

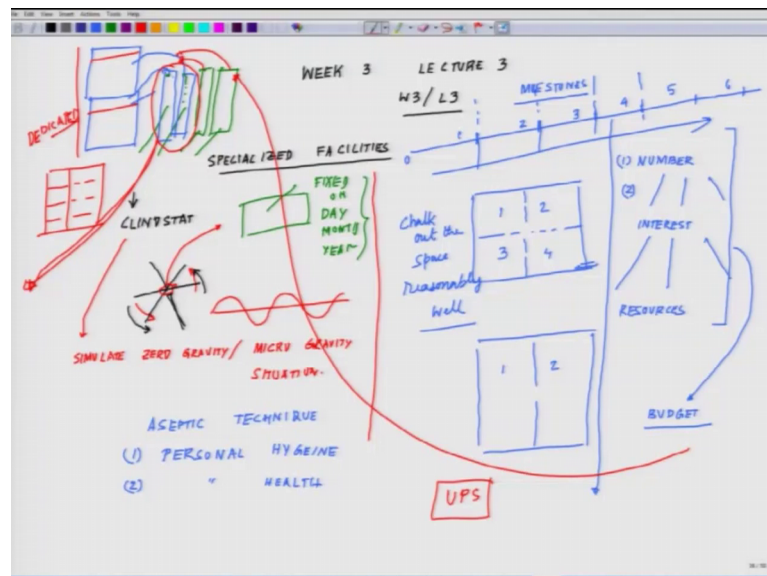
Cell Culture Technologies
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Lecture - 13
Specialized facility in cell culture Lab

So, welcome back to the lecture series in annual cell culture. So, in the last class we kind of walked through or virtual lab, which I wish most of you develop something. So, what are the points which has to be kind of kept in mind in the whole layout and the budget constraints what you face.

So, now, I will devote a little time on some of the aspects or some of the facilities which are kind of advance level facilities, which most of the time are not being talked in a cell culture lab, but some of you may needed to think in that way too. So, we have already put the layout now if I have to be an addend up of certain things, why I told you leave a lot of space.

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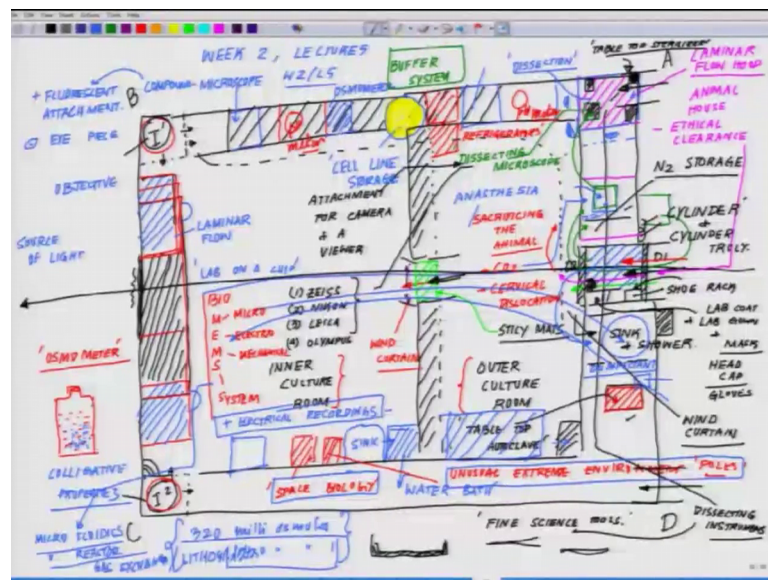
So, that is precisely is the point. So, today while we are moving on to our week 3 lecture 3; we will talk about those w 3 L3. We will talk about those a specialize situation specialized facilities within a cell culture lab if you wanted to develop. So, one of the thing which you may need suppose you needed if you are working on a space biology, and you needed a cell culture facility. So, you have a cell culture facility. So, you have to

curve out and each of certain spots to have certain specific experiment and one of the critical experiment what is being done in space biology is where you wanted to simulate the growth of cells in an in vitro culture.

Using zero gravity simulator, which the most simplest of all is called a Clinostat. So, this is a very interesting thing which kind of you know it is a setup which rotates like this at a particular RTM, and you have your sample kind of kept somewhere out here. So, the cells experience change in the gravity like this. So, the gravity value changes these kind of devices Panasonic in Japan they do make it, and if you have call in engineer surround you they can develop it for in their designs which you are available all night to make this kind of devices, and their whole idea is to simulate zero gravity or zero gravity is tough really to simulate it is basically a micro gravity situation how the cells grows in that kind of situation.

So, you have cell growing dish out here from where they are wont be anything will spill over. So, the inside it seal properly with of course, proper gaseous exchange and it is moving in this clinostat. So, if you have to a facility like that within your system.

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So, have to go back and see where you really can you know accommodated. So, you have to have these spots which are left somewhere out here say for example. So, that is why I told you that leave space you do not know where you may be needing things or say for example, you may needed to say for example, you have a space biology setup out

here. This is one specialize setup your adding in to it or say for example, you wanted to create certain situation of unusual extreme environment situation.

Something like you want to simulate conditions of poles soft North Pole South Pole. So, you needed incubators of that kind where you can simulate those conditions. So, you needed to keep them at separate spots. So, you never know when you are planning a lab you really do not know where you are going to land up with, but you have to have a provision that you know if I land up with it I will be working on it. Then there are several labs across the world who are currently working in the area of integrating cell on microstructures, which you must have heard something called Biomems M stands for micro, E stands for electro, the second M is mechanical, S stand for system. Biological micro electromechanical systems these are essentially microstructures. So, and we will be coming later about it the there is another buzzword in the market which is called lab on a chip.

Which is nothing, but a small set up where you are growing the cells which is self contained. So, you have supply of medium and everything within it, we will come later at this point just listen to me and think over it, but will come systematically on this topic. Now for these kind of work you may needed to curve out a space either you do it somewhere out here in the outer room where. So, we have the autoclave here, but then you have a space out there. You can use this and not only that there are these kind of setup added up with electrical recording setups. So, many of the labs who work on these kind of electrical recording systems yeah microelectrode arrays field effect transistors you work on. So, you needed to have those kind of assemblies already in built into it.

Or say for example, fourth year of fifth year down the line or in next any you want to develop, and you have to have the provision already there how you want to develop it. You cannot make this call at the last minute, that now I want this that wants to want. So, you have to because the reason why I am adding up to this we will always thing will have another room where you are going to do, it whether the thing is that you are biological samples are there. So, you might as well thing little louder I head of your time and have the things then and there, so that you minimize any kind of contamination because see your major major major problem will be contamination in any of these culture.

Following the aseptic techniques you must have seen all throughout and repeatedly kind of you know hinting upon it not really telling that you know this is you should do this is you should do. But I am kind of making you feel as we are developing this virtual lab how it will look like, that have the sticky mats have the wind or the currents have the room continuously you know circulating it, how you are going to work on the laminar flow hood, where you should look put the laminar flow hood where you can I minimize the you know outside current flow, where you can have you know slide in doors.

So, these are a small bits and pieces of informations which will help you to follow the aseptic techniques. So, if you have plans to explore in the area of micro electromechanical systems and all those kind of things, you might as well start thinking in the beginning instead of thinking after you make up the lab or you have a colleagues with part of team, who was to work on electrodes and integrating cells on electrodes. So, we have to provide that small knish within this assembly where that xyz individual can come and do certain things. So, think in advance all there are people who work on kind of a interaction of toxins with the cells.

So, they may need a very separate hood where they can play out with there you know toxic material and see they are effect on the cells. So, we have to be careful because this individual is working on something else and you have to may prefer to have a separate incubator for those kind of cultures because you do not know because you are testing something very toxic it may makes up with something right. So, those are most of people who are can some kind of industrial related problem or you know some kind of other toxic material derived from insect fungus or something. So, you have to think several times and another thing try to avoid or close proximity of a microbial wave facility along with the mammalian cell culture, try to avoid it. You may have a situation you have no other go there will be close by, but try to avoid it as much as you can that led they we are distance or if you have no other go that you are a microbial facility adjacent to your cell culture.

You have to ensure that all the aseptic techniques are being followed and you have to be ultra careful at every level that microbial contamination should not contaminate your mammalian cell culture facility or animal cell culture facility or you know whatever cell cultured you are following. Keep that in mind these things no one will tell you, but then if you are no other go and you have to really have a lab cell culture facility adjacent to a

microbial facility, then your only option is that you just implement strict code of conduct, so that contaminants from one side does not spill over into the other one. So, this is another thing which you have to be very careful. So, you see as of now you have discussed about some of the specific areas this area may go a long way. So, I have only talk to you about say suppose you have a facility of working on space systems, space biology or you have your creating a system of extreme environment.

So, we have to have separate incubators or your working on something like you know micro electro mechanical systems and electrical recordings. So, you may love to have all these facilities in an around you and these are the kind of things where these are helpful for will be coming later into this about micro fluidic set up there are people who are working on micro fluidics there are people who works on reacted designs or micro reactors there are working were use working on gas exchange assemblies there a people who are some lithography.

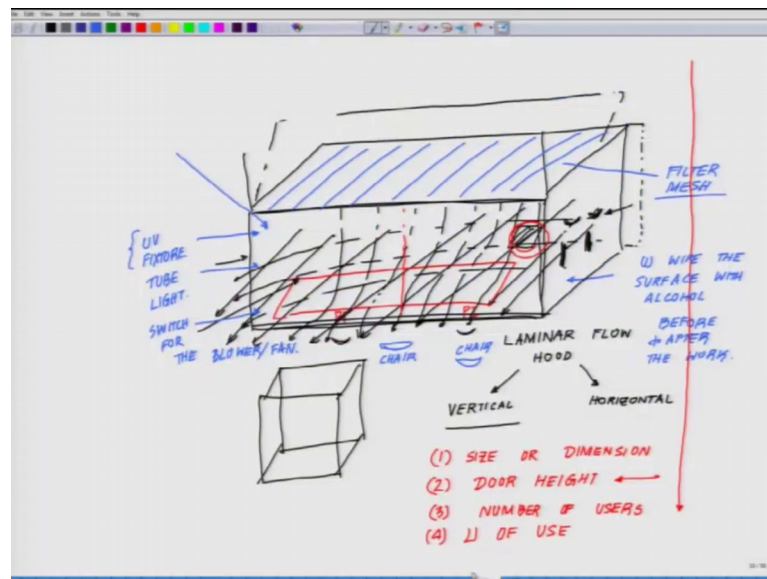
So, these all fall under the basic purview of micro or bio MEMS. So, keep all these in mind when you are setting of the facility, how you are going to do it shall we split. So, there are you have multiple ways suppose I get a facility like this, I split up into four different chambers for different purpose. So, from one coronary you are entering and then you rearrange it. So, I was facility for xyz likewise. So, they have multiple ways or the one which we kind of in virtual system develop like you known two part, part 1 part 2 you may have part one, part two, part three, part four.

It all depends very. So, these kind of drawings you have to do in your basic manual to visualize what you are asking for whatever you are going to asking for your going to get that, but unless you do your homework right you will land up in trouble and what are the points what you have to keep in mind, what is your again rehashing it is, what is the number of user this is very important. Second what are their different areas of interest? So, that will decide what all resources will be needing right and all these things or a function of the kind of budget you are looking forward and most importantly is what are the milestones, in terms of milestone I meant like suppose today I am starting one year, two year; one, two, three, four, five, six, likewise.

So, within this year we will achieve this with our next set up funds will do this, next set up fund do this. So, that demands that you chalk out the space reasonably well. So, do

not unnecessarily cover of the space with bulky stuff which you know you have to remove. I have seen people you know I am covering this space it should look all field, which is foolish mentality do not do that think over it that. If I have a plan for next 10 years down the line or I have a plan for next 20 years down the line, why I should unnecessarily cover of a spaces let it be there let it remain slightly empty no problem another thing what I did not mention here.

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While you are planning this setup on the walls of these sides you will have storage of materials.

But now if you want to do it on the walls and you have to keep in mind then you have to have a dedicated ladder for your lab, which is purely dedicated your keep the ladder somewhere or a now nowadays we have the all this kind of you know foldable ladders something you have to foldable lad because we have to fold down a stuff from the racks on the sites.

So, keep these small tips in mind to be very helpful once you make the lab. Now comes what kind of lighting your looking forward to. It is a good idea to have a facility with really really bright good quality lighting and everyday ensure the whoseever is coming in and out. First of all they should be very careful about their point one on the aseptic techniques I will tell you about their personal hygiene this is must the must your personal hygiene, there is no compromise on it if you are not well it is absolutely absolutely

advisable that do not come to lab second. So, personal hygiene personal health, next it is absolutely make it a mandatory point to have the hair caps. So, that there is hair fall or something it is not going to you know contaminate the system, have the mask even if I have a mild cougher anything it is not going to contaminate system.

Have your lab codes clean on regular basis, ensure you wash your hands all the way up here before you kind of you know wiper with the alcohol slightly alcohol just wipe it and before you put on the glass as long as you are following some of these very very basic fundamental rules, and when you are inside the lab be dedicated for that period of time do not get you know I am going there is I am talking I am doing like do not do those effect, because when we have to dark we have to remove your mask. So, I have nothing any as I have talking you just remove your mask and you spread several things all over the place. So, and specially this holds true when you are on the laminar flow hood; when you are working on the laminar flow hood. So, on the laminar flow hood front the very first criteria is wipe the surface and the side, and the back after you finish the work with alcohol.

Before you start the work do another wipe, and once you finish the work overnight keep the u v on at least for 2 to 3 hours before you start the work or you can even leave the fan on there is no and, but if you keep the fan on then you have to keep the front opening also open. So, that the air continuously flows out and every week or we can scheduled your lab in such a way that this laminar flow hood is being inspect it and cleaned then comes your incubator. While your opening the incubator we very very ultra careful about your aseptic techniques in terms of the incubator.

Incubator is your life line in a lab because that is where all your cells are. So, you should have already planned a designated trace or shelf for individuals. Do not fight over it let there be designated things and before you put your samples and everything just with the mile alcohol white the stuff keep it there and ensure that rack is being bite out at least on if not regular basis at least once in a week. Second thing please please please ensure that the there is always a tray underneath the incubator, that water is being changed and there are certain antimicrobial detergents which are present you please add in that ensure that very very essential, and suppose you are placing your stuff inside the incubator.

First of all minimize the opening and closing of the incubator you are plan it, and suppose there is spillover. Immediately wipe it out pull out the tray wipe it out inside the laminar flow hood and then put it back, do not neglect. Another important thing what I have observed over the years is people forget to keep track of if it is a CO₂ incubator of the amount of CO₂ in the incubator. So, some people I know once I did it there was sensor you will say if the CO₂ level goes down below a point of course, the incubator has sensor. So, we had additional sensors what we added.

So, have say for example, you have one incubator here right and of course, so, that one incubator you have oscillator or adjacent to it. So, we have another in incubator stat on top of it you have said to cylinders hopped up here like this all recommend you have two more stand by behind them. For the rainy days because dear friends will forget that these are about to end and then you are hovering running around, what to do, what to do, what to do, not allow that to happen. So, have this backups ready, the day you fix this cylinders maintain a log buffer and on top of that put a stick sticker, telling that fixed on say you know day month year.

So, we have a fairly good idea that whether it will last a month or two months or whatever. So, you make it a scheduling, it is a very scheduling problem which most of the people forget you have to do a lot of a scheduling with your colleagues that you next change. So, as soon as these two are over will have to immediately send them for refill and in anytime this will come and from you remember on the outside you might told you that outer room you will have the backups ready, those backups from that room we will come and replace these two green walls and these two green one we will take the place of the blue ones, and these two blue ones we will go for refilling.

So, you have to have log register keeping track of it and you have dedicated members of the lab, we will ensure that your lab never runs out of it. This is how much so you are (Refer Time: 25:20) sound trust me, I have seen people I had seen labs (Refer Time: 25:23) in a crisis that nobody above that and one find weekend everything went for a toss. Second thing which is very important is you may of for uninterrupted power supply somewhere in do this set up. This UPS facility is very important because of the obvious reason because your running all this kind of incubators out there, and these incubators if the light goes off they will go off and that something you would cannot afford.

So, we have to have them on dedicated facility or dedicated line, and same way you want the refrigerator to be on the dedicated track. These are something which you have to take precautions well in advance laminar flow it you can avoid fine there is no light or no power we can get around, but in India this is not on the India, I mean across the world this is a problem there may be certain power serge or certain you know power drop how get around it. So, these are some of the points what you have to be really really cautious in terms of safety protocols, in terms of aseptic techniques, in terms of backup plans and everything.

So, I will close in here and we will continue this discussion on other different aspects of it, but please be careful and do your designing right.

Thank you.