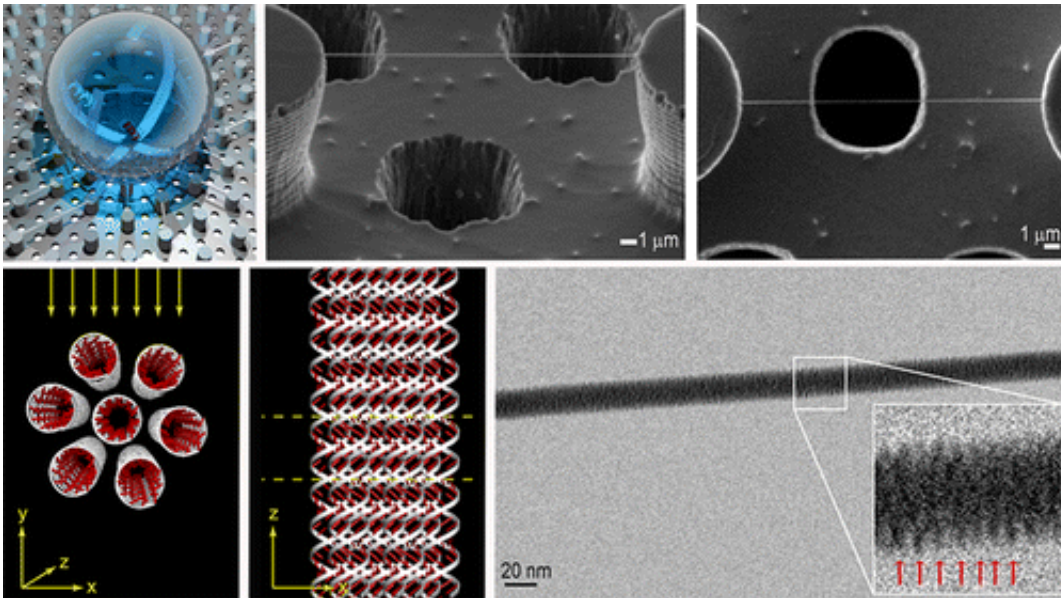


Researchers capture high contrast image of band of DNA fiber

December 3 2012, by Bob Yirka



Credit: ACS

(Phys.org)—A research team in Italy has succeeded in capturing a high contrast image of a band of DNA fiber – the closest anyone has ever come to taking a photograph of a single strand of DNA. The team has outlined the process they used to create the image in their paper published in *Nano Letters*.

Up till now the only visual verification scientists have had that proves that DNA does indeed exist in its famous double helix shape, has come

about through a process known as X-ray crystallography, whereby beams of x-rays are directed at a band of crystallized DNA fibers resulting in a bunch of dots displayed on photographic film; which in turn have to be interpreted by complex mathematical formulas. Thus, its shape has been inferred rather than captured directly.

This new approach comes a lot closer. It's still not possible to see the double helix, but it is possible to see the [DNA strands](#) as part of a chord. To take the picture, the team built an extremely small structure made of quick drying silicon that consisted of a base with [tiny holes](#) drilled in it – between the holes, were very small tower type structures. When a drop of a liquid solution with a band of DNA in it was placed on the structure and allowed to dry, the single band was caused to span the distance between two of the towers, directly over one of the holes. To take the picture, electrons were fired from an [electron microscope](#) up through the hole. The result is an extremely fuzzy image of six DNA molecules wrapped around a core made of a seventh – individual strands can be seen, but they only hint at what scientists believe are double helixes. The reason a band of several strands was used was because a single strand would have been destroyed by the [electron beam](#).

The researchers write that they are optimistic that further work (reducing the amount of electrons fired up through the hole, etc.) will eventually allow for capturing an image of a single [DNA molecule](#) existing as a [double helix](#), allowing people everywhere to finally see for themselves one of the main molecules responsible for allowing us to grow into the unique beings we are.

More information: Direct Imaging of DNA Fibers: The Visage of Double Helix, *Nano Lett.*, Article ASAP. [DOI: 10.1021/nl3039162](https://doi.org/10.1021/nl3039162)

Abstract

Direct imaging becomes important when the knowledge at few/single

molecule level is requested and where the diffraction does not allow to get structural and functional information. Here we report on the direct imaging of double stranded (ds) λ -DNA in the A conformation, obtained by combining a novel sample preparation method based on super hydrophobic DNA molecules self-aggregation process with transmission electron microscopy (TEM). The experimental breakthrough is the production of robust and highly ordered paired DNA nanofibers that allowed its direct TEM imaging and the double helix structure revealing.

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