Active Radiation Level Measurement on New Laboratory Instrument for Evaluating the Antibacterial Activity of Radioisotope

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1. Introduction

Radioisotopes have a specific half-life and emit radiation of an endemic energy range. Sometimes, cells are destroyed by the physical energy of the emitted radiation. These properties of radioisotopes are used in cancer treatment research. Therefore, a measurement device for evaluating the antibiotic potency of radioisotope is essential.

A disc method has been widely used to measure the antibacterial effect of chemical agents. However, it is difficult to measure the antibacterial effect of radioisotopes using a disc method. A disc method is a method for diffusing a drug by placing the drug containing disc on the medium. In this method, radioisotopes are diffused on the medium and it is difficult to measure the exact effect by radiation. Thus, new laboratory equipment needs to evaluate the antibacterial activity by the radioisotopes.

2. Methods and Results

2.1 Preparation of a New Laboratory Instrument

In the new instrument, the radioisotope filling area is placed on central position of the conventional plate. The shape of this area is a cylindrical hole. The central portion of the filling area is filled with cotton. The liquid form of radioisotope is injected into this area and evenly distributed. It is finished with a para-film through-portion of the plate's back surface, which is connected to the filling area. The preparation method of a new laboratory instrument for measuring the antibacterial activity of a radioisotope is presented in Figure 1.

2.2 Radiation Level Measurement of radioisotopes on the New Laboratory Instrument

By using a plate that was newly produced, a blocking wall between the radioisotope and the medium is formed. This wall blocks the radiation released by the radioisotopes to the bacteria in the medium. However, it may be calculated using a shielded evaluation using MCNP. By substituting the antimicrobial evaluation value calculated here, the antibacterial activity of the actual radiation dose is expected.

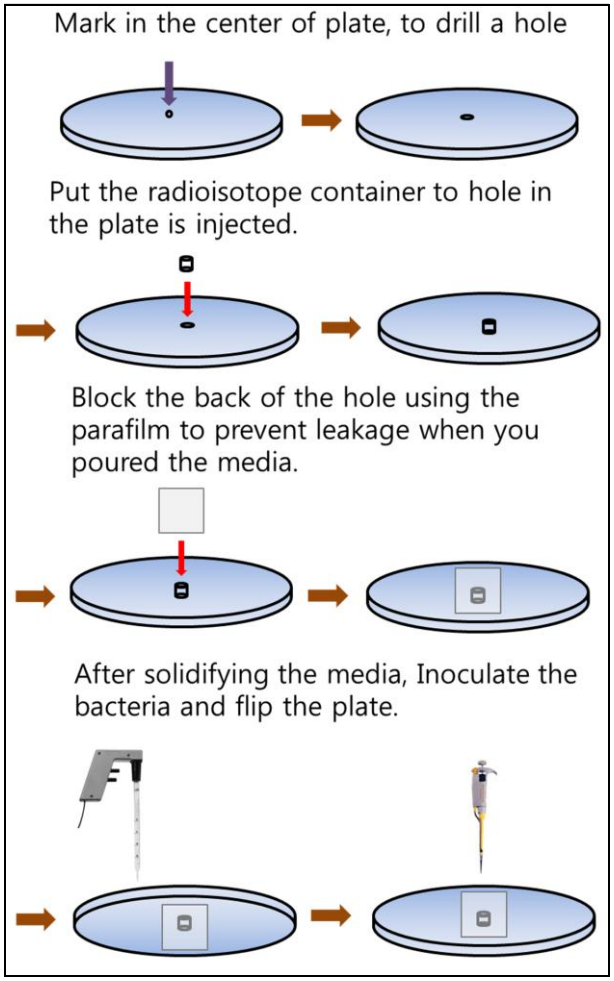

Fig. 1. Preparation method of a new laboratory instrument that measure the anti-bacterial activity of radioisotope.

3. Conclusions

In this study, we measured the radiation level of radioisotopes on a new laboratory instrument using a MCNP. A disc method has been widely used to measure the antibacterial effect of chemical agents. This method uses a drug diffusion system for the measurement of anti-bacterial antibiotics. To measure the antimicrobial activity of a radioisotope, a new type of laboratory instrument is necessary to prevent the drug from spreading. In the medium, a space isolated separately

for radioisotope injection was used to prevent the radioisotope from spreading. It is expected that, through the present study, measuring the antibacterial activity of the radioisotopes easily in the laboratory will be possible.

The radioisotopes are used to diagnose and treat cancer. However, studies for anti-biotical use have not progressed. The radiation of radioisotopes has the effect of killing bacteria. Before this study proceeds further, it is necessary to be able to measure the antimicrobial activity of the radioisotope easily in the laboratory. However, in this study, it was possible to measure the antimicrobial activity of the radioisotope in the laboratory using a new laboratory instrument. We intend to start evaluation studies of the antibacterial activity of specific radioisotopes. In addition, it will be possible to develop research to overcome diseases caused by bacteria in the future.

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