Self Assembly Hydrogel Polymers, Historical Research Context of Hydrogel Smart Materials and Nano Worms That Rapidly Grow From Nanometers to Visible Size

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by **Ana Maria Mihalcea**, MD, PhD, *Dr. Ana's Newsletter*
May 21, 2023

Scientists from NTU and CMU created a leaf-like hydrogel structure through a process similar to how real leaf tissues grow. Credit: CMU and NTU

In this article, I wanted to explain more about Hydrogel. There have been scientists and doctors saying that you cannot see nanotechnology grow from nanoscale to microscopic scale and that we cannot possibly see what we claim to see in the blood.

Our latest research findings show however **that we are seeing what we claim**:

- ***Visual Inspection Of C19 Vaccinated Live Blood Clots – Rubber (Hydrogel) Like Substance Found – Beware Graphic Images***

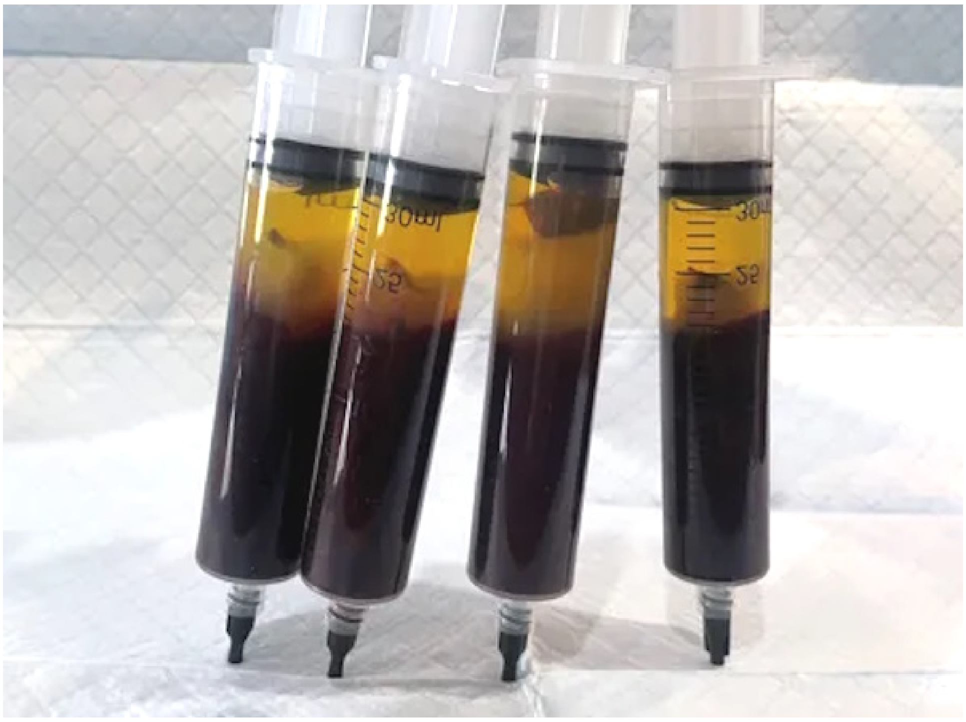

Image: Four vaccinated Blood Samples left to sit for 4 hours I have posted the work of Clifford Carnicom and myself showing that Near Infrared Spectroscopy performed on C19 vaccinated and unvaccinated blood repetitively identified the spectral signature of functional chemical groups indicating polymer hydrogels.

Read full story

There are people who do live blood analysis who call the hydrogel containing filaments parasites, biofilm, other lifeforms explicable via terrain theory. They dismiss the filaments because they were seen before historically, so they cannot have anything to do with the C19 injections. These are incorrect claims and I wish to explain the scientific background here.

We have discussed extensively that the Transhumanist assault of synthetic biology has been going on for decades and that historically the same filaments have been found in people's blood before the C19 injections – they were then called Morgellons or Cross Doman Bacteria (CDB) and sprayed via geoengineering and bioengineering for people to inhale and get sick. The symptom complex experienced by CDB/ Morgellons has enormous overlap to "long Covid" poisoning – including chronic fatigue, brain fog, multi organ dysfunction, accelerated aging, mood disorders and more.

In the image above, you can see hydrogel used to grow like a leaf. In the article below, it is discussed that hydrogels can grow like biological tissues and that oxygen tension can control the growth. The more oxygen there is the faster they grow. Normal blood is carrying oxygen. There are many more ways to control the growth, this is just one example:

> ***Scientists make research hydrogel grow more like biological tissues***
>
> *The team's findings, published in Proceedings of the National Academy of Sciences today, suggest new applications in areas such as tissue engineering and soft robotics where hydrogel is commonly used. The team has also filed a patent at CMU and NTU. In nature, plant or animal tissues are formed as new biomass is added to existing structures. Their shape is the result of different parts of those tissues growing at different rates.*
>
> *Mimicking this behaviour of biological tissues in nature, the research team comprising CMU scientists Changjin Huang, David Quinn, K. Jimmy Hsia and NTU President-designate Prof Subra Suresh, showed t****hat through manipulation of oxygen concentration, one can pattern and control the growth rate of hydrogels to create the desired complex 3-D shapes. The team found that higher oxygen concentrations slow down the cross-linking of chemicals in the hydrogel, inhibiting growth in that specific area.***

Hydrogel research has gone on for many decades. Here is an article **from 1977** discussing the interactions of hydrogel and blood:

ANNALS OF THE NEW YORK ACADEMY OF SCIENCES

INTERACTIONS OF BLOOD AND BLOOD COMPONENTS AT HYDROGEL INTERFACES*

Allan S. Hoffman, Thomas A. Horbett, Buddy D. Ratner

First published: February 1977 | https://doi.org/10.1111/j.1749-6632.1977.tb41782.x | Citations: 40

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*Interactions of Blood and Blood Components at Hydrogel Interfaces**

INTERACTIONS OF BLOOD AND BLOOD COMPONENTS AT HYDROGEL INTERFACES *

Allan S. Hoffman, Thomas A. Horbett, and Buddy D. Ratner

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INTRODUCTION

A hydrogel can be defined as a polymeric material which exhibits the ability to swell in water and retain a significant fraction (e.g., >10–20%) of water within its structure, but which will not dissolve in water. Hydrogel materials resemble, in their physical properties, living tissue more than any other class of synthetic biomaterial. In particular, their relatively high water contents and their soft, rubbery consistency give them a resemblance to living soft tissue. Based upon these properties, a number of advantages, some obviously real and others somewhat speculative, can be cited for hydrogel materials.

With respect to the real advantages, two in particular stand out. First, the expanded nature of the hydrogel structure and its permeability to small molecules allows polymerization initiator molecules, initiator decomposition products, polymerization-solvent molecules, and other extraneous materials to be efficiently extracted from the gel network before the hydrogel is placed in contact with a living system. The *in vivo* leaching of additives used during the fabrication of polymeric materials has been cited as a cause of inflammation and eventual rejection of implanted biomaterials.[1] Second, the rather soft and rubbery consistency of most hydrogels can contribute to their biocompatibility by minimizing mechanical (frictional) irritation to surrounding cells and tissue.

The most intriguing of the potential advantages for hydrogels is the low interfacial tension that may be exhibited between a hydrogel surface and an aqueous solution. This low interfacial tension should reduce the tendency of the proteins in body fluids to adsorb and to unfold upon adsorption.[2] Minimal protein interaction may be important for the biological acceptance of foreign materials, since the denaturation of proteins by surfaces may serve as a trigger mechanism for the initiation of thrombosis or for other biological rejection mechanisms.

Here is an article explaining how fast the hydrogel can change its volume or size. What we have been seeing in human blood and in the analysis of C19 vials nanotechnology is entirely consistent with the literature.

Nano-structured smart hydrogels with rapid response and high elasticity

Lie-Wen Xia, Rui Xie, Xiao-Jie Ju, Wei Wang, Qianming Chen & Liang-Yin Chu

Nature Communications **4**, Article number: 2226 (2013) | Cite this article

Abstract

Smart hydrogels, or stimuli-responsive hydrogels, are three-dimensional networks composed of crosslinked hydrophilic polymer chains ***that are able to dramatically change their volume*** *and other properties in response to environmental stimuli such as temperature, pH and certain chemicals. Rapid and significant response to environmental stimuli and high elasticity are critical for the versatility of such smart hydrogels. Here we report the synthesis of* ***smart hydrogels which are rapidly responsive, highly swellable and stretchable, by constructing a nano-structured architecture with activated nanogels as nano-crosslinkers.***

You can control the growth of hydrogels by many different chemical means. Here is an article from 2001 – just to show how long the scientific community has worked on perfecting this technology:


Advanced Drug Delivery Reviews
Volume 53, Issue 3, 31 December 2001, Pages 321-339

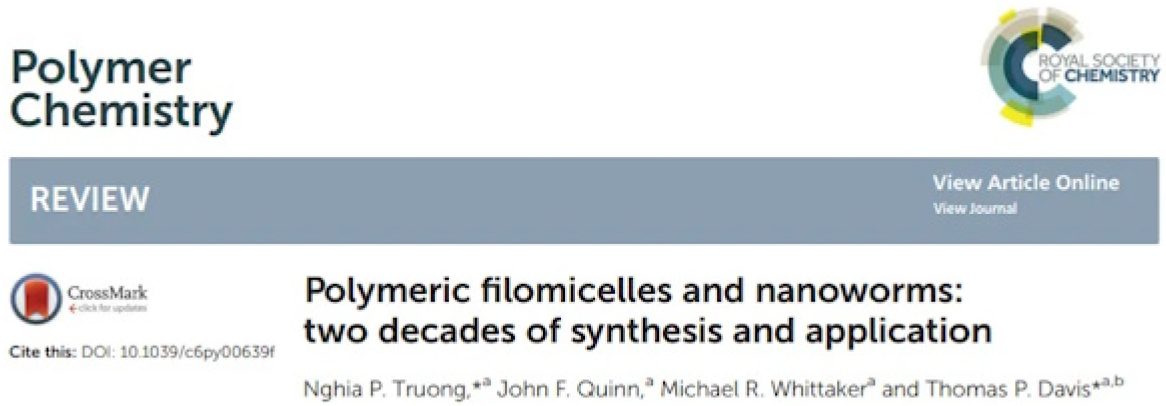
Environment-sensitive hydrogels for drug delivery

Yong Qiu, Kinam Park

[***Environment-sensitive hydrogels for drug delivery***](#)

*Environmentally sensitive hydrogels have enormous potential in various applications. Some environmental variables, such as low pH and elevated temperatures, are found in the body. For this reason, either pH-sensitive and/or temperature-sensitive hydrogels can be used for site-specific controlled drug delivery. Hydrogels that are responsive to specific molecules, such as glucose or antigens, **can be used as biosensors as well as drug delivery systems**. Light-sensitive, pressure-responsive and electro-sensitive hydrogels also have the potential to be used in drug delivery and bio separation. **Hydrogels containing such 'sensor' properties can undergo reversible volume phase transitions or gel–sol phase transitions upon only minute changes in the environmental condition. The types of environment-sensitive hydrogels are also called 'Intelligent' or 'smart' hydrogels.** Many physical and chemical stimuli have been applied to induce various responses of the smart hydrogel systems. **The physical stimuli include temperature, electric fields, solvent composition, light, pressure, sound and magnetic fields, while the chemical or biochemical stimuli include pH, ions and specific molecular recognition events.** Smart hydrogels have been used* *in diverse applications, such as in making artificial muscles, chemical valves, immobilization of enzymes and cells , and concentrating dilute solutions in bioseparation.*

The worm like appearance we are seeing in the blood is not a parasite but a self assembly polymer nano worm which has been developed by science for over 2 decades *(thanks to Shimon Yanowitz for sending this to me):*


Polymer Chemistry

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REVIEW

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Cite this: DOI: 10.1039/c6py00639f

Polymeric filomicelles and nanoworms: two decades of synthesis and application

Nghia P. Truong,*[a] John F. Quinn,[a] Michael R. Whittaker[a] and Thomas P. Davis*[a,b]

Filomicelles and nanoworms are an emerging subclass of nanomaterials with a special elongated shape. The physical properties of a filomicelle are distinct from a traditional spherical micelle, and as such have attracted tremendous interest in a variety of research areas. In this review, we highlight the substantial progress in the synthesis and application of polymeric nanoworms over the past two decades. ***Synthetic techniques summarized in this review are particle replication in nonwetting templates (PRINT), film stretching, self-assembly (SA), crystallization-driven self-assembly (CDSA), polymerization-induced selfassembly (PISA), and temperature-induced morphological transformation (TIMT).*** *The applications of filomicelles as (i) templates for inorganic nanoparticles, (ii) building blocks for superstructures, (iii) synthetic dendritic cells for immunotherapy, (iv) constituents of thermoresponsive gels for biomedical applications, and (v) nanocarriers for cancer drug delivery are subsequently discussed. In the conclusion, we* *describe the current trajectory of research in the field and identify areas where further developments are of urgent need.*

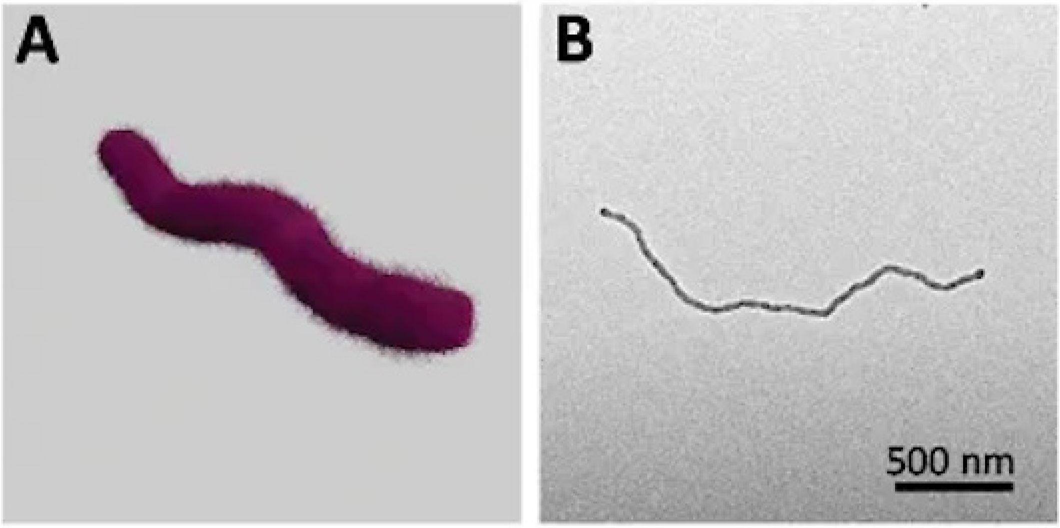

Fig. 1 (A) A three-dimensional cartoon of a nanoworm and (B) a transmission electron microscopy image of a synthetic nanoworm. Adapted with permission. Copyright 2016 by Royal Society of Chemistry.[6]

Note how the researchers consider self assembly as a “living” process.

Review Polymer Chemistry

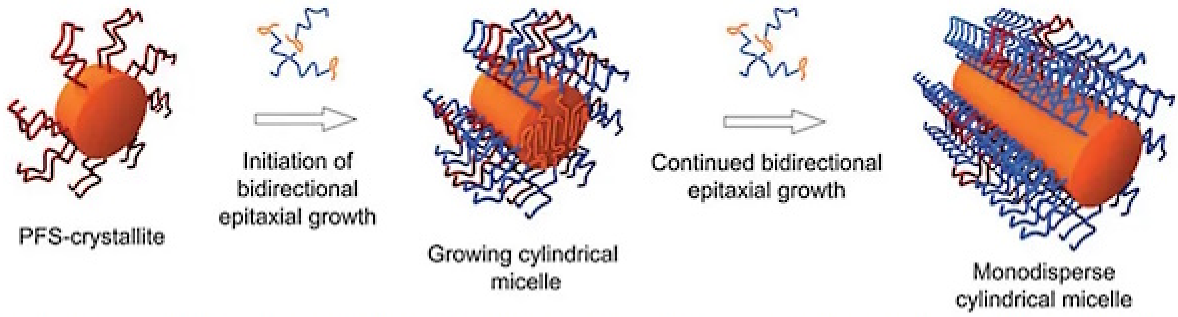

Fig. 6 The formation of filomicelles *via* crystallization-driven self-assembly (CDSA) from small, uniform, stub-like crystallites as initiators for the crystallization-driven living self-assembly of PFS block copolymers with a crystallizable, core-forming block. The polymers used in this study are shown in orange (PFS), red (PDMS) and blue (PI). Adapted with permission. Copyright 2010 by Nature Publishing Group.[59]

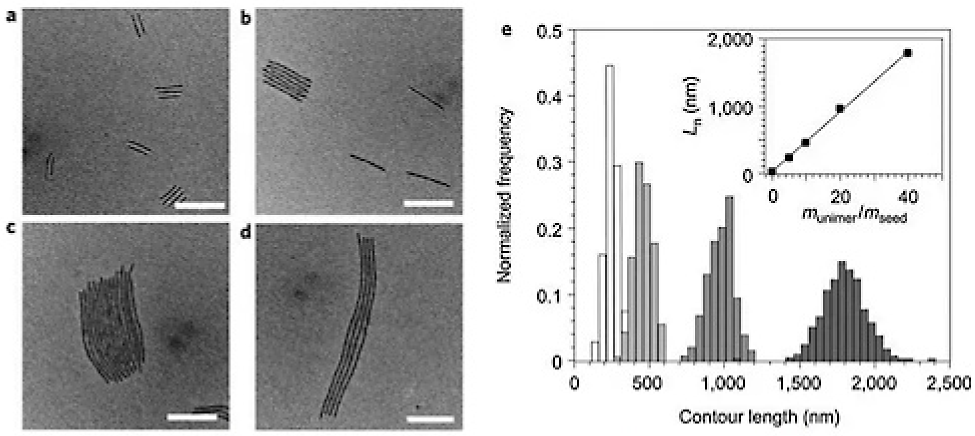

Fig. 7 The growth of monodisperse cylindrical micelles grown from short (a) to (b, c, d) longer lengths. (e) Histograms of the contour lengths of samples a–d. Adapted with permission. Scale bars = 500 nm. Copyright 2010 by Nature Publishing Group.[59]

Please note that these can grow from nanometer to macroscopic size, visible with the naked eye:

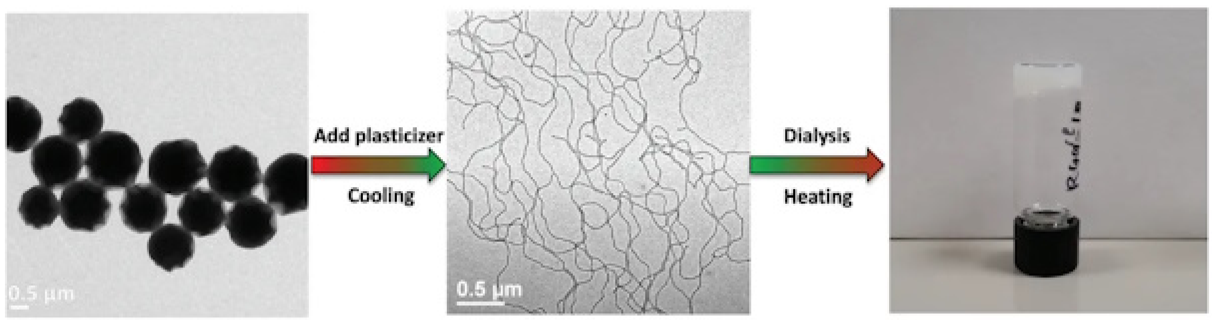

Fig. 10 The transformation of the spherical polystyrene aggregates into filomicelles and the formation of a gel-like solution of stable filomicelles in hot water. Adapted with permission. Copyright 2016 by Royal Society of Chemistry.[6]

Metals are used to control hydrogel polymer properties. Hydrogels can induce growth stasis in human stem cells and embryos. Please see link here: Polymeric Filomicelles and

Nanoworms: Two Decades of Synthesis and Application

Connect with Ana Maria Mihalcea, MD, PhD