FMRI REHSS 2016-Fibrin Gel

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Abstract

The depth of wound healing and blood clotting is the basis of fibrinogen and thrombin. Using a plasma etch and a dip coder a thin fibrin gel layer was created to observe with cells. The cultured cells on the fibrin gel layer were dyed with fluorescent markers. This described that the fibrin gels or blood coagulation results in a barrier that protects the skin and allows for blood cells to grow and continue to flourish.

Background

In all forms of blood coagulation, the effectiveness of proteins such as fibrinogen is vital for the survival of an organism. The combination of fibrinogen and the enzyme catalyst, thrombin, help form the blood clot within the initial minutes of a cut or any laceration. The blood coagulation benefits the organism as it provides a barrier for the bleeding and ensures that blood does not continue to flow and it protects from bacteria and other foreign objects that could enter the body through the laceration.

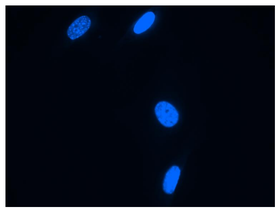
Objectives

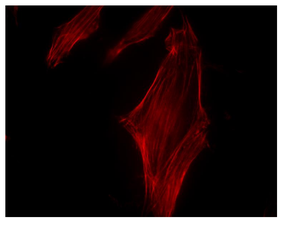
- Create a Fibrin Gel layer that simulates a similar makeup as the human blood clot
- Develop the Fibrin Gel layer as thin as possible
- Culture cells on the thin Fibrin Gel layer and observe reaction and effects.

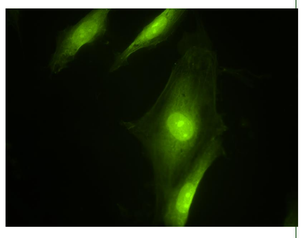
Approach

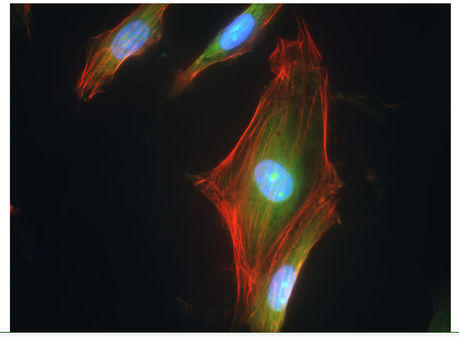
Using the procedures of Sigma Aldrich to develop a Fibrin Gel, a solution of DMEM, $CaCl_2$, Thrombin and Fibrinogen. 1 mL of the solution was placed in mini well containers and placed in the incubator for 30 min. The Fibrin Gel layers were observed under microscope and then repeated the previous steps but used 0.5 ml of the solution in each of the mini wells and observed after incubation. Once again the gel formed was too thick to observe clearly and therefore, a plasma etch machine was used to clean the cover slips which helped create a hydrophilic coating on the surface of the cover slip. Only 20 µl of the solution could be used to cover the surface of the cover slip.

Another method also applied used a dip coder which allowed for the cover slip to be dipped in 2 solutions and allowed to dry and form a gel. However, this gel is not visible to the eye then both gels were cultured with cells and fluorescent dyes were added.









Conclusions

The results cannot be proven based on values or statistics but rather based on some type of substantial and subjective observance of the effects of cell on the gel. Due to the fluorescent stains and dyes it was available for the cells to be observed in comparison to the gel and can be found to have a mutual and benefitting relationship. The dip coded coverslips tended to have a better interaction with the cells due to the thinner gel that allowed for a greater surface area contact.

Referenced Resources

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