covering the spectrum of molecular biology. The Laboratory has five units: the main Laboratory in Heidelberg, and Outstations in Hinxton (the European Bioinformatics Institute), Grenoble, Hamburg, and Monterotondo near Rome. The cornerstones of EMBL's mission are: to perform basic research in molecular biology; to train scientists, students and visitors at all levels; to offer vital services to scientists in the member states; to develop new instruments and methods in the life sciences and to actively engage in technology transfer activities. Around 190 students are enrolled in EMBL's International PhD programme. Additionally, the Laboratory offers a platform for dialogue with the general public through various science communication activities such as lecture series, visitor programmes and the dissemination of scientific achievements.