


Homeostatic Nanomachines

Developed in [YE 38](#) by [Advancer Enterprise's Advanced Medical Division](#), Homeostatic Nanomachines are a closely related family of medical nanoscale machinery that work within a human's body to help keep the host healthy. Coming from a variety of vectors, the Nanomachines do more than just prevent diseases: they filter toxins such as heavy metals and radioactive particles out of the body before they can affect it and actively repair genetic damage caused by external factors. Homeostatic Nanomachines are intended to open up a new era in medicine for humans in known space, providing them with the sort of boosted immune system normally seen in synthetic species like Nekovalkyrja while implementing radiation resistance akin to that of the Freespaceers.

How Homeostatic Nanomachines Work

The Homeostatic nanomachines are as their name suggests nanomachines, but unlike what one thinks of when they think of nanomachines, they are constructed on the cellular level from a combination of organic molecules and inorganic materials such as iron and zinc atoms. This construction allows for maximum compatibility with a living body, avoiding the issues with rejection and the like. Based on organic cells, the nanomachines feature a organic-synthetic nucleus which contains instructions, blueprints, and the nanite's programming: the different strains of Homeostatic Nanomachines have different nuclear programming based on their intended functionality. All nanomachine strains, however, contain synthetic mitochondria which generate ATP for the nanite through  [Cellular Respiration](#), which is used to power the nanomachine's various functionalities.

One of the more common nanite strains are the genetic repair nanomachines, intended to be dispersed throughout the body's tissues. These nanites once in place began to observe and check the body's cells for damage done by radiation or other external factors, performing repairs and maintenance to tissues and the replication structures in the cell's nuclei.

The other and more common nanite that counts as a Homeostatic Nanite are the Immunobooster nanites, which are spread throughout the body's circulatory, lymphatic, and cardiovascular system. These nanites function similarly to the body's lymphophages, attacking and absorbing hostile organisms such as bacteria, virii, and fungi. An additional function of these nanites is that they are also keyed to target toxic heavy metals such as lead and uranium, and also sequester away radioactive materials that would otherwise be absorbed into vital glands and organs such as Thorium. When a nanite of this type has absorbed and sequestered invader organisms, or heavy metals, or radioactive particles; it passes into the body's waste filtering system where it and the sequestered thing is expelled from the body.

Regardless of whatever mixture is used, a single injection of Homeostatic Nanomachines will stay in the recipient's body for roughly one week before the nanites cease functioning or are destroyed by the body's own immune system.

Notice for Pregnant and Nursing Women: During Pregnancy, the Nanomachines will also infuse a gestating fetus' tissues to maintain its health and help regulate the growth process, protecting against developmental disorders. After giving birth, the nanomachines will stay within the infant for up to a week, slowly being expelled out in the body's waste products as they die off.

Nanomachine Hive

For all of their functionality, the Homeostatic Nanomachines cannot live within a human body indefinitely. Like all of the body's cells they will eventually be consumed and recycled by the body itself or flushed out with other waste products; this is a design feature implemented specifically to prevent a possibly detrimental buildup of the nanomachines in the body. The nanites can become a permanent feature of the recipient's bodily system however, through the implantation of a Nanomachine Hive.

A Nanomachine Hive is a specialized artificial organ, constructed using a mixture of tissues grown using the recipient's own genome and synthetic parts. Once implanted through a simple inpatient procedure into the patient's upper torso and connected into their circulatory system, the Hive will go to work. The Hive has three main functions when within the body: construction of new nanomachines using internal molecular assemblers; disassembly of old or malfunctioning nanomachines; and as a sort of health monitor. The Hive slightly increases the caloric uptake of the patient: much like natural organs it receives power through the process of Cellular Respiration, which requires that the patient's caloric intake be increased by 5%.

While capable of and mostly designed to construct new nanomachines and disassemble old ones, the Hive's most beneficial function is in its ability to monitor the host's health. In addition to the normal nanites that it produces the Hive produces much smaller numbers of so called signaler nanites. These Nanites are dispersed through the body and whenever a change in homeostasis indicating an injury or sickness is discovered, or chemical signals indicating an infection are picked up, the Signaler Nanites send a report to the Hive, which then sends a report to the host's most convenient digital device and/or their physician.

Implantation

Implantation of the Nanomachine Hive is achieved through a simple in-patient procedure. The patient is sedated first before their body is opened up. With the aid of [Surgical Nanites](#), the Nanomachine Hive is grafted onto the recipient's left kidney and linked directly into their circulatory system. The entire procedure takes roughly 2 hours, with four days of rest recommended afterwards.

Dangers of Homeostatic Nanomachines

While Homeostatic Nanomachines are incredibly safe and problem free, some issues were discovered during testing that may lead to health complications; chief among them the fact that a small percentage of humans are allergic to the nanomachines with reactions ranging from sneezing and hives to Anaphylaxis in some rare cases. Other less serious side effects have been the nanites simply not purging from the body naturally and building up over time in the circulatory system, creating conditions similar to cholesterol blocking.

Pricing

- Single Injection, lasting for 1 week: 50 KS
- Nanite Hive Implantation, lasts for a lifetime: 1000 KS

OOC Notes

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