BETTY KIM: So nanoparticles are materials that are made up of different types of materials, whether it be metallic semiconductor polymers or of different shapes and sizes that can be used for varying purposes. Whether it be for delivering agents, whether it be for imaging purposes, or for both.

The size of the nanoparticle is within approximately the size of a DNA molecule. It's approximately 100,000 times smaller than a hair strand.

So the novel nanomaterials that we designed, the multivalent bispecific nano engagers, are very different from a traditional vaccine. Because they are actually not immunogenic on its own. It actually has to engage with that patient's cancer cells in order to heighten the immune system.

So vaccines in a traditional sense you would need to trigger an immune system reaction prior to the host developing the disease. This system develops heightened immune system only when it's engaged with a diseased cell. And that's what's really incredible about our system. Is that once the body forms a tumor, this nano engager will go in, engage itself with the cancer cells, will bring in a immune system to heighten the effects of the host immune system.

And furthermore, it will develop a long term memory of this cancer cell such that in years later if the tumor were to grow, your immune system will know this during a surveillance monitoring system and will target and kill it.

One of the limitations for cancer immunotherapy is that it has low potency. It does not induce long term immune memory to reduce tumor recurrence. And it also does not target a lot of the subpopulation of cancer cells. And in essence, the tumors grow back.

So these are a lot of the limitations that we have in immunotherapy. And we wanted to design the next generation nanomedicines that can go beyond these limitations.