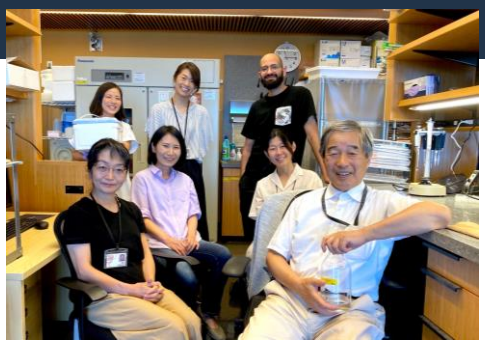
Seed Phase



Development of effective therapeutic methodology using a series of siRNAs conjugated with nanoparticles

Tadashi Yamamoto
Kensuke Osada*, Saori Nishijima, Akiko Fujimoto Nishiyama, Nao Ohmine, Hijiri Yoshida**: *QST, **NanomRNA Co Ltd
Cell Signal Unit

What is the problem?

The lifetime probability of Japanese individuals being diagnosed with cancer is nearly one in two for both males and females. In addition, the likelihood of Japanese people dying from cancer is one in four for males and one in six for females. Cancer patients have access to a variety of surgical and medical treatments. Among them, chemotherapy with anti-cancer chemicals stands out as a powerful method to target to cancer cells. In fact, 30% to 100% of cancer patients undergo treatment with anti-cancer chemicals. However, it is essential to note that more than 70% to 80% of patients who receive chemotherapy experience various side effects that negatively impact their quality of life. As a result, there is a need to explore the potential of effective cell killing with lower doses of anti-cancer drugs to mitigate the adverse effects. Finding ways to decrease the dosage of drugs could greatly benefit cancer patients.

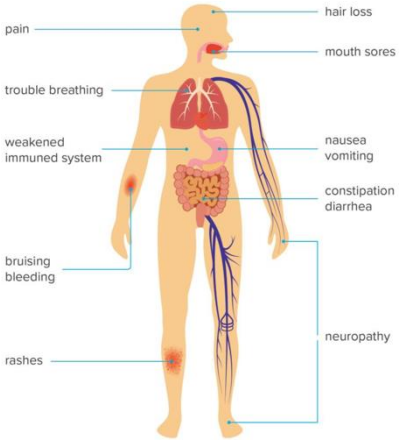


Figure 1 Side effects of chemotherapy, cited from Kelly in Medical News Today

What is your solution?

Our technology aims to treat cancer patients by combining anti-cancer chemicals with siRNA targeted against the *tob* gene. The Tob protein carries anti-apoptotic activity, and our approach involves suppressing this activity using *tob* siRNA, making cells more susceptible to the effects of anti-cancer chemicals. To ensure the stability of siRNA in vivo, we have chemically modified it using the well-established AESC (advanced enhanced stabilization chemistry) method. The resulting AESC *tob* siRNA is then encapsulated into uPIC nanoparticles, a development by K. Osada and his group at the University of Tokyo. Note that Osada is a member of our POC program. These uPIC nanoparticles are small enough to navigate through the newly formed blood vessels surrounding the tumor. Through the enhanced permeability and retention (EPR) effect, the *tob* siRNA is efficiently delivered to the tumor tissues.

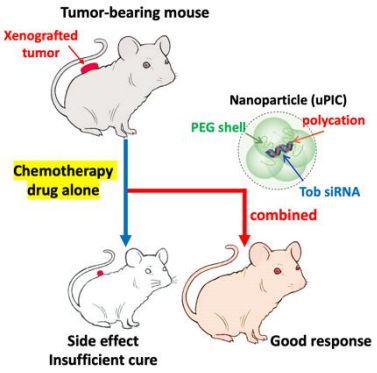


Figure 2 Chemotherapy with uPIC nanoparticle carrying *tob* siRNA

Other resources

- Unit website
- Publication list

Contribution to SDGs

Keywords: Chemotherapy, tob siRNA, uPIC Nanoparticle, EPR Effect