Welcome! After finding a cool article about nanotechnology, please write a brief summary below. Give your entry at title and include your name, and provide a link to the material.

- **Buckyball research at UCLA** (Laurie Starkey) NOVA recorded a documentary about buckyballs. One of the chemists who discovered it was from UCLA so they wanted to record some footage of the campus and I was one of the three grad students they asked to jog around campus. They chose blond-haired blue-eyed people to represent SoCal (ugh) and all three of us were originally from Connecticut lol. https://youtu.be/pDXHAOPLMYk?si=C-AKqKm8qLgJG8RZ

Title: The Strength and Potential of Carbon Nanotubes

Name: Kimberly Morales

Carbon nanotubes are tiny cylindrical molecules made entirely of carbon atoms arranged in a hexagonal pattern like a rolled-up sheet of graphene. What makes them so interesting is their combination of extreme strength, light weight, and strong electrical conductivity. They're stronger than steel but much lighter, and they can conduct electricity better than copper. Because of these properties, CNTs are being explored for use in everything from lightweight materials for spacecraft to flexible electronics and advanced medical drug delivery systems. Researchers are continuing to develop safer and more efficient ways to produce nanotubes, as their potential applications have the power to revolutionize technology worldwide.

Link: https://www.chemistryconnected.com/courses/CHM316/chemmatters-oct2009-nanotech.pdf

Name: Katelyn Cortez

Title: Uses of nanotechnology

Nanotechnology has been used to revolutionize medicine, food safety, energy, etc. In medicine, nanoparticles have been created to mimic HDL (good cholesterol) to shrink plaque and reduce the risk of atherosclerosis (hardening of arteries). In energy research, nanotubes are being used to potentially remove carbon dioxide from exhausts from power plants to reduce emissions. Nanotechnology is continuing to be used to improve technology and benefit society.

Article: https://www.nano.gov/about-nanotechnology/applications-nanotechnology/

Name: Irene Jurinario

Title: Nanotechnology in concrete

Concrete is the most widely used material in the world. It is made up of many different parts and has a complex structure at the nanoscale that changes as it ages. New high-resolution tools now make it possible to observe and measure concrete structure, chemistry, and strength at the nanoscale. In addition, atomic force microscopy has proven to be effective for examining cement hydration, surface morphology changes, carbonation, and cohesive forces.

Article: https://doi-org.proxy.library.cpp.edu/10.1016/j.conbuildmat.2010.03.014

Title: The Uprising of Nanotechnology

Name: Jennifer Lopez

Nanotechnology is changing particular fields by manipulating matter at the nanoscale to enhance properties and add new applications. In the article "Nanotechnology's Big Impact," it mentions how this technology is used in medicine for targeted drug delivery by using super small pores to release tiny molecules. It is also used in science to create stronger, lighter, and more durable materials for building structures. This type of technology is only expanding, and it promises some intriguing advancements for the future.

http://www.chemistryconnected.com/courses/CHM316/chemmatters-oct2009-nanotech.pdf

Carbon Nanotubes

By Rebekah Marmolejo

Carbon nanotubes are incredibly small cylinders made of carbon atoms arranged in hexagonal patterns. They are about thousands of times thinner than human hair but very strong and stronger than steel. They make great conductors of heat and electricity. Their unique structure and elements allow them to be used to make stronger materials, improve batteries, and help with delivering drugs within the human body.

https://www.acs.org/content/dam/acsorg/education/resources/highschool/chemmatters/articlesbytopic/bonding/chemmatters-oct2009-nanotech.pdf?utm_source=chatgpt.com

Nanotechnology and its benefits

By Ashley Trinh

The article “An Overview of Nanotechnology and Its Application” discusses how nanotechnology, which is working with materials between 1–100 nanometers, has transformed industries like medicine, electronics, energy, agriculture, and textiles. It explains how nanoscale materials can improve drug delivery, enable smart textiles, enhance renewable energy systems, and even create sensors that detect foodborne pathogens. The study highlights nanotechnology’s power to make products smaller, faster, and more efficient while also addressing global challenges like pollution and energy sustainability. Something interesting found in the article is that nanotechnology is being used in agriculture to create “nanofertilizers” and nanosensors that accurately monitor soil health and crop growth, which lets farmers to apply nutrients and pesticides only where needed, thus greatly improving efficiency and reducing environmental harm.

https://www.e3s-conferences.org/articles/e3sconf/pdf/2023/28/e3sconf_icmed-icmpc2023_01079.pdf

Nanotechnology: A Revolution in Modern Industry

By Kai Moore

“Nanotechnology: A Revolution in Modern Industry” is an article that discusses the industries that have appeared due to nanotechnology. The industries that started using nanotechnology have been from the food industry to automobiles. It is to be bleaves that at the rate of development “nano-scale manufacturing will be incorporated into almost every domain of science and technology”, it goes into detail of the drawbacks that come with nanotechnology.

https://pmc.ncbi.nlm.nih.gov/articles/PMC9865684/

Title: The Power of Nanotubes

Name: Keira Roberts

Nanotechnology explores structures that are only nanometers wide—thousands of times thinner than a human hair—and has led to incredible discoveries like carbon nanotubes. These tubes, made solely of carbon atoms rolled into a honeycomb shape, are remarkably strong (100 times stronger than steel, but much lighter) and conduct electricity far better than copper or silver. Because of this, scientists see huge potential for nanotubes in building advanced computers, materials, and medical devices. The field of nanotech not only mimics nature's tiny designs but is also helping solve issues in energy, health, and environmental sustainability.

Link: https://www.chemistryconnected.com/courses/CHM316/chemmatters-oct2009-nanotech.pdf

Title: Graphene; The Miracle Nanomaterial

Name: Samantha Christakis

Graphene is a single layer of carbon atoms arranged in a honeycomb structure, often called a "wonder material." It's stronger than steel, lighter than aluminum, and conducts electricity better than copper. Because of these properties, it's being used in flexible electronics, stronger batteries, and even biomedical devices. Graphene shows how nanotechnology can take a simple element like carbon and unlock incredible new possibilities.

Link: https://www.nano.gov/nanotech-101/what/graphene

Title: Nanoparticles in Drug Delivery: From History to Therapeutic Applications

Name: Claire Tang

Nanoparticles have been used to deliver nanocarriers into specific sites of the body through nanomaterials. Many diseases have been treated using this method known as nanomedicine. Some diseases that have been treated include various types of cancers (brain, lung, breast) and cardiovascular diseases. This technology was introduced in 1959 by a physicist named Feynman, enhancing the efficiency of medicine when combined with nanotechnology.

Link: https://pmc.ncbi.nlm.nih.gov/articles/PMC9781272/

Title: Nanotechnology's Role in Treating Brain Cancer

Name: Chloe Alchin

Often, brain tumors are difficult and dangerous to treat as they require a higher dosage of chemotherapeutic drugs, due to these drug's inability to be targeted. However, nanotechnology, specifically nano-drug carriers, have higher efficacy and can easily be controlled to target specific regions in the brain. Via passive, active, or magnetic targeting, nano-drug delivery systems can be targeted to brain tumor regions, thus reducing damage done to normal brain function and the immune system. A biomimetic nano-drug system is currently the most successful method, as it can protect the drug from degradation and naturally pass through the blood-brain barrier.

Link: https://pmc.ncbi.nlm.nih.gov/articles/PMC9737081/

Title: Carbon Nanotubes and Their Composites

Name: Leslie Vasquez

Carbon nanotubes offer lots of opportunities for development of new material systems. They have exceptional mechanical properties, low density, unique electronic properties, a thermal conductivity higher than diamond to mechanical properties where the stiffness, strength and its resilience exceeds any current material.

Link: https://www.sciencedirect.com/science/article/pii/S026635380100094X

Title: How Nanotechnology is Changing Medicine

Name: Farrah Wooldridge

Nanotechnology plays an increasingly important role in shaping the future of healthcare by allowing scientists to diagnose, treat, and even prevent diseases with greater accuracy. This article gathers current findings on how nanomedicine is transforming fields like drug delivery, cancer therapy, regenerative medicine, gene therapy, and dentistry. For example, nanoparticles can target specific cells or tissues, leading to more effective treatments with fewer side effects, while also helping to create advanced medical tools and improve imaging and diagnostics. What makes nanotechnology so important is its ability to operate at the molecular level, where most

diseases begin. This allows for earlier detection, more accurate treatments, and faster recovery for patients. While there is great potential, it is equally important to address the safety, environmental, and ethical concerns surrounding its use to ensure nanomedicine develops responsibly. Overall, nanotechnology represents a major leap forward in how we approach healthcare and medical innovation.

Link: https://pmc.ncbi.nlm.nih.gov/articles/PMC10536529/

Title: SMART drug delivery systems: Back to the future vs. clinical reality

Name: Xitlali Siguenza

In recent decades, drug delivery has advanced due to improvements in polymer chemistry, biotechnology, and nano-engineering, focusing on site-specific targeting, especially for tumors via the EPR effect. Established nanocarrier materials include liposomes and micelles, while emerging materials like nanoparticles are being explored. Research highlights both passive and active targeting methods and smart systems for drug release. Despite promising technologies, many nanomaterials are complex and potentially toxic, complicating production and necessitating extensive toxicity studies. Current optimal particle size for effective delivery is proposed as 5-10 nm for enhanced circulation and tissue penetration, while patient selection based on EPR monitoring is vital for therapeutic response. Although nanomedicines show potential in improving targeting and reducing adverse reactions, true clinical efficacy remains challenging, with mixed results in human trials. A shift towards practical strategies, such as integrating imaging and combination therapies, is recommended to enhance cancer treatment outcomes without relying solely on advanced nanomedicine systems.

Link: https://www-sciencedirect-com.proxy.library.cpp.edu/science/article/pii/S0378517313001907

Title: Nanotech and Its Role in Space Exploration

Name: Dana Lopez

Nanotechnology has become increasingly vital in the exploration of space. This technology is applied across many areas, from the construction of spacecraft and the design of astronauts' spacesuits to the development of advanced life support systems. For example, nanomaterials are used in water filtration systems, which are essential for sustaining life and enabling long-duration missions in deep space. By making materials lighter, stronger, and more efficient,

nanotechnology enhances the stability, safety, and durability of space equipment, establishing itself as a key driver of future space discoveries.

Link: https://www.azonano.com/article.aspx?ArticleID=4983

Title: Current advance of nanotechnology in diagnosis and treatment for malignant tumors

Name: Kristin Lam

Nanomedicine has become a widely investigated topic to treat a number of difficult diseases. Currently, there are engineered nanoparticles, such as nanoprobes and nanobiosensors, that are crucial to diagnosing and treating cancer - a significantly damaging disease, and risk to human health. In cancer treatments like chemotherapy and radio therapy, they are not specific enough to only target cancerous cells, hence the side effects of damaging normal, healthy cells and seeing physical changes such as hair loss. When using nanoparticles however, drugs, sensors, gene fragments, and other small treatment medications, can be transported to targeted tumors without any risk of harming normal cells. This technology enhances diagnosis, therapeutic efficacy, and treatment outcomes while minimizing harm to the rest of the body. However, caution must be taken when testing these nanoparticles as it is a biosafety issue in preclinical and clinical issues as errors can cause bodily reactions like cell dysfunction and inflammation.

Link: https://www.nature.com/articles/s41392-024-01889-y

Title: Basic Principles of Nanotechnology

Name: Brady Matthews

Nanotechnology involves the utilization, study, and manipulation of matter at a nanoscale. A nanoscale is anything roughly 1-100 nanometers in size. The importance of size when it comes to discussing nanotechnology is surface area. The smaller size increases the surface area to volume ratio, which increases dramatically at the nano scale. This allows for more atoms to interact with the technology and, in turn, increases durability, strength, and conductivity. There are many possible classifications of nanomaterials; however, the emphasis isn't strictly on making things smaller but rather on exploiting unique properties that appear at the nano scale.

https://education.nationalgeographic.org/resource/nanotechnology/

Organic Chemistry 3150

Tuesdays and Thursdays

1:00 pm to 2:15 pm

Sofia Flores

Nanotubes

After reading the article provided in class, I was able to learn a lot of interesting information about nanotubes. Nanotubes have diameters and hexagons that are arranged in a certain way on a wall that affects the way these nanotubes conduct electricity. Due to this, it makes them useful for creating electronic components smaller than the ones being currently used. Another fact I found very interesting was learning about nanoballs. It was stated that it looks like a hollow soccer ball made from 60 carbon atoms. After researching more about nanotubes, I learned the importance of them. I was able to learn that we use these nanotubes as materials to make protective body amor, sporting goods like tennis rackets and even boats.

Article: https://www.chemistryconnected.com/courses/CHM316/chemmatters-oct2009-nanotech.pdf

https://www.cas.org/resources/cas-insights/tiny-technology-big-possibilities

Title: Nanotubes Cleaning Up Water

Name: Arlene Rodriguez

Carbon nanotubes are being used to build next-generation water filters because their tiny hollow tubes allow water to pass through at extremely high rates while blocking contaminants. Their smooth, cylindrical carbon structure reduces friction, and when aligned and embedded into membranes they also resist bacterial fouling better than conventional filters. This makes them a promising technology for more efficient, scalable clean-water systems in the future.

Source: https://www.sciencedirect.com/science/article/abs/pii/S1383586618312437

Title: Nanotechnology: The Future Medicine

Name: Allison Chow

Nanotechnology can be used in devices that function at the molecular level. With this, nanotechnology has been used in applications dedicated to medicine. Such applications that nanotechnology can be used in are pathogen detection, separation of molecules, protein detection, and examining DNA structure. In addition, some tools can control drug traits like retention time and controlled release. Overall, nanotechnology in medicine is still in development, but has the possibility to be groundbreaking to medicine.

Link: https://pmc.ncbi.nlm.nih.gov/articles/PMC2890134/

Title: The Nanotube Potential

Courtney Neal

Although there are a number of uses and applications of nanotubes in chemistry, one major development is the use of specifically carbon nanotubes as a building block for other practical nanotube devices. Although small, through the reach into the potential as a foundational unit, it can be used on a macro scale.

Link: https://www.sciencedirect.com/science/article/pii/S0039602801015588

Title: Nanotechnology in Nano-drug delivery

Name: Wendy Viviano

After reading the in-class article, I learned about nano-drug delivery, where scientists are using nanotechnology to solve health issues. In another article, the topic is explored in more depth, detailing how nanotechnology principles are applied to drug delivery systems. This strategy allows drugs to be encapsulated or attached to nanosized carriers, such as liposomes, dendrimers, or carbon nanotubes. The nanocarriers make traveling through the body more efficient, where they can target specific cells (tumor cells, etc.), and release the drug in a controlled manner. Lastly, it also describes how nanostructure (particle size, shape, etc.) can influence drug solubility, body absorption, and bioavailability. All in all, nanotechnology is both interesting and imperative as it has important applications, including its use today in cancer treatments.

Source: https://pmc.ncbi.nlm.nih.gov/articles/PMC9781272/

Title: Electronic Transport and Quantum Phenomena in Nanowires

Name: Isaac Lichtman

This article looks at the use of Nanowires as superconductor-semiconductor hybrids. The article goes into the device fabrication, quantum transport measurements, and synthesis methods of group III-V semiconductor nanowires. This article then ends off their article by looking specifically at recent developments with group IV nanowires. Then further discusses the goals potential research should focus on in relation to quantum transport and commuting. Mainly the article calls for more research to be done to determine better alternative materials to create Nanowires with that will lead to stronger spin orbit coupling, larger g-factors, higher mobility and more properties

Source: https://pubs-acs-org.proxy.library.cpp.edu/doi/10.1021/acs.chemrev.3c00656

Title: Nanotechnology for Wound Treatment

Name: Alyssa Roldan

There are many uses of nanotechnology in the medical field today; it is seen in drug delivery, treatment for diseases such as cancer, heart disease and diabetes, as well as for wound treatment. In the article called Understanding Nano it discusses the use of nanotechnology at Wisconsin University where a bandage can apply electrical pulses to the wounded area. This nanogenerator bandage would be useful in situations where a patient is experiencing internal bleeding; this bandage would reduce blood loss. There are also studies still being observed so nanoparticles can act as platelets and will be injected into the patient to reduce blood loss.

https://www.understandingnano.com/medicine.html

Title: Nanomedicine and its benefits

Name: Valeria De La Torre

Nanomedicine uses tiny particles to help diagnose, treat, and prevent diseases more accurately. Because these particles are so small, they can change how a drug behaves, they can stay in the bloodstream longer, or release slowly over time. One example from the article is the use of magnetic nanoparticles in MRI

scans. These nanoparticles make the images clearer, helping doctors detect diseases earlier. The nanoparticles can also be combined with fluorescent tags or gene-delivery systems, allowing doctors to track where the particles go and even deliver treatments at the same time. Nanomedicine continues to grow because it allows treatments to be more targeted and effective while reducing side effects.

Link: https://pmc.ncbi.nlm.nih.gov/articles/PMC2890134/

Title: Carbon nanomaterials: Revolutionizing biomedical applications with promising potential

Name: Nathaniel Carl

Summary: Researchers are using carbon nanomaterials as a more complex and precise tool for biochemical functions such as biosensing, drug delivery, and even tissue scaffolds. Reasons that allow this include exceptional electrical, thermal, and mechanical properties, a huge surface area that can be chemically functionalized; and high sensitivity for detecting diseases. Some potential downsides include toxicity leading to oxidative stress, inflammation, or DNA damage. Diagnostics are still being done to develop methods that reduce potential side effects while exploring biomedical capabilities.

Link: https://www.sciencedirect.com/science/article/pii/S2589965124001673?via%3Dihub

Title: Nontechnology in Agriculture
Name: Chance Thorn
Part of animal production, the farm has to have the animal meet requirements such as ideal slaughter weight, limiting diseases, and healthy breeding techniques. When making this possible, they would use feed additives and antibiotics which ultimately carry risks such as drug resistance and residues. Using Nanotechnology specifically nano minerals gives farms a more profitable approach because it is cheap and needed in lower concentrations. IT is beneficial to animals as well because it promotes growth and has immunostimulant effects. Overall, nanotechnology has created an impact on food and animal production by reducing health risks in the animals and feeding and keeping toxins out using nanosenors to detect contamination.
Link: https://pmc.ncbi.nlm.nih.gov/articles/PMC9856992/

Title: Carbon Nanotubes: Tiny tubes that have huge potential
Name: Alan Flores
Carbon nanotubes (CNTs) are cylindrical nanostructures composed of carbon atoms rolled into tubes with one atom thick, called single-walled or multi-walled. They tric walls, called multiwalled. They possess exceptional properties, including extremely high tensile strength, remarkable electrical and thermal conductivity, and very low density. These properties arise because carbon atoms in CNTs are bonded

similarly to those in graphene but are shaped into a one-dimensional tube with unique “chirality” (twist) that determines whether the nanotube behaves like a metal or semiconductor. In practical terms, CNTs are being explored-and in some cases, used-in composite materials to strengthen-but-lighten things like sporting goods or body armor; in energy storage, batteries need better conductivity and stress tolerance; and in solar and hydrogen storage applications, even in biomedical roles, as carriers for drugs or in neurotechnology. While the properties of CNTs are amazing in the lab, making them at scale with consistent quality-same diameter, same chirality, same wall number-remains difficult, and ensuring their safe handling raises health concerns, especially when they are long fibers.
Link: https://www.sciencedirect.com/science/article/pii/S2666351120300036?utm_source

Title: **Emerging Applications of Nanotechnology in Healthcare and Medicine**

Name: Dianne Ibarra

Nanotechnology is used to conduct sensitive medical procedures. Nanotechnology is showing successful and beneficial uses in the fields of diagnostics, disease treatment, regenerative medicine, gene therapy, dentistry, aesthetics industry, drug delivery, and therapeutics. It’s also being used to treat cancer cells by using nanotechnology-based platforms; they can detect cancer biomarkers with high sensitivity and specificity. It’s also being used to prevent infections by using nanoscale antibacterial agents that are being incorporated into medical devices such as catheters.

Title: Nanotechnology and Buckyballs

Name: Mayra Moran

Nanotechnology is the manipulation and study of atoms and molecules. It can be found naturally and/or can be synthesized. One way to characterize nano material is by classifying them between fullerenes and nanoparticles. One example of a fullerene is the “buckyball”, which is a long chain of nanometer sized carbons that are in tightly bonded hexagons or pentagons. They are very stable and can withstand very high temperatures and pressure. They are even able to survive in outer space. In fact, they have been the largest molecules to be discovered in space. Furthermore, they can protect any atom or molecule that is found inside its “cage”. Scientists have claimed that buckyballs make good chemical “holders” or ”tracers”. For this reason, NASA has been experimenting with nanotubes that produce extremely black spots or color on satellites. This helps the data collected to be polluted by light.

https://education.nationalgeographic.org/resource/nanotechnology/

Title: Nanotechnology is the study and manipulation of individual atoms and molecules.

Name : Matthew Lopez

Looking and reading this article, we looked and talked about different nanomaterials. These nanomaterials are found all over nature. These were formed by humans not on purpose, some examples would be vehicle exhaust or even pollution. The main two types would be fullerenes and nanoparticles, fullerenes are allotropes of carbon. While nanoparticles are elements that we know of like gold and silver silicon. Nanotechnolgy was found in 1959 by richard feynman.

https://education.nationalgeographic.org/resource/nanotechnology/

Title: Applications of nanotechnology in medical field

Name: Clarabelle Lee

Nanotechnology has been increasingly used in medical applications. It offers useful applications in diagnostics, imaging, targeted drug delivery, implants, pharmaceuticals, and tissue engineering. Additionally, with the use of nanotechnology, medical professionals can administer highly toxic treatments, such as chemotherapeutic cancer drugs, in a safe way.

https://www.sciencedirect.com/science/article/pii/S2414644723000337

Title: Nanomaterials application in medicine

Name: Anthony Chheang

Nanomaterials can help revolutionize our understanding of treating and regenerating body parts at the cellular level. A major application of such technologies is the usage of them to destroy cells that are harmful to the body like cancer cells. Origami Nanorobots are example of a type of nanomaterial used to induce cell death in cells afflicted with leukemia and lymphoma. They could also be used to help solve problems that are currently being studied with the integration of stem cells into bodies that normally would reject them! They also can provide us with information on what is happening in the body which can especially be important for bodies with tumors on them.

Source: https://engineeringonline.ucr.edu/blog/nanotechnology-in-medicine

Title: Applications of Nanoparticles in Brain Computer Interfaces

Name: Tej Andhari

The use of biocompatible nanoparticles may help brain computer interfaces (BCI) become more consumer friendly by avoiding the invasive nature of these devices. BCIs aim to transmit data wirelessly, record neural activity, and even stimulate neurons. There are use cases where patients with stroke were able to restore limb movement with the help of BCIs for example. Nanoparticles come into play by replacing electrodes which are normally implanted surgically. Due to the small scale of nanoparticles, they are able to interact with nerve tissue through piezoelectric effect and essentially act as a nano antenna without the invasiveness of implanted electrodes. Nanoparticles could be embedded in the blood brain barrier intranasally.

Source: https://medcitynews.com/2025/02/biocompatible-nanoparticles-tiny-antennae-with-huge-potential-for-brain-computer-interfaces/

Title: Advances in nanotechnology-mediated drug delivery systems

Name: Luis Martinez

Although there are restrictions in conventional therapies for certain cancers, nanotechnology can deliver theraputic agents with precision while also minimizing the side effects that may come with it. In this medical field, nanotechnology-based drug delivery systems can target tumor cells to reduce growth and side effects for an overall more efficient method to treat certain cancers. What I found most interesting is that this source claimed it may be an answer to battling drug resistance in treatments across the medical field, a constant concern.

Source:
https://www.proquest.com/docview/3206317582/88E8F28C476C46CEPQ/5?accountid=10357&sourcetype=Scholarly%20Journals

Title: Carbon Nanotube Sensors in Harsh Environments

Name: Jade Sanders

Strain sensors made from carbon based nanomaterials called Carbon nanotubes (CNTs), have several advantages for surviving in difficult conditions. They have good electrical conductivity, high mechanical strength, thermal stability, and flexibility. This is useful because many real-world applications involve harsh environments where the sensors can fail. However, by using CNTs, the sensors will become more durable and reliable, opening more opportunities for data collection. This article displays how nanotechnology like nanotubes are tested beyond lab prototypes and into environments where the sensors must endure extreme conditions.

Source: https://www.mdpi.com/2311-5629/9/4/108

Name: Trinity Garcia

Title: Nanotechnology in Medicine

Nanotechnology has the potential to revolutionize medicine, offering new ways to treat diseases like cancer, enhance drug delivery, and improve diagnostic tools. One interesting example is the use of DNA-based nanobots that can target and destroy cancer cells. Unfortunately, there are also risk, like the possibility of nanoparticles harming organs if they enter the human body.

Article: https://engineeringonline.ucr.edu/blog/nanotechnology-in-medicine

Name: Will Darling

Title: Application of some nanoparticles in the field of veterinary medicine

Certain types of nanoparticles can be useful in the field of veterinary medicine due to their large range of functions. Some, such as AgNps are valuable for their antiviral and antimicrobial uses, and in overall disease prevention. Others like AuNps are used in imaging machines, and other nanoparticles can be incorporated into animal feed, addressing deficiencies in animals that we previously did not have a way to correct.
Source: https://pmc.ncbi.nlm.nih.gov/articles/PMC6968591/

Name: Kristiann Alcantara

Title: Fullerene and nanotube growth: new insights using first principles and molecular dynamics

The article explains that carbon nanotubes can be considered elongated fullerenes. It describes how single-walled carbon nanotubes start growing from a curved fullerene-like cap, and when small carbon pieces called C2 fragments are added, that cap slowly turns into a longer tube. The

study uses detailed computer simulations to show how this happens on an atomic level, and it also looks at how iron nanoparticles can act as catalysts to make the growth easier by lowering the energy needed. Overall, the research gives a clear picture of how carbon nanotubes grow, both with and without metals, and highlights how important the fullerene cap is during the early stages of nanotube formation

Source: https://pmc.ncbi.nlm.nih.gov/articles/PMC4978748/

Name: Lauren Min

Title: Nanotechnology Applications

Nanotechnology has the potential to enhance health care by improving the way we diagnose, treat, and prevent diseases. Right now, there is a lot of research being done such as using them to deliver medication directly to cancer cells to minimize the risk of damaging healthy cells. They have created a nanoparticle that mimics the body's cholesterol to shrink plaque. Another study that nanotechnology is being used for is regenerative medicine like mimicking the structure of bone or growing complex tissues, to grow human organs for transplant surgeries.

Source: https://www.nano.gov/about-nanotechnology/applications-nanotechnology/

Name: Lance Arzadon

Title: Carbon Nanotubes: Present and Future Commercial Applications

Carbon nanotubes (referred to as CNTs) are cylinders of layered graphene, ideally bonded in a hexagonal lattice (although mass produced CNTs introduce defects). CNT research began in the early 1990s, and production of CNTs has grown since, with CNT being used in bulk composite materials and thin films. CNT composite materials are used in the automotive industry to enable electrostatic-assisted painting of certain parts; are used in the microelectronics industry to make electromagnetic interference-shielding packages and wafer carriers; to enhance sporting goods, wind turbine blades, and maritime security boat hulls; and is used as a flame-retardant additive in plastics. They are also being investigated for use in aircraft and for antiballistic vests. CNT films are being used to reduce biofouling in ship hulls. In microelectronics, CNT arrays are used with

transistors, with CNT thin-film transistors driving OLED displays. CNTs are also used in lithium-ion batteries and are being looked at for application in water purification. In the field of biotechnology, CNTs are being considered for use in biosensors, medical devices, in vivo applications, and implants.

Source: https://www.jstor.org/stable/23343720

Title: Nanotechnology in a Nutshell

Name: Krystin Shaver

From what I found, nanotechnology is super cool beacause it lets scientists create extremely tiny materials with unique properties. It's fascinating that carbon nanotubes can be lighter and stronger than steel. I also thought that it was interesting that nanotechnology can help deliver medicine right where the body needs it.

Source: https://www.chemistryconnected.com/courses/CHM316/chemmatters-oct2009-nanotech.pdf

Title: Nanotechnology used in anti-viral drugs

Name: Emma Orpiano

Fullerenes are multiple carbon rings fused together in a way that creates a soccer ball-like structure. Ever since they were discovered, more research has shown that there are various pharmaceutical uses for fullerenes. One application of this type of nanotechnology is in making anti-viral drugs. Fullerenes have anti-viral properties. One such example of this is Dendro fullerene, which has been shown to interact with HIV molecules so that it does not progress to AIDS. The way in which fullerenes do this is by binding to an HIV enzyme, HIV-P. By binding to the enzyme, it hinders the enzyme from being able to replicate the virus in the host cell. This is one of the mechanisms that inhibits HIV from further weakening a patient's immune system and becoming AIDS. Although this was a beneficial and important finding, the use of fullerenes as it pertains to anti-viral drugs specifically targeting HIV is still in its research phase and has yet to be sold on the market.

Source: https://pmc.ncbi.nlm.nih.gov/articles/PMC2676811/#sec2

Title: Nanotechnology in medicine

Name: Maria Lule Licea

Nanotechnology has had incredible strides in technology, medicine, and other applications. Nanotechnology has already been revolutionary in medicine and is continuously being applied in biomedicine. Such as the use of nanotechnology for high toxicity like chemotherapeutic drugs. In addition, wearable gadgets that can provide necessary information to doctors that allow them to detect slight changes in the body from infections, vital signs, and cancer cell conditions. This would be revolutionary in the field of medicine, as doctors would have a jump start to treat conditions than they would normally.

Link: https://www.sciencedirect.com/science/article/pii/S2414644723000337

Title: The Negative Effects of Carbon Nanotubes

Name: Isabel Vasquez

Carbon nanotubes, commonly known as CNTs, are a key component of modern nanotechnology. These structures have unique mechanical, electrical, and chemical properties that allow them to be used in a wide range of applications, including electronics, medicine, and materials science. Although CNTs have contributed to major technological advancements and made many aspects of our work more efficient, it raises the question, are they also impacting our health? According to an article released on PubMed, evidence presented by researchers indicates that exposure to carbon nanotubes, whether in the workplace or nearby environment, can heavily impact pulmonary function. CNTs can cause inflammation, granulomas (tiny nodules), and lung fibrosis when inhaled. Furthermore, some animal studies also show that CNTs can cause changes in lung structure by interfering with the balance of the extracellular matrix. I found this quite interesting since CNTs contribute to the emerging world of technology we live in, and although they can be highly beneficial, I think it is still important to consider and bring awareness to these potential risks.
Link: https://pubmed.ncbi.nlm.nih.gov/41138955/

Title: Utilizing Nanotubes for H_2S Detection
Name: Christine Phung

Despite the widespread usage of hydrogen sulfide (H_2S) gas in agricultural, biomedical, and metallurgy fields, the compound poses imminent dangers to the human body. As exposure to H_2S at low concentrations, i.e. 10-15ppm, with extended contact time can lead to respiratory diseases and loss of consciousness, creating a highly sensitive H_2S detector is of utmost interest. Zhu and coauthors synthesized Fe_2O_3 nanotube-decorated $ZnFe_2O_4$ open nanocage sensors capable of detecting H_2S gas at concentrations as low as 39 ppb with quick response and recovery times.

The sensors demonstrated high selectivity towards the H_2S gas due to its porous units and open cavities, and its robust architecture with high reproducibility makes it a desirable candidate for H_2S detection and a model for other potential gas-capturing nanomaterial structures.

Source: https://doi.org/10.1021/acsami.5c02415

Title: The Good and the Bad of Nanotechnology
Name: Sergio Castro

The science of nanotechnology is working with technology that is extremely small, which leads them to act differently than normal. This difference allows scientists to build new things like drug-delivery systems that are very precise, stronger metals, and even structures like nanotubes. The article does point out the different ways that these materials can be misused because of their power such as dangerous chemicals or biological agents that can be easy to hide and also harder to regulate. The main reason is that there is no real laws that fully cover all nanotechnology. This means that there need to be major changes which start with more research.

Source: https://www.american.edu/sis/centers/security-technology/the-applications-and-implications-of-nanotechnology.cfm

Title: Nanoparticles in sunscreen

Name: Shannon Shinyama

Titanium dioxide nanoparticles are approved to be used in sunscreens and lotions to give these products a transparent appearance on the skin and avoid a white cast. This is also used as a filter in sunscreen products to protect the skin from harmful UV rays. The Scientific Committee on Consumer Safety (SCCS) confirmed that the concentration of titanium dioxide nanoparticles can be used up to 25% as a UV filter in sunscreens and can be considered safe for humans. More research and challenges arise due to the development of data on nanoparticles in correlation with human health. These sunscreens are also not considered safe for reefs and shouldn't be used if you are planning to come into contact with marine life.

Source: https://health.ec.europa.eu/document/download/662b234b-7a9d-4393-9881-b303ecaf158b_en#:~:text=This%20opinion%20refers%20to%20the,S75'%20(April%202014).

Title: Nanotechnology in anti-aging cosmetics

Name: Liliana Bachman

The integration of nanoparticles in cosmetics has increased due to concerns about skin aging. Nanomaterials can offer a non-invasive method of rejuvenating aging skin or preventing skin damage. They have been used to decrease the appearance of wrinkles, scars, and pigmentation inconsistencies. Nanoparticles can enhance the delivery of active ingredients such as antioxidants and retinoids. They have also been used to prevent wrinkles by being incorporated into sunscreen.

Source: https://www.sciencedirect.com/science/article/abs/pii/S001430572400572X

Title: Optics in the Nanoworld

Name: Camila Valdez

Applications of optical microscopy are generally limited by the standard resolution limit set by the wavelength of visible light. The invention of near field scanning optical microscopy (NSOM) first enabled this limit to be overcome, opening many systems, from physics to biology, to investigation by optical microscopy. NSOM offered greatly improved spatial resolution compared with conventional optical microscopy, and the use of tunable excitation sources allowed basic spectroscopic information to be obtained. The authors describe a technique that combines the high spatial resolution of NSOM with the high spectral resolution of coherent nonlinear optical spectroscopy.

Source:
https://www.science.org/doi/full/10.1126/science.1065119?casa_token=DWk8KGqzq9gAAAAA%3Avlo2qPnYxiqk_N1-jUQRqdsFnxucFOecf8gfUp4xy2BDAVfpPJFZq6kebljhRtJ4coEO1QgDIYBG

Title: Engineered Nanoparticles in Consumer Products: Understanding a New Ingredient

Name: Madison Navarro

In 2010, it was established that engineered nanomaterials would be prohibited from any USDA food product that beared an “Organic” label. Many people from the start of engineered nanoparticles being introduced into consumer goods have had their own problems and concerns with these implementations and what hazards they pose from potential exposures. Some

consumer products that had implemented nanotechnology include products like stimulating shampoo which uses copper nanoparticles, or toothpastes with silver nanoparticles. Other products ranging from skin creams to dietary supplements. Much concern comes from the lack of labeling requirements, for example sunscreen made with nanoparticles can pose a risk to consumers with rashes or skin abrasions and a lack of regulations on labeling these products make it difficult to properly identify them.

Source:

Title: Nanotechnology and The Agricultural Future

By Sophie Zaragoza

One interesting thing I learned about nanotechnology is how it is beginning to transform agriculture through nano-sized sensors and delivery systems. Researchers are developing tiny nanowire-based sensors that can detect nutrients, diseases, or chemical changes in soil much faster than traditional testing methods. These sensors give farmers real-time information about what their crops need, helping reduce fertilizer waste and increase yields. Scientists are also exploring nano-scale carriers that can release fertilizers or pesticides slowly and only when needed, making farming more efficient and environmentally friendly.

Title: Nanomaterials in Agriculture

Name: Darlene Pham

This article delves into the topic of nanomaterials being utilized as tools in agriculture due to their small size and high reactivity that allows them to interact efficiently with plants and soils. This would ultimately improve nutrient uptake, photosynthesis, and overall growth. The article reviews how various nanomaterials such as metal nanoparticles, nano-fertilizers, and nano-carriers can help crops tolerate abiotic stresses such as drought, salinity, extreme temperatures, and heavy metal contamination by enhancing antioxidant defenses and regulating key physiological processes. Despite having many benefits, there are also potential risks such as toxicity to plants/soil microbes, bioaccumulation, and uncertain long term environmental effects. So, more field research is needed for safer nano formulations to ensure nanotechnology can be safely integrated into future agricultural practices.

Source: Nanomaterials in Agriculture: A Pathway to Enhanced Plant Growth and Abiotic Stress Resistance - PMC

Title: Nanobot technology to create nanoscale objects

Name: Emily Avram

This study provides proof of the concept of using nanobot technology to turn genetic material into specific constructs. DNA was used like a mechanical object that could potentially be used as a case to protect a drug for delivery in the body. In addition, this technology could create materials that respond to the body. To make these creation units, called “voxels”, DNA origami was used to shape DNA from the bacteriophage virus into cylinders, held together by synthetic DNA. The DNA joined together at specific chosen locations and can further join as a voxel with other voxels to create more flexible shapes. In the study, the DNA was used to create a nano-sized “dinosaur” shape.

Source: Reconfigurable nanomaterials folded from multicomponent chains of DNA origami voxels

Name: Alannah Shaw

Title: Nanotubes have potential to help with making bullet proof material.

In the article I found is that today the pieces used to help protect police officers is known to leave bruises. However there is research being done on nanotubes to potentially one day use them as materials made from that are lighter and potentially more effective. The reason for it because the reason that nanotubes have the potential to block a bullet is due to their elasticity and how strong they are. The nanotubes are able to take the energy/force from the impact of a bullet and displace it as well as overall just absorb the impact. It is also noted that nanotubes are able to quickly go back to their original shape and be able to take on another hit more quickly and easily than current materials used. So it is very possible that in the future nanotubes can be used to help make bulletproof vests more efficient and even more light weight.

Source: https://www.scientificamerican.com/podcast/episode/2bd650ff-e7f2-99df-3774897cd1c43eb4/#:~:text=A%20thin%20vest%20of%20tiny,Cynthia%20Graber%20reports.&text=Most%20bullet%2Dproof%20materials%20that,to%20make%20a%20bulletproof%20vest

Title: Applications of nanotechnology in agriculture

Name: Stephanie Perez

When it comes to agriculture there is an abundant use of chemical fertilizers. Which has a negative impact on the soil and environment. These chemical fertilizers decrease the soil's fertility effecting the crops grown. Which is why researchers have introduced nanotechnology to agriculture. Nanotechnology is used in controlling the excess argi-inputs and maintaining environmental balance. Some of the nanotechnology that is used in agriculture are nanofertilizers and nanopesticides. Which have shown to be greater contributors to plant growth and pest control. Other nanotechnologies along with other agriculture tools have been used to provide nutrients to plants and toxins to pests in controlled amounts. Nanosensors are also introduced to agriculture which showed skillful applications in smart agriculture systems and food security.

Source: https://www.sciencedirect.com/science/chapter/bookseries/abs/pii/S0580951719300029

Title: Nanomaterials used in CO2 Reduction and Conversion

Name: Stephanie Jauregui

Electrochemical CO2 reduction is the process of converting CO2 into valuable chemicals such as methane, methanol and other hydrocarbons; offering a promising strategy for mitigating climate change. Nanomaterial's unique properties make them a promising tool for interacting with CO2 at the molecular level. Nanomaterials have a high surface to volume ratio and catalytic properties; therefore, offering a unique way for the capturing, reduction and conversion of CO2. They have become popular catalysts for their high selectivity and efficiency, which is seen in photocatalytic conversion of CO2 with TiO2 or ZnO.

Source:
https://pmc.ncbi.nlm.nih.gov/articles/PMC11510645/#:~:text=Nanomaterials%2C%20thanks%20to%20their%20high,mitigation%20through%20CO2%20management.

Title: Nanotechnology in Cosmetics and Cosmeceuticals—A Review of Latest Advancements
Name: Maya Franco

Nanomaterials have been found to be useful in the cosmetic industry by improving product efficiency. This results in the replacement of many traditional cosmeceuticals with these new nanocosmeceuticals. Especially as these nanocosmeceuticals have been used for various anti-aging formulations. There have been risks though with health hazards by toxic effects on the skin. As well as health risks, there are environmental risks when these nanocosmeceuticals are discharged into the water, air, and soil. They go through reactions in biological systems resulting in biochemical interference. Therefore, there must be strict regulations when implementing nanotechnology into the cosmetic industry.

Source: https://pmc.ncbi.nlm.nih.gov/articles/PMC8951203/

Nanotechnology in Clean Water: Tiny Filters that have a Big Purpose

Name: Sadaf Lutfy

Researchers are using nanotechnology to address one of the world's biggest issues while working to create access to clean water. They are doing this by using nonhazardous chemicals and lower energy to mitigate pathogens and bacteria from water that has been contaminated. Graphene Oxide, one of the nanoparticle types covers larger surface areas having oxygen functional groups that are able to attack a wide variety of microorganisms. Other nanoparticles like silver and titanium dioxide can kill bacteria or break down pollutants as well, while carbon nanotube membranes act as ultra-fine filters that trap contaminants smaller than viruses. Because these materials work on the molecular level, they can purify water faster and more efficiently than traditional methods. It is a powerful tool and a great example of how something microscopic to the naked eye can make a monumental impact on a global scale.

Sources:

G. McCracken, et al. "Nanoparticles for Microbial Control in Water: Mechanisms, Applications & Environmental Implications." *Frontiers in Nanotechnology*, 2024.

Carbon Nanotubes: A Summary of Beneficial and Dangerous Aspects of an Increasingly Popular Group of Nanomaterials

Name: Princesa Barajas
Carbon nanotubes are super tiny carbon fibers that are strong, light, and useful in technology and medicine, like helping deliver cancer drugs or improving imaging. But the article points out

that some types, especially long and stiff ones like MWCNT 7, can act kind of like asbestos. They can get into the lungs, cause irritation, mess with DNA, and in animal studies even lead to mesothelioma type tumors. Since more products are starting to use carbon nanotubes, it is important to understand the risks and make sure workers and the environment stay safe.

Source: https://pmc.ncbi.nlm.nih.gov/articles/PMC8353320/

Title: Nanotechnology Discovery Offers New Hope for Pancreatic Cancer

Name: Adan Gutierrez

Scientists and engineers at the University of Miami Miller School of Medicine developed magnetic electric nanoparticles. Magnetic electric nanoparticles can be directed to pancreatic tumors by magnetic fields. The nanoparticles are activated remotely to destroy cancer cells that are in the pancreas. The MENPs provide real-time imaging of the cancer cells being destroyed. The MENPs are activated by an MRI scanner. Once the MENPs are activated, they generate electric fields that distinguish heathy cells and cancerous cells based on their cell properties. The cancer cells undergo cell death. The reduction of pancreatic tumors by the MENPs can be confirmed by MRI scans.

Source:https://news.miami.edu/coe/stories/2025/11/nanotechnology-discovery-offers-new-hope-for-pancreatic-cancer.html

Nanotechnology: Treatment of Broken Bones with Carbon Nanotubes

By:Marina Vining

What are carbon nanotubes? Carbon nanotubes are 1 atom thick of carbon rolled up into tube structures. Researchers found that when nanotubes are placed in the area of a damaged bone they reduce inflammation and help heal the bone. A broad range of materials, such as peptide fibers or polymers, makes scaffolds that may face rejection from the body. The natural combination of hydroxyapatite crystals and collagen fibers makes bone tissue and the CNTs help become part of the bone matrix itself. Research reveals that nanotubes can imitate collagen's role as the formation material of scaffold for growth into the bone.

Source: https://phys.org/news/2008-03-carbon-nanotubes-bones.html

Nanotechnology in Solar Energy Harvesting

Walker Sakaki

Nanomaterials are increasingly central to advancing solar energy technologies due to their unique optical, electrical, and structural properties. Incorporating nanomaterials into solar collectors, fuel cells, photocatalytic systems, and photovoltaic cells can significantly improve overall performance. In solar collectors, nanomaterials can enhance the absorption of incident solar radiation by up to nine times, yielding efficiency gains of 10% over traditional designs.

However, several challenges hinder large-scale adoption. Long-term stability issues, environmental risks associated with some nanomaterials, and high production costs are still key barriers.

Source: https://www.frontiersin.org/journals/energy-research/articles/10.3389/fenrg.2025.1560718/full

Title: Nanotechnology against Cancer

Name: James Vuong

Nanotechnology is the future of cancer research and treatments and many scientists are using nanotechnology as a solution to discovering cancerous tumors and diseases before the spread. “pH- response to fluorescent nanoprobes can help detect fibroblast activated protein-a on the cell membrane of tumor-associated fibroblasts” (Jin et al. 2020). Nanotechnology has not only helped in detecting tumors and tumor cells in early stages but has been shown to provide treatments with no side effects involved, in comparison to chemotherapy. “In lung cancer, the detection of metastases can be determined by developing immune superparamagnetic iron oxide nanoparticles (SPIONs) that can be used in MRI imaging with the cancer cell lines as the target for the SPIONs” (Jin et al. 2020). Early and accurate detection of cancerous tumors is extremely important in preventing the deaths of many cancer related patients because it is easier to treat a patient when the spread of the cancer is very minimal in comparison to a patient that has cancer cells throughout their entire body.

Source: https://pmc.ncbi.nlm.nih.gov/articles/PMC7646098/

Title: Are nanotubes good or bad?

Name: tamahara ramirez

Carbon nanotubes are considered to be nanomaterials that have very different applications that can be produced on a large scale. However, the biggest takeaway is that while these nanomaterials have tons of promising applications, they also pose a significant health risk. The paper emphasizes that certain types of CNTs, like MWCNT-7, are structurally like asbestos sharing a fiber-like shape and persistence in the body. This similarity isn't just cosmetic because studies show that these specific CNTs can trigger the same mechanisms that lead to cancer, particularly malignant transformation. Essentially, we need to be really careful and design safer versions of these materials to limit the carcinogenic hazards during their widespread production and use. Although CNTs are extremely dangerous, they are also useful because they can be used for drug and molecule transport within the body, tumor imaging, and even photothermal therapy, which is a form of cancer treatment. Overall, nanotubes can cause much harm if not used properly, but they also are advancing the human medical field.

https://pmc.ncbi.nlm.nih.gov/articles/PMC8353320/#B22

Name: Natalia Quintanar

Title: Engineers discover a new class of materials that passively harvest water from air

A group of engineers discovered a way to use nanotechnology and create a new type of material that pulls water from the air and releases it without needing to use external energy such as solar, geothermal, or biomass energy. This material is able to combine both hydrophobic and hydrophilic components on a nanoscale. This was discovered accidentally during unrelated experiments and could benefit the way water is collected in particularly dry areas without having to use a significant amount of external energy.

https://blog.seas.upenn.edu/penn-engineers-discover-a-new-class-of-materials-that-passively-harvest-water-from-air/

Title: Nano-biotechnology, an applicable approach for sustainable future

Name: Elijah Huang

Nanoparticles/nanomaterials have multiple medical applications in the field of nanobiotechnology, where smart nanoparticles synthesized from organic, inorganic, and hybrid nanomaterials can be used in smart drug delivery based cancer therapies, tissue engineering, producing vaccines, gene therapy, and antigen delivery. Considering cancer, traditional and conventional therapies such as surgery, chemotherapy, and irradiation can cause severe side effects to patients, due to the large scale method of attack. Loading anti cancer drugs into nanomaterials provides a nano based drug delivery system that detracts the side effects.

Source: https://pmc.ncbi.nlm.nih.gov/articles/PMC8828840/

Title: Application of Nanotechnology

Name: Tra Nguyen

Nanotech has been known as the new approach for many different fields, however I was interested in looking at its application in healthcare. I believe this source is very helpful in describing the big picture of nanotech applications. In this article, they mentioned the fact that we can have different approaches for therapeutics utilizing nanoparticles that are encapsulated to directly access cancer cells, which can minimize the risk of side effects of other therapies such as chemotherapy. By having these different approaches, the healthcare field has more promises for further understanding and curing human diseases.

Source: https://www.nano.gov/about-nanotechnology/applications-nanotechnology/

Source: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.chemistryconnected.com/courses/CHM316/chemmatters-oct2009-nanotech.pdf

Title: Nano-drug delivery

Name: Christian Suarez

UCSF is creating new and innovative ways to approach drug delivery. In order to do this, tubes which are 7 nanometers in diameter are being employed via a microchip which can steadily release glucose molecules over time. This microchip can also deliver varied dosages by attaching to the intestinal wall to evade detection by the immune system as well as harmful enzymes during this prolonged activity.

Name: Raelene Santana

Title: Nanotechnology in Wound Healing

Researchers attending the University of Wisconsin are experimenting with a bandage that will cover the wound using electrical pulses that will accelerate healing. The pulses induce clotting on the wound which would reduce bleeding, speeding up the recovery.

Source: Nanotechnology in Wound Healing

Title: The Growing Impact of Nanotechnology on Society

Name: Gwyneth Soldevilla

Nanotechnology is rapidly expanding and increasingly influencing society. It is now widely used in agriculture, food production, medicine, automotive, construction, and environmental management. One interesting example is its role in poultry, where nanotechnology helps control dangerous foodborne pathogens like Salmonella and Campylobacter. It does this through a variety of nano-based tools like nano-enabled disinfectants, surface biocides, protective clothing, air and water filters, improved packaging materials, and biosensors that detect pathogens and ensure that the food is safe for human consumption.

Source: https://pmc.ncbi.nlm.nih.gov/articles/PMC9865684/

Name: Luna Julian

Title: Innovation of Buckyballs

Entry:

Buckyballs are spherical molecules composed of 60 carbon atoms arranged as a truncated icosahedron. It's a structure comprising 12 pentagons and 20 hexagons, which resembles a soccer ball. Richard Smalley, Robert Curl, and Harold Kroto discovered buckyballs in 1985 at Rice University. Buckyballs have become known for their useful and innovative properties. In hydrogen gas storage, its fullerene hydrides are thermally stable or preserve molecular integrity upon heating, which provides a potential use in fuel cells for electric vehicles. Buckyballs can additionally exhibit optical limiting behavior that is suitable for protection against devices with intense light sources, which can be good for eye safety, as society is increasing its usage of technology. Lastly, buckyballs have medical and biological applications, as it has antiviral agents that target HIV protease and useful antibacterial compounds.

Source:
https://www.researchpublish.com/upload/book/Bucky%20Balls%20%20An%20Introduction,%20Discovery-4973.pdf

Title: Importance of Nanotechnology in the treatment of ocular diseases

Name: Ava Valdemar

Link: pmc.ncbi.nlm.nih.gov

Summary: I learned the nanotechnology is becoming an important tool in the treatment of eye disease due to the eye having many protective barriers that make regular medicine hard to deliver. Researchers have been using nanoparticles, liposomes, and other nano sized carriers to help medications reach certain parts of the eye quickly and effectively to both anterior and posterior segments of the eye. These particles can improve how long a drug or medicine can stay in the eye, reduce side effects, or target specific locations such as the retina. Some studies show promising results for conditions such as glaucoma, dry eye, and macular degeneration as well. These studies may lead to eventually more precise, longer lasting, and less invasive treatments for the eye.

Title: Recyclable Carbon Nanotube Fibers

Name: Aubrey Krause

Link: https://news.rice.edu/news/2025/rice-researchers-unveil-surprising-breakthrough-carbon-nanotube-recycling-paving-way?

Summary: I learned that researchers recently figured out how to fully recycle carbon nanotube (CNT) fibers without weakening them. They dissolve old CNT fibers in a special acid and re-spin them into new ones that have the same strength and conductivity as the originals. This is a big deal because it makes high-performance CNT materials reusable, which could reduce waste in electronics and aerospace.

Title: How Nanotechnology is Shaping the Future of Eyewear

Name: Edward Tuj

I was curious about what nanotechnology offers to people who wear glasses/contacts, and I found a short article that briefly touches on some key facts regarding how nanotech is being researched in eyewear. Regarding contact lenses, the article mentions that there is research going on that aims to make these advanced lenses to be able to have microscopic sensors and electronic components that monitor any changes in the eye. Regarding glassware lenses, they mention that research is trying to make these lenses water-repellent and self-cleaning (which is pretty interesting in my opinion) and scratch-resistant, which is beneficial for people who frequently drop their glasses.

Link: https://www.uoosd.com/future-of-nanotechnology-in-eyewear

Title: A Review on Carbon Nanotubes Family of Nanomaterials and Their Health Field

Name: Leslie Batista

I found it interesting that carbon nanotubes (CNTs) are used in pathogen detection, food safety, environmental protection, tissue engineering, drug delivery, and disease diagnosis/treatment. Their unique mechanical, chemical, and physical properties (e.g., strength, flexibility, conductivity) make them very versatile. In terms of tissue engineering, CNTs can improve electrical conductivity in cardiac scaffolds, supporting growth and function of heart cells. Then, in bone tissue, when combined with polymers, CNTs help create tougher, more resilient scaffolds for bone regeneration. They also support osteoblast proliferation and mineralization.

Link: https://pubs.acs.org/doi/10.1021/acsomega.3c08824

Title: Nanotechnology medication

Samantha De Leon

I found the administration of medication through nanotechnology very interesting. Nanotechnology helps medicine work better by using tiny particles to deliver drugs exactly where they're needed in the body. This means fewer side effects and stronger treatment. It can also help medicine cross hard to reach areas, like the brain, and even make painless patches or faster-working pills possible.

Link: https://chemistryconnected.com/courses/CHM316/chemmatters-oct2009-nanotech.pdf

https://www.sciencedirect.com/science/article/pii/S2414644723000337?via%3Dihub

Name: Trinity Pedregon

Title: Nanotubes in Medicine

Something fascinating I learned is how carbon nanotubes may one day help with drug delivery in the body. CNTs are tiny carbon tubes with unique electrical and chemical properties, and scientists are studying them as potential carriers that can deliver medicine directly to diseased cells. Because they can be chemically modified to make them water-soluble, CNTs can travel

through the bloodstream and release a drug when they encounter a specific trigger, such as a change in pH near cancer cells. This type of targeted delivery could reduce side effects and make treatments more efficient. Although the research is still developing, CNTs show a lot of promise for creating more precise medical therapies.

Link: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7936533/

Name: Jasleen Kaur

Title:: Nanotechnology and Risk

Summary: Nanotechnology basically lets us work with materials at the smallest level, meaning working with things humans cannot see or reach. This technology can address many current issues, such as improving medicine, providing cleaner energy, and creating stronger everyday products. But there still isn't much research on the potential health or environmental risks, and the little we do know offers reasons to be cautious. Due to the limited research, it can also raise ethical and social concerns, such as whether we should enhance human abilities or how foods containing nanotechnology should be labeled. A lot of people don't really understand nanotechnology, so public fear alone could slow down its progress. And overall, the U.S. isn't really set up to regulate this technology yet, so major updates to the system will be necessary.

Link: https://www.resources.org/archives/nanotechnology-and-risk/?gad_source=1&gad_campaignid=20291819400&gbraid=0AAAADGZZQPxhF84VmjuZHXoJ_HB6h9AM&gclid=Cj0KCQiA5uDIBhDAARIsAOxj0CE99wE4bBHi6ZorWckP6G4AIJexJ4hHii5oorz4X2YR_ajB8q1O77waAgvYEALw_wcB

Name: Shanel Branson

Title: Meeting Contemporary Challenges: Development of Nanomaterials for Veterinary Medicine

Summary: Nanotechnology has been on the rise in veterinary medicine to allow for more advanced treatment for certain animal diseases. The reason why nanotechnology is looked at so heavily compared to other technological services is because it focuses on things like reversing antibiotic resistance, neoplastic diseases, metabolic corrections, and other areas of the field. Diagnostics will be on a whole different level considering nanomaterials will allow for different equipment and imaging available for Veterinarians to evaluate.

Link: PMC10536669

Name: Lucia Portillo

Title: Tiny Technology, Big Possibilies

Summary: Nanotechnology is involved in new advances due to its high tensile strength, light weight, thermal conductivity, and ability to be filled with other materials. Today, nanotechnology is used in body armor, sports, and durable goods. There is also great potential for their use in biomedical fields, drug delivery, the evolution of EVs, and more.

Link: https://www.cas.org/resources/cas-insights/tiny-technology-big-possibilities

Nanomaterials in Veterinary Medicine

Name: Giselle Green

Summary: I found an article that discusses how nanotechnology is being used in veterinary medicine. The article splits the applications of nanotechnology in the vet field into four main categories: diagnostics, treatment, prevention, and veterinary-sanitary inspection. It also discusses the current applications of nanomaterials in vet med, which include metal nanoparticles being combined with hydrogels to form a composite material that helps prevent, diagnose, and treat diseases. Another interesting application is the potential for metal nanoparticles to become an alternative to antibiotics, which could potentially stop the growth of antibiotic resistance, which is a serious problem all over the world.

Link: https://pmc.ncbi.nlm.nih.gov/articles/PMC10536669/

Name: Marian Calderon-S.

Title: Nanotechnology in Dentistry

Summary: Researchers are advancing rapidly in nanodentistry, aiming to achieve optimal oral health through innovative techniques. By harnessing the power of nanomaterials and biotechnologies, these developments hold promise for effectively addressing a range of dental challenges, including orofacial fractures, bone augmentation, temporomandibular joint cartilage regeneration, pulp repair, dental implants, and more. A particularly noteworthy aspect of nanotechnology is its ability to enhance the mechanical strength and biological performance of

dental materials. For instance, natural bone surfaces typically exhibit features around 100 nm in size, and through the application of nanotechnology, similar structures can be created on implant surfaces. This microstructured design is conducive to promoting osteoblast adhesion, proliferation, and overall osteogenesis, paving the way for improved outcomes in dental treatments.

Link: https://pmc.ncbi.nlm.nih.gov/articles/PMC3571524/

Title: Nanotubes: Small Size, Big Impact

Name: Zoey Nguyen

Nanotubes are very useful in nowadays life. So, what is nanotube? Nanotube is a tiny, hollow, tube-shaped structure made at the nanometer scale, usually formed from carbon atoms. Even though nanotube is very tiny, it is 100x stronger than steel, but only a fraction of the weight. According to the article, carbon nanotubes (CNTs) have been very useful for cell tracking. Scientists use CNTs as contrast agents for MRI, or radiotracers, which helps monitoring engineered tissue growth. Moreover, CNTs are very good at electrical conductivity, and it can be used for structural support, scientists also use CNTs for gene delivery and for reinforcing tissue scaffolding.

https://www.sciencedirect.com/science/article/abs/pii/S0142961206006569

Title: Nanotechnology in Plastic Degradation

Name: Brandon Koehn

Plastics are a great threat to our environment today. The accumulation of plastics in our soil and ocean introduces toxins into the food chain which ultimately will enter us in turn. Nanotechnology provides a solution to this by allowing us to increase the degradation of polythene via microorganisms. The microorganisms' metabolic cycles can be altered, allowing for nasty polymers in our ecosystems to be safely degraded compared to conventional biological methods, like enzymatic processes which are inefficient due to environmental limits.

https://www.biotech-asia.org/vol20no1/nanotechnology-in-plastic-degradation/

Title: Nanotechnology Applications in Cancer Therapy

Name: Gabriel Elepano

https://rivm.openrepository.com/server/api/core/bitstreams/3d29057d-57ce-4825-928f-98ae53bab306/content

Nanotechnology, specifically “nano-structured polymer capsules”, has a novel use in cancer treatment. These capsules are constructed to contain the drugs used in chemotherapy and can be used to deliver them directly to tumors, which reduced the damage to healthy cells nearby the cancerous ones. They are structured with an outer layer of antibodies to target cancer cells and are embedded with light absorbing gold particles. Once enough capsules attach to the tumor, an infrared laser is used to burst them, dispersing the medicine. This is a great advancement in cancer treatment, and with more refinement it could become a widespread treatment in the future.

Title: Recent Advantages in Nanogels in Veterinary Medicine

Name: Elise Rathbun

This article reviews the significant progress of nanogels, a promising class of nanomaterials, as versatile platforms for veterinary therapeutics. It outlines key developments and potential applications, offering an in-depth discussion on critical factors like synthesis, biocompatibility, biodegradability, clinical translation, and technological considerations. There is a possibility of having nanogel based vaccines and drug delivery systems, with a focus on the mucosal route for administration. This could help the livestock industry.

https://veterinaryresearch.biomedcentral.com/articles/10.1186/s13567-025-01576-y

Title: Nanotechnology in Leukemia Therapy

Name: Micaela Montinola

Link: https://pmc.ncbi.nlm.nih.gov/articles/PMC12084282/

Utilizing tiny packages to carry drugs, genes, or immune-boosting signals that stick specifically to leukemia cells in the blood and bone marrow, nanotechnology may be a potential key treatment for leukemia. Because leukemia cells are spread throughout the body, normal treatments can be powerful but unfortunately very damaging to non-leukemia cells. Nanocarriers

and nanomaterials like liposomes, polymer particles, and small metal particles can help target therapies directly at leukemia cells, release drugs slowly and methodically, and can help the immune system better recognize and target the cancer cells. Another benefit of nanotechnology is that these nanoparticles can be attuned to size and surface coating so they can travel throughout the blood system while avoiding damaging healthy, normal cells. Further research and developments should consider nanotechnology as a promising way to make leukemia treatments more targeted, effective, and less toxic in the future.

Lipid Nanoparticles that can Deliver mRNA Directly into Heart Muscle Cells Discovered

https://phys.org/news/2025-11-lipid-nanoparticles-mrna-heart-muscle.html

Sara Mishina

In the discovery of a human cardiac micro physiological system known as heart-on-a-chip, researchers have utilized this tool to further heart-failure therapeutics. Researchers from UC Berkeley, the Gladstone Institutes, and UCSF were thus able to discover a lipid nanoparticle that could penetrate the dense heart muscle and efficiently deliver therapeutic messenger RNA into cardiomyocytes. The lipid nanoparticle counters the struggle of delivering mRNA to cardiomyocytes and allows effective exit of the endosome and entering of the cell's cytoplasm, maximizing therapeutic effects.

Title: Styled in Nanotech Clothing

Name: Lynne Payad

Nanotechnology for the average consumer is more familiar than it may seem. While water repellent materials utilize nanoparticles to create hydrophobic coatings on fabrics, nanocoatings using metal oxides such as titanium dioxide and zinc oxide are becoming popularized for their UV protection. There are also metal nanoparticles like silver and copper integrated into textile fibers for their antimicrobial and therefore odor reducing properties in articles of clothing like sportswear. Such additional treatments to the fabric can improve performance and functionality without compromising comfortability or integrity of the material.

Source: https://www.sciencedirect.com/science/article/pii/S2666978125000698

Title: Nanotechnology for Coral Reef Conservation
Rebecca Roytman

I found a cool article about how nanotechnology could actually help protect coral reefs. Researchers are using nanoparticles like titanium dioxide and cerium oxide to reduce the coral bleaching by neutralizing the reactive oxygen species that build up when corals are stressed by heat. The particles almost act like antioxidants which helps prevent the chemical reactions that damage the corals tissue. They are also designing nano-sized materials that encourage the calcium carbonate to form which helps young coral polyps attach and grow on the artificial reefs. It's so amazing to see how chemistry at such a tiny scale can have a real impact on rebuilding huge ecosystems in the ocean

Source:https://www.nature.com/articles/s41565-023-01402-6

Title: The Role of Nanotechnology in Space Exploration

Name: Alondra Alday

Nanotechnology is the science that involves working with matter at the atomic and molecular level allowing for advancements in the spacecraft, space suits and equipment, life support systems, robotics, and space exploration. Using nanomaterials such as carbon nanotubes causes the spacecraft to weight lighter and enhances resistance against radiation and extreme temperatures. Additionally, using nanomaterials in space suits makes them more durable, flexible, and resistant to space hazards. While in the spacecraft, nanotechnology can enhance the air filtration improving the air quality therefore reducing health risks for astronauts from airborne particulates. In robotics, the usage of nanotechnology allows for more efficient sensors and actuators which enhances the performance of robotic system in satellite maintenance and planetary exploration. Overall, nanotechnology is a great tool for advancing space exploration and hopefully in the future be further implemented in space missions.

Link: https://www.azonano.com/article.aspx?ArticleID=4983