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Viola Berkling

with Illustrations by Ming-fai Chow

Biotechnology in Cartoons



 Springer

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Reinhard Renneberg • Viola Berkling

Biotechnology in Cartoons

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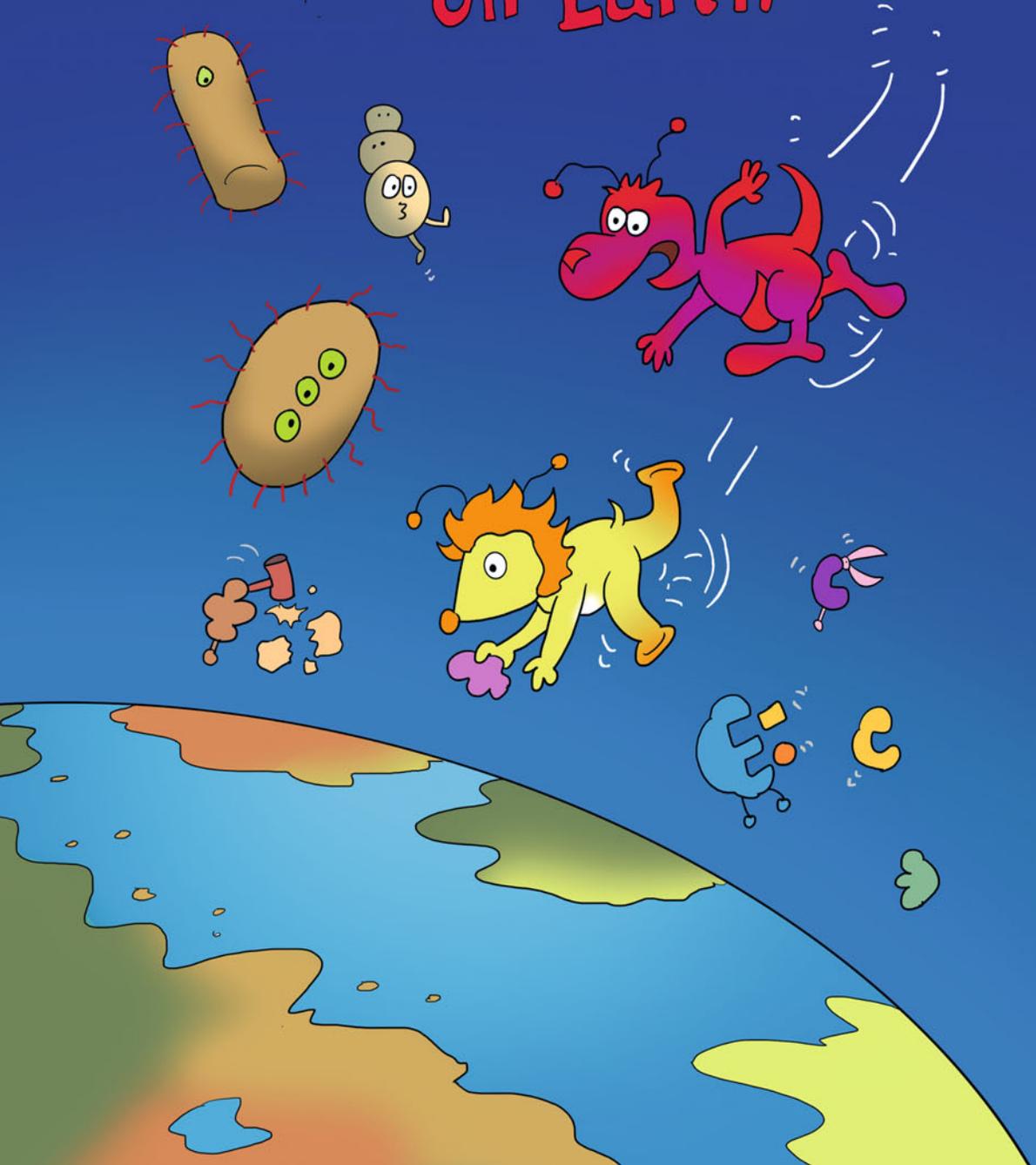
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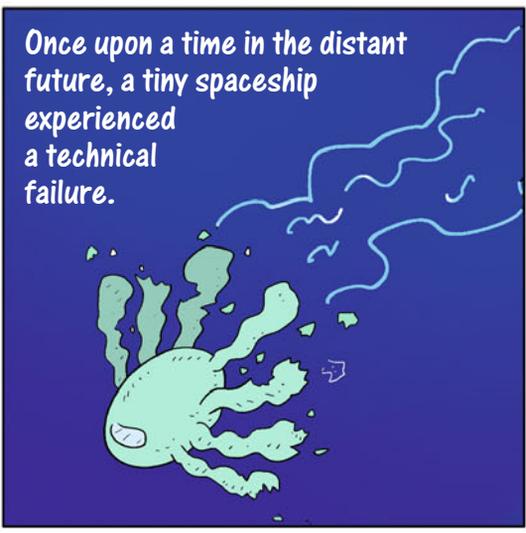
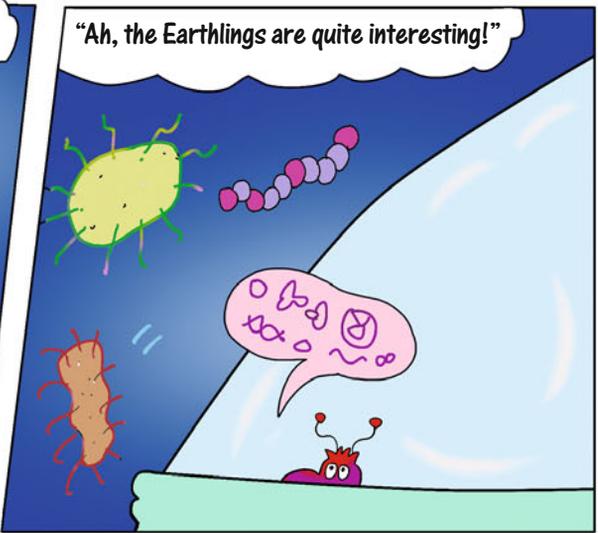
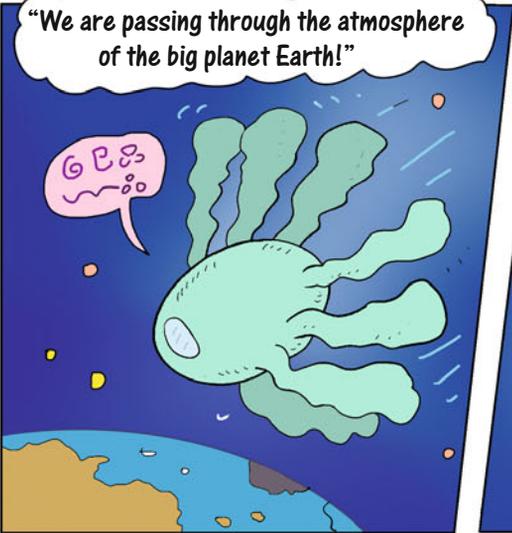
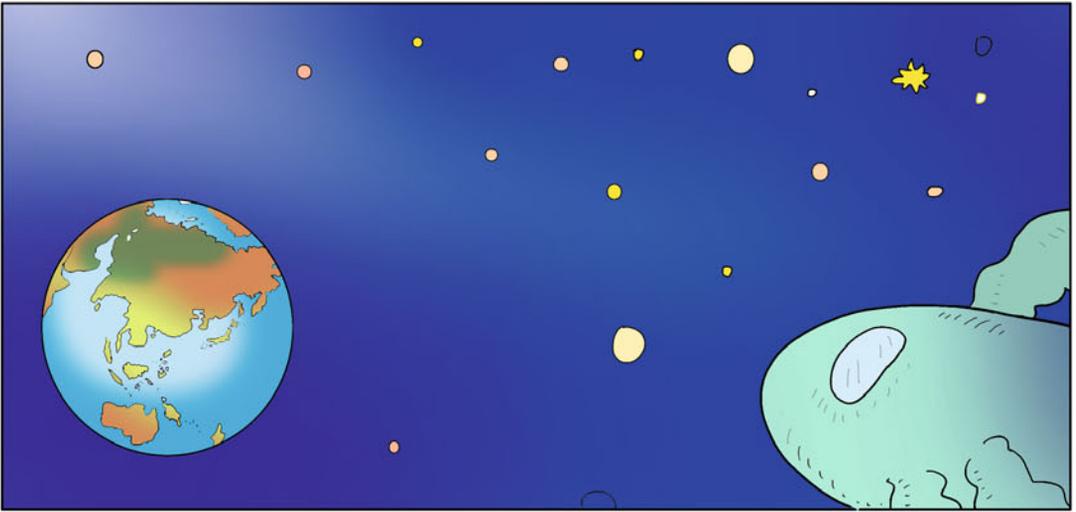
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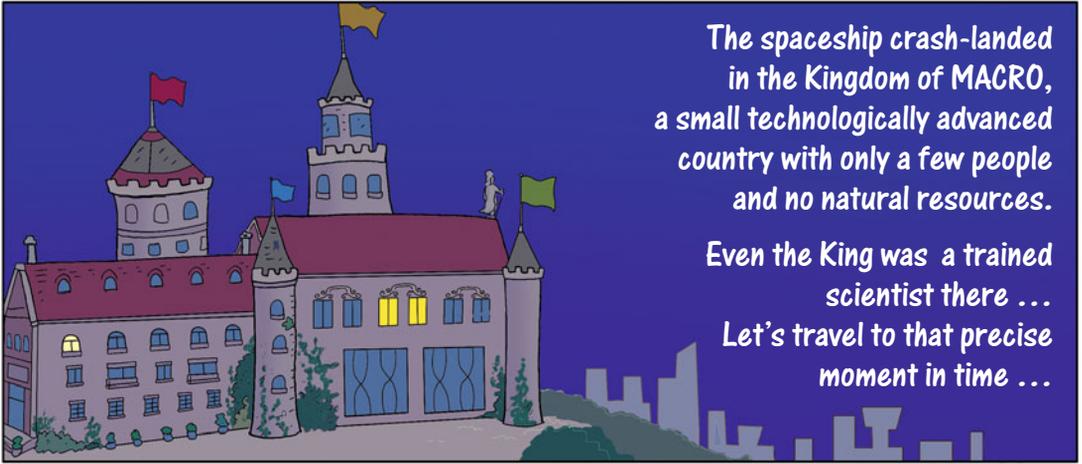
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Welcome to biotechnology!

Nanoroo's landing on Earth





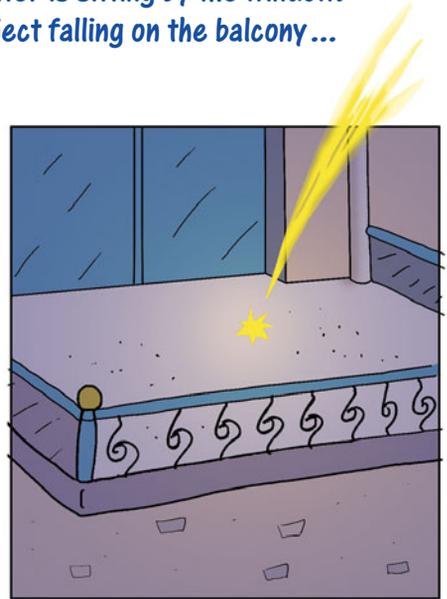


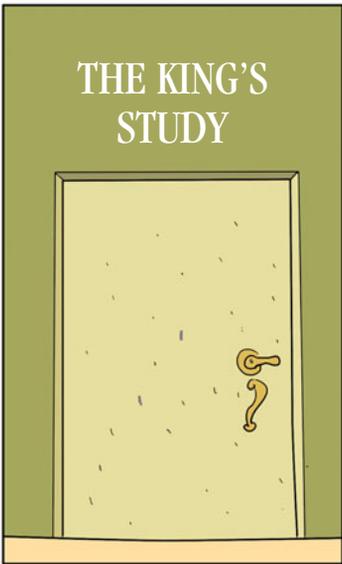
The spaceship crash-landed in the Kingdom of MACRO, a small technologically advanced country with only a few people and no natural resources.

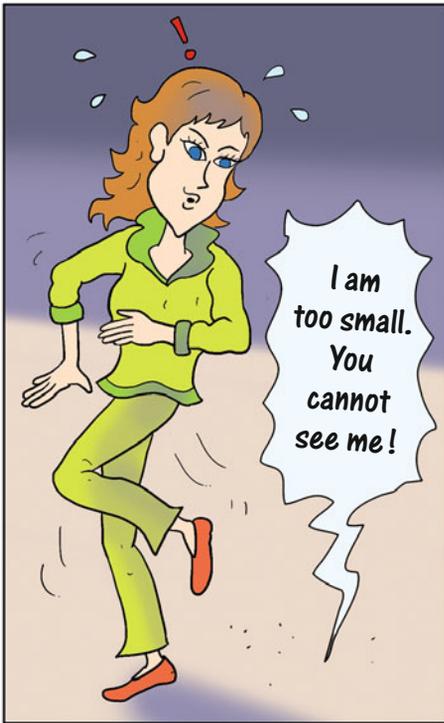
Even the King was a trained scientist there ...

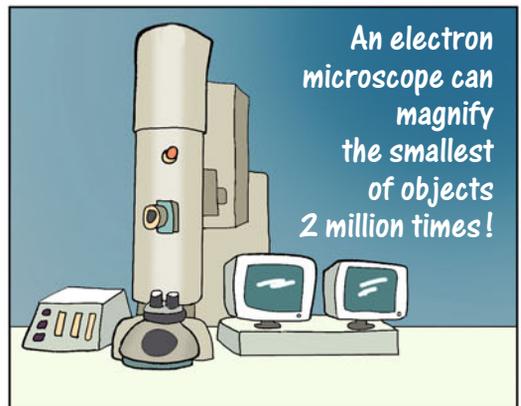
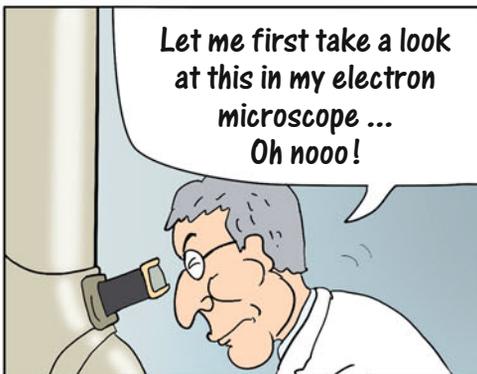
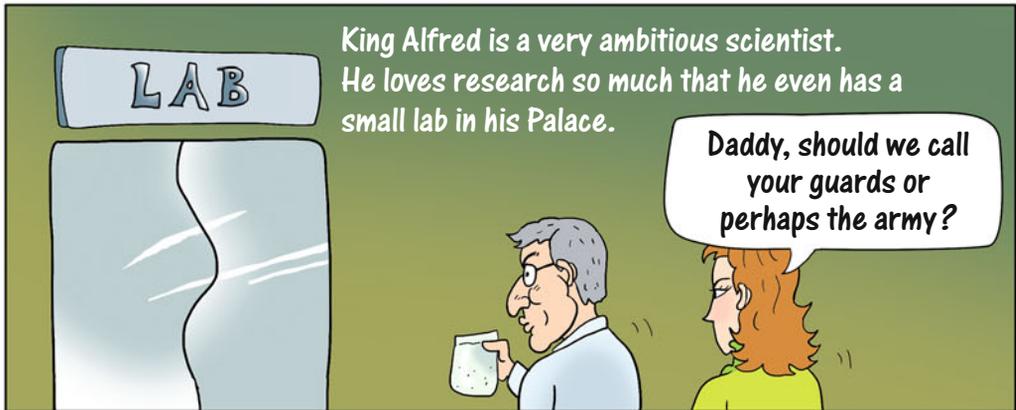
Let's travel to that precise moment in time ...

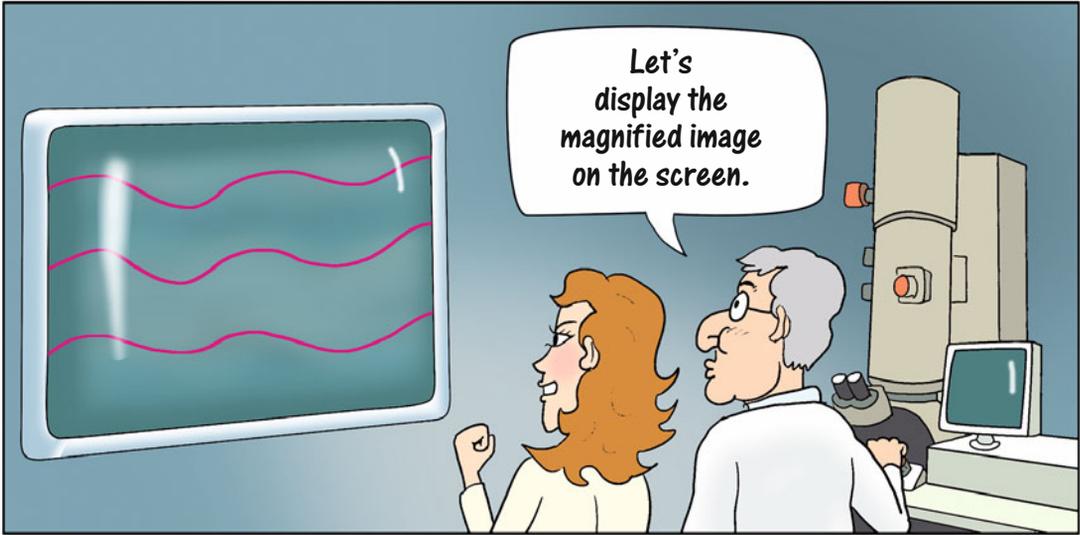
Princess Biola, the King's 17-year-old daughter is sitting by the window. All of a sudden, she sees a tiny, glowing object falling on the balcony ...











Let's display the magnified image on the screen.



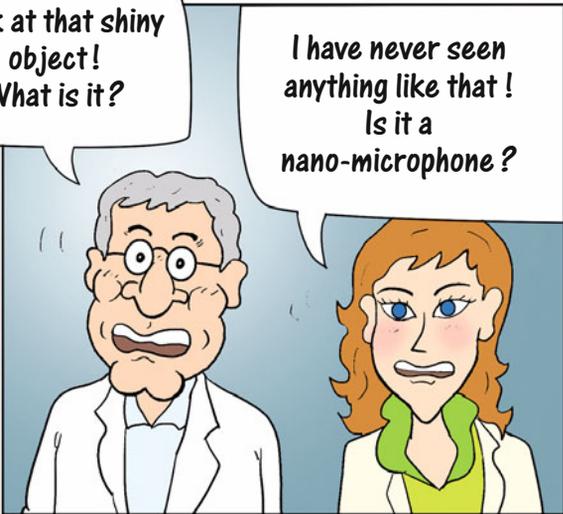
Interesting! So many things to see in just a little dust ...



Please, can we see this at higher magnification?

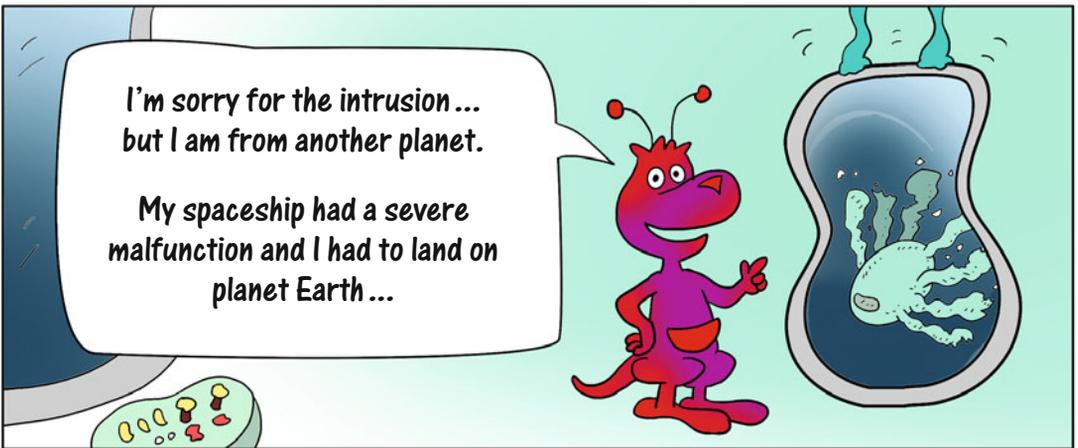
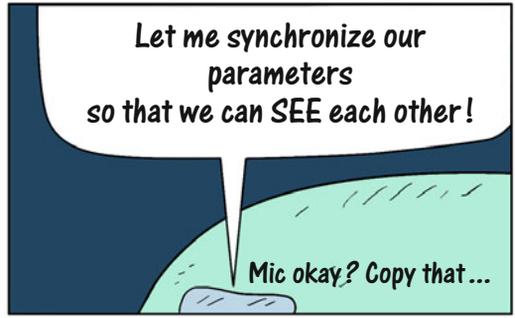


Look at that shiny object! What is it?

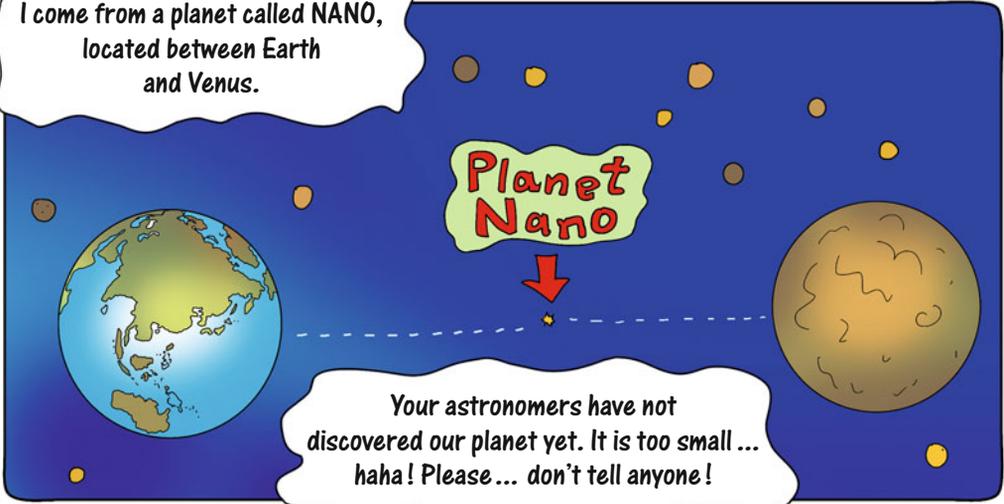


I have never seen anything like that! Is it a nano-microphone?

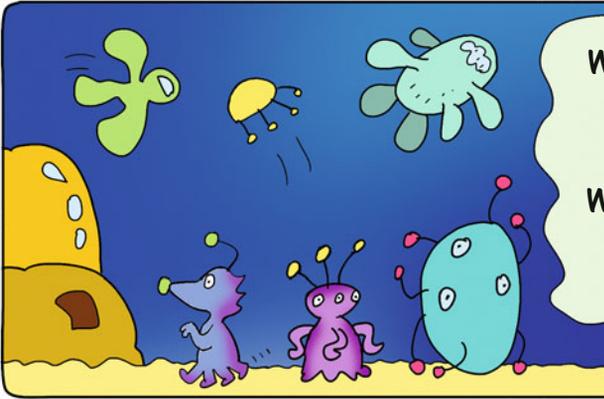
Suddenly, a VOICE is heard ...



I come from a planet called NANO, located between Earth and Venus.



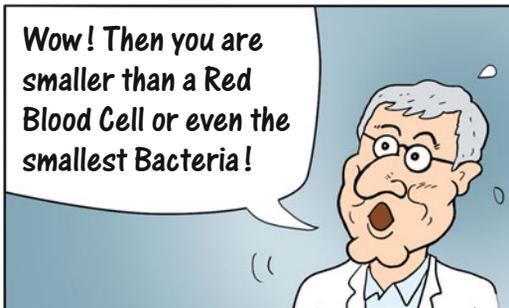
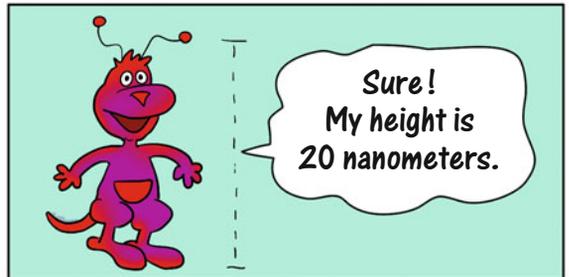
Your astronomers have not discovered our planet yet. It is too small ... haha! Please... don't tell anyone!

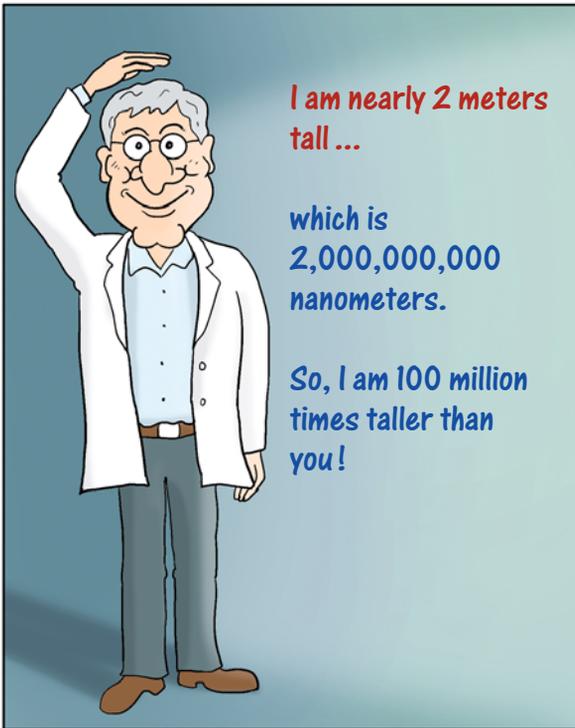


We are very advanced scientifically. So we can explore various large planets.

We are so tiny that we can use solar wind to move through space. At the speed of light ...

A photon needs only 8 minutes to travel from the Sun to Earth ...





I am nearly 2 meters tall ...

which is 2,000,000,000 nanometers.

So, I am 100 million times taller than you!

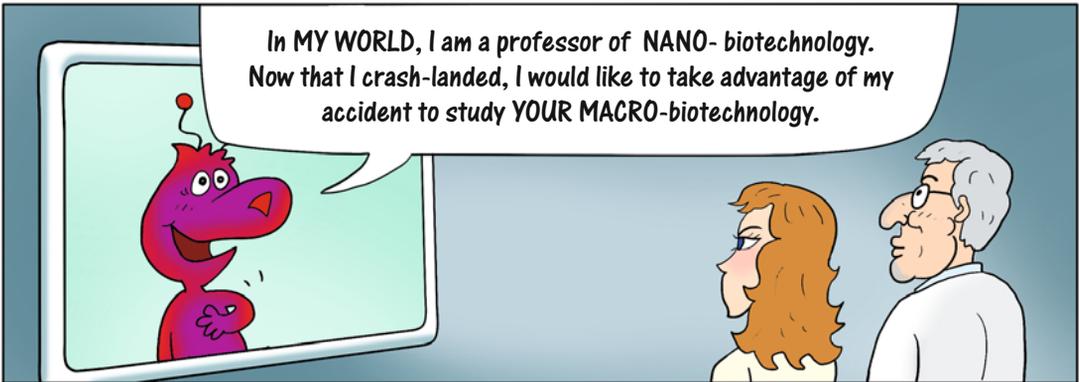
You are only 20 nanometers tall ?
Your body structures must be very different from ours ...



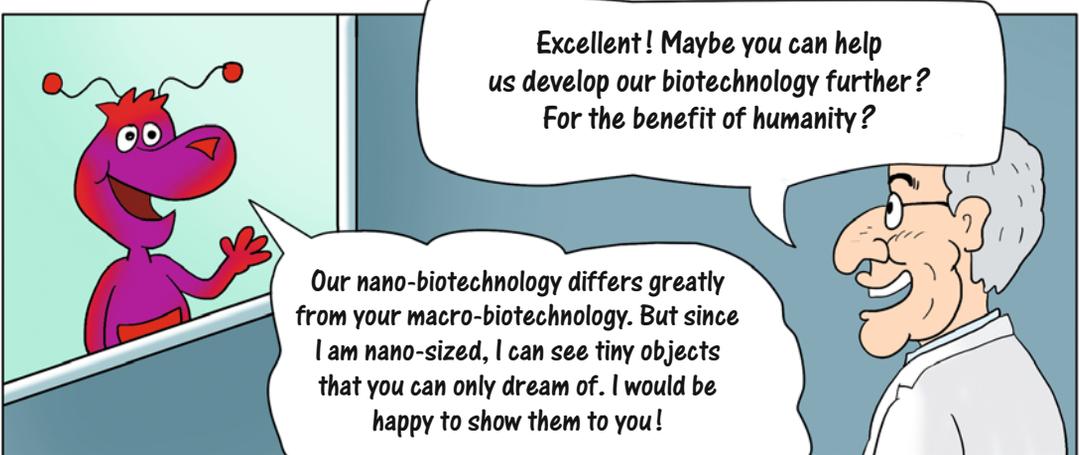
... because on a nano-level the tiny physical and chemical forces make a huge difference.



So, WHAT will you do on Earth?



In MY WORLD, I am a professor of NANO- biotechnology. Now that I crash-landed, I would like to take advantage of my accident to study YOUR MACRO-biotechnology.



Excellent ! Maybe you can help us develop our biotechnology further ?
For the benefit of humanity ?

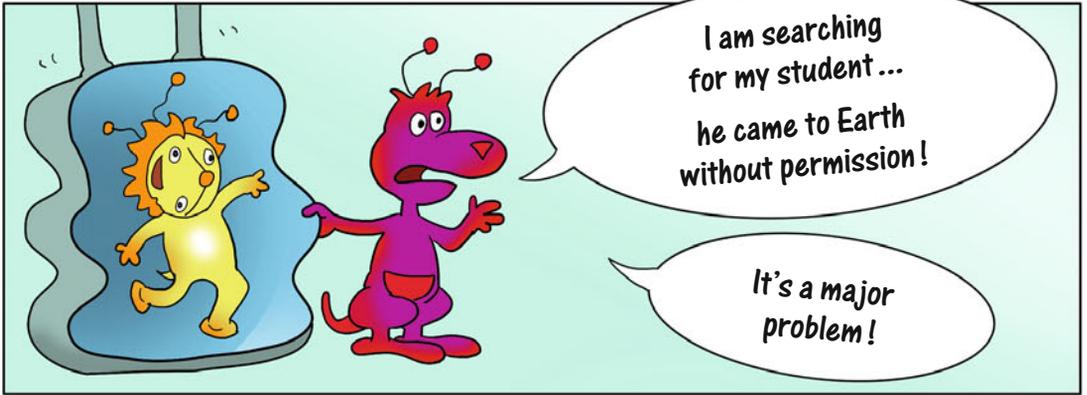
Our nano-biotechnology differs greatly from your macro-biotechnology. But since I am nano-sized, I can see tiny objects that you can only dream of. I would be happy to show them to you !



But I also have a special mission ...



What mission is this?

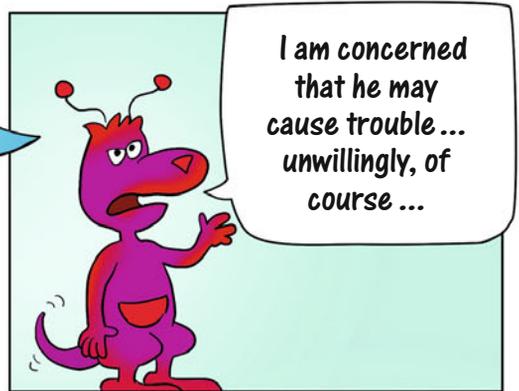


I am searching for my student ...
he came to Earth without permission!

It's a major problem!



I have been tracking him and I know that he landed in your Kingdom!



I am concerned that he may cause trouble ...
unwillingly, of course ...



Why do you both look so different?

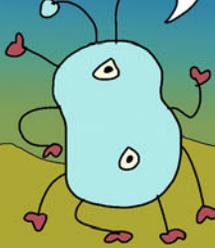


Well...
Who is more handsome?
He has three eyes!

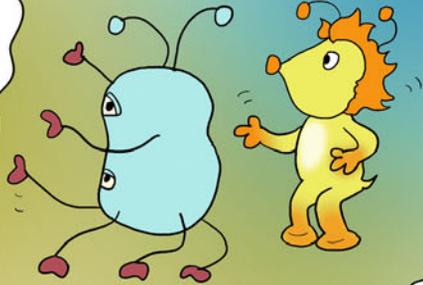
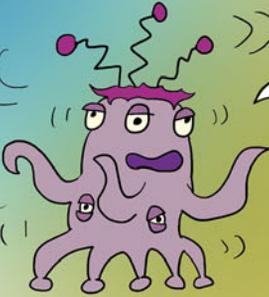
Most of us on Planet NANO are pretty familiar with nano-biotechnology ... For example, we can change our nano-SHAPE to adapt to different situations.



If we want to talk to living organisms on another planet, which are as small as us, we can transform ourselves into one of them ...



I am experimenting with 360-degree panorama eyes. Oh, I feel dizzy...



One has to be extremely careful with nano-biotechnology ...



The trouble with my runaway student is that he loves to experiment and often has the strangest of ideas.



I hope that he will not create CHAOS on Earth ...



No worries, I will find him soon !



Professor, even though you are 100 million times smaller than I am, I can hear you so clearly, even without seeing you ... this is really strange !



Oh, yes! We have made significant progress in nano-technologies for sound transmission ... But - up to now - we have not been able to convert nano into macro-structures. We are working on it though ...

