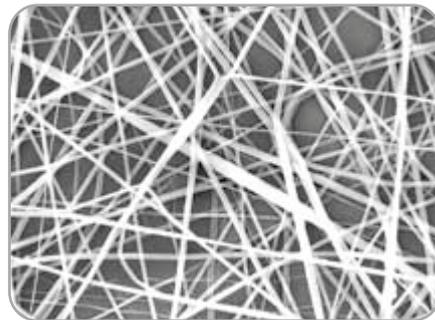


NANO - Role Play

“Want to be a Superhuman?”

Scientists have become able to design molecules that could lead to a breakthrough in bone repair by recreating natural bone structure at the nanoscale level. Synthetic nanofibres have been created that self-assemble into 3D structures that mimic key features of human bone, such as collagen. Collagen is the most plentiful protein in the human body. It is found in most human tissues including bone, cartilage, the heart, eyes and skin and gives these tissues their structural strength.

When these synthetic nanofibres form, they make a gel which could be used as a sort of glue in bone fractures or to create a scaffold for other tissues to regenerate onto. As a result of its chemical structure the nanofibre gel would encourage attachment of natural bone cells which would help to patch up the fracture. The gel could also be used to improve implants or hip and other joint replacements. These fibres are “cell-friendly” and cells can grow on them.



SEM images of nanofibres and hFOB seeded on electrospun nanofibrous scaffolds.

Ref: Biocomposite nanofibres and osteoblasts for bone tissue engineering J. Venugopal, P. Vadgama, T. S. Sampath-Kumar and S. Ramakrishna Nanotechnology 18 (2007)

This technology is being developed to heal bones, but a natural progression could be to use it to strengthen otherwise healthy bones to make them almost unbreakable. This solution might not be available for some people (due to cost or limited accessibility), so it could become a human-enhancement tool only for a few.

The Dilemma is:

Is it acceptable to use processes developed for medical treatment to enhance the human body?

NANO - Role Play
“Want to be a Superhuman?”

The Dilemma Is:

Is it acceptable to use processes developed for medical treatment to enhance the human body?

Stakeholder: The Scientist

- Read the text on your card and share your opinion with the group

You represent the community of scientists and researchers in the nano-science and nanotechnology field.

Your primary motivations are:

- To seek knowledge and understanding of properties of materials on the nanoscale.
- To design many new materials for medical applications.

People often fear the unknown and wish to resist change. The very premise of science is to always push back the known boundaries. Without this drive there would never be any improvement of the conditions we live in or the technology we have at our disposal. It is not right to put a limit on what science can achieve. It is not science that should be monitored but the ethics of the people who go on to use it.

- **Share your opinion with the group**

I think.....

- Note: you may come up with additional ideas, don't feel limited by the information above.

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Stakeholder: Patient

- Read the text on your card and share your opinion with the group

You represent patients seeking medical care.

Your primary motivations are:

- Make sure that you can get the medical care you need.
- Ensure that you have a say in what kinds of care you need.

Anything that speeds up my recovery suits me fine! I have a family to support and I need to get back to work to earn money to support them. I broke my hip when I was knocked off my bicycle and it is affecting both me and my family. I do think to use this kind of technology just to enhance someone's body would be wrong. Imagine a society where some people could afford to get their bones made unbreakable and others couldn't, that would be a nightmare scenario.

- **Share your opinion with the group**

I think.....

- Note: you may come up with additional ideas, don't feel limited by the information above.

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Stakeholder: Ethicist

- Read the text on your card and share your opinion with the group

You represent ethical groups seeking justice and equity.

Your primary motivations are:

- Make sure that no one is lacking for their basic needs.
- Priority must be given to global distribution of the products and services created by nanotechnology

Ethics refers to the social norms and values that guide both individuals and their interaction with their fellow human beings and communities, and with their environment. It cannot be right to use a potentially life-changing medical procedure to enhance some people's bodies. What will the human race turn into? The new world – a tiered system of human beings, some with enough money to become virtually indestructible?

- **Share your opinion with the group**

I think.....

- Note: you may come up with additional ideas, don't feel limited by the information above.

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Stakeholder: A Multi-Millionaire

- Read the text on your card and share your opinion with the group

You represent a community of very rich people who can afford such enhancement of the human body.

Your primary motivations are:

- To have the best quality of life that money can buy.
- To have the right to spend my money as I wish.

Why shouldn't I be allowed to enhance my body if I want? I can easily afford it and it is my choice, after all plastic surgery is not illegal. I want to live as long and as healthily as I possibly can and I will try anything to achieve this.

- **Share your opinion with the group**

I think.....

- Note: you may come up with additional ideas, don't feel limited by the information above.

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Stakeholder: Private Medical Centres

- Read the text on your card and share your opinion with the group

You represent a Private Medical Centre that has developed the bone-strengthening techniques and is seeking to begin selling them.

Your primary motivations are:

- To provide bone repair treatment.
- To meet demand for body enhancement.
- To generate profit for the Medical Centres.

We try to meet the demands that people express. That is our remit. We owe it to our shareholders to explore all avenues to raise profits. If there is a demand for body enhancement we will try to supply it. It is our business. Body enhancement has been around for decades, think of plastic surgery, this has now become commonplace. It is obvious that developments should happen in this area as they have in other areas.

- **Share your opinion with the group**

I think.....

- Note: you may come up with additional ideas, don't feel limited by the information above.

NANO - Role Play
“Want to be a Superhuman?”

The Dilemma is:

Is it acceptable to use processes developed for medical treatment to enhance the human body?

Stakeholder: Child (You)

What is your opinion?