

Ethical Principles of Molecular Robotics (ver. 1.0)

Preamble

Making much progress in creativity and ingenuity of technology, a new device or system appears continuously. But there are concerns that ethical scope of molecular robotics ranges widely. In Japan, there has been promoted research and development of molecular robotics, taking advantage of an important elemental technology concerning sense, motion, and intelligence.

It is feasible to be much more complicated configuration of molecular robotics which will be applied to informatics, engineering, chemistry, and biology in near future. This could be also applied to medicine. So, it is an issue of capital importance to establish an ethical framework with a new view of material, information, and life according to such a progress of technological development.

In this context, we formulate the following ethical principles. We also request any person who engages in molecular robotics to comply with the principles.

Ethical Principles

1. Comprehensive assessment of risk and benefit

▶ Any person who engages in molecular robotics shall make a comprehensive assessment of burdens to be caused on human and environment as well as predicted risks and benefits. Then they shall also take measures to minimize those burdens and risks.

2. Consideration for safety and environment

▶ Any person who engages in molecular robotics shall take containment and safety measures for artificially modified organisms which may affect environment. This includes ethical responsibility and consideration for future generations.

3. Paying attention to security and dual-use issues

▶ Any person who engages in molecular robotics shall investigate security measures in consideration of physical, personnel, transport, material, and information aspects. They shall also pay attention to dual-use issues.

4. Ensuring accountability and transparency

▶ Any person who engages in molecular robotics shall ensure accountability and transparency for the public good, making progress of the research and development rooted in social justice.

The above principles were translated from the Japanese version into English, July 28,2018.