Poster

[P25-5] P25-5: Anti-infective drugs (5)

Chair: Paula Schaiquevich, Argentina

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[P25-5-1] Development of an immunoassay-based point-of-care testing (POCT) device for therapeutic drug monitoring of vancomycin

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Background

In clinical practice, therapeutic drug monitoring (TDM) is being conducted to analyze the drug concentrations in patients' blood and to allow doctors to control their dosage. TDM not only contributes to the promotion of appropriate medical treatment for patients, but to the prevention to the administration of unnecessary / ineffective medicines in the early steps. These aspects imply that TDM is beneficial medical practice for both patients and medical sides. Especially in the field of infectious diseases, the importance of TDM of vancomycin is increasing to reduce the risk of MRSA appearance. However, most medical institutions in Japan choose outsource measurement, which make it impossible to offer rapid diagnoses based on the TDM. Therefore, in the present study, we propose a device that allows TDM in real-time and point-of-care testing using a fluorescent nano-particle-conjugated immunoassay technique.

Methods

Carrier protein and vancomycin were conjugated using the closslinker to make antigen. Eight-weeks-old rats were immunized with the antigen with Freund's complete adjuvant. Lymph node cells obtained from rats were fused with mouse myeloma cells. The antibody titer of cultured supernatant against vancomycin was measured by ELISA. The positive cells were cloned and further cultured to get a few mg of purified anti-vancomycin antibody (IgG). One antibody was covalently ligated into fluorescent silica nanoparticles (Quartz Dot; Furukawa Electric Co., Ltd.) to make a labeled antibody, and another one was fixed in place on a strip (5 x 25 mm). The fluorescent emission was observed with a portable fluorescence reader. A series of diluted vancomycin (0 –20 micro g/mL) with human serum were prepared as a samples. 10 micro L of sample was mixed with the labeled antibody then placed on the edge of the strip with 90 micro L of mobile buffer. Fluorescence intensity was confirmed 15 min after the sample application.

Results and Conclusion

The detection limit was less than 1 micro g/mL, which equals or exceeds the conventional immunoassay analyzers of vancomycin, and fluorescence intensity was increased with increasing concentration of vancomycin. These data imply that the immunoassay technique presented here would be suitable for a POCT device.