AN ADJUSTABLE MICROPLATE PLATFORM

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SUMMARY: An adjustable platform has been designed to facilitate the addition of biological assay components to a multiwell microplate. Nonmanifold additions of liquid components to microplate wells are made especially easy by using this device. The microplate platform can accommodate any of the common formats of disposable microplates. Moreover, it can be adjusted to varying angles allowing the investigator to view into all the wells as assay components are being added.

Key words: adjustable platform angles; cell culture; microplate platform.

I. INTRODUCTION

Precise additions of liquid components to microplate wells are required in in vitro biological assays. These steps are made easier when the microplate can be tilted to be viewed at an acute angle to the surface that it is resting on. This perspective permits the investigator to judge which wells have received a liquid addition, usually by comparing the menisci between neighboring wells. As unsophisticated as this need is, there is no inexpensive product which is commercially available to meet it. Instead of relying upon hand-tilting of the microplate during the assay, a base, or platform, with adjustable-angle settings can greatly reduce manual errors in the addition of assay components to a multiwell microplate. The materials and processes for making this apparatus are generally available in machine shops within large research facilities.

II. MATERIALS

A. Platform components

Acrylic (Plexiglas), 0.25-in. thick, Commercial Plastics¹

Continuous hinges, 0.80-in. strips, McMaster-Carr²

5 Metal screws, 0.25-in. long.

2 Socket head cap nuts and 1 screw each with plastic thumb knobs²

Stainless steel, 316 or 400 grade, 0.090-in. thick, Tull Metals³

B. Miscellaneous equipment and solutions

Detergent solution

Ethyl alcohol 95%, no. EX-0280-3, Curtin Matheson⁴

Ethyl alcohol 70%, (diluted from 95%)

III. PROCEDURE

A. Assembly

The microplate platform is tooled in a machine shop to the dimensions diagrammed in Fig. 1. Placement of the

adjustable hinges should be on the right side of the platform, as diagrammed, so that the weight of the microplate will serve to tighten its position. The finished platform is pictured in Fig. 2. It should be noted that the right-sided placement of the hinges, as outlined in Fig. 1, is advised. Otherwise, the weight of the microplate may loosen a left-sided hinge from its position, causing the platform to collapse.

B. Use

For sterile work, the metal parts of the apparatus should be cleaned for the first time with a mild detergent to remove any oils or resins, followed by complete

FIG. 1. Front and side dimensions of microplate platform. Acrylic front plane and bottom ridge are for microplate support. Stainless steel is used for back plane and struts.

FIG. 2. Microplate platform.

sterilization with ethyl alcohol (70 or 95%). After cleaning, the platform is adjusted, with microplate in place, at an appropriate angle to reduce both glare into the wells and provide for a line of sight to judge liquid volume differences between wells.

IV. DISCUSSION

Simultaneous viewing all wells of a multiwell microplate is essential when single-pipetting liquid components into an *in vitro* biological assay. It provides the investigator with an added measure of confidence concerning the correct addition of components to individual wells of the microplate. Holding the microplate or propping it up to achieve this advantage is both laborious and undependable. Utilizing an adjustable microplate platform can improve the accuracy of additions and isolate the risk of mishaps to the investigators. This is especially important for the addition of expensive, hazardous, or radioactive materials to individual wells of a multiwell microplate. In high

capacity work the use of more than one adjustable microplate platform can facilitate single pipette additions to several microplates at a time. Although the authors have designed this device for use in their work in immunology (1 and manuscripts in preparation), it is useful to any application requiring the addition of liquid components to individual wells in a multiwell microplate for an *in vitro* biological assay or tissue culture procedure.

For sterilization, the apparatus should not be autoclaved or exposed to UV-irradiation. Autoclave temperatures are too high for the acrylic components. Repeated UV-irradiation may change the acrylic surface from clear to opaque. A clear acrylic platform beneath the microplate is the best condition for observing the meniscus of a liquid within a well.

V. REFERENCES

1. Faircloth, G. T.; Stewart, D.; Clement, J. J. A simple screening procedure for the quantitative measurement of cytotoxicity to resting primary lymphocyte cultures. *J. Tissue Cult. Methods*; 11(4):201-206; 1989.

¹ Commercial Plastics, Orlando, FL

² McMaster-Carr Hardware Co., Chicago, IL

³ J. M. Tull Metals, Miami, FL

⁴ Curtin Matheson Scientific, Houston, TX