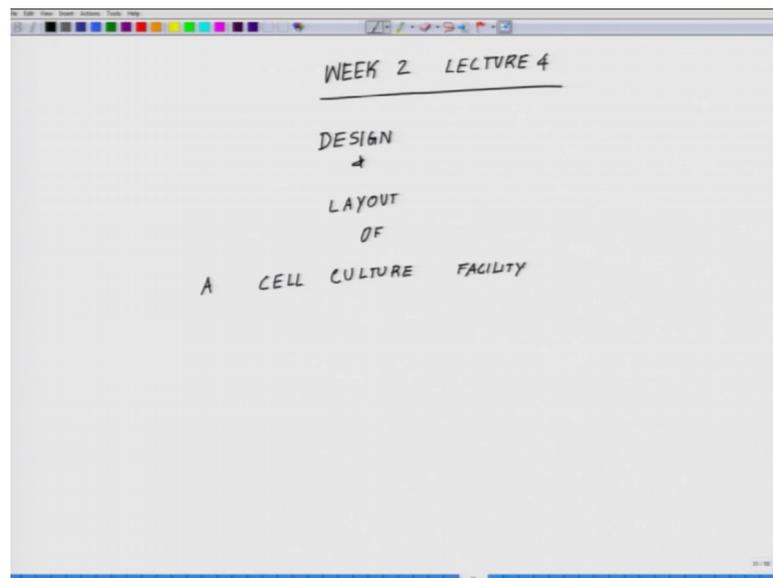


Cell Culture Technologies
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Lecture – 09
Precutions during Designing the Lab Layout – II

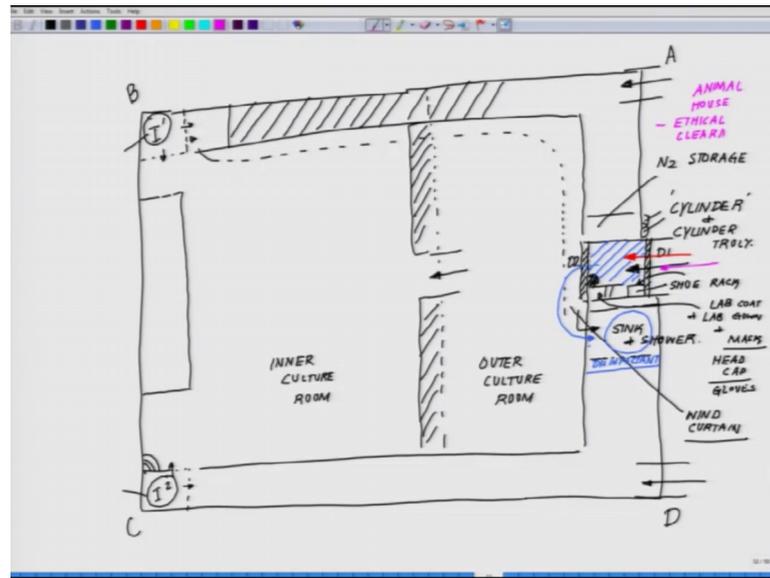
Welcome back to the lecture series in Cell Cultural Technologies. So, today we are into the 4 th lecture of the second. Week last lecture if you recollect we talked about or started talking about the design or the layout of the cell cultural facility. And there are certain points which you have to kept keep in mind. So, today what we will do? We will just first of all let us put back layout in front of us and keep on adding the components which will be needing is, we are into Week 2 lecture 4.

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Design and layout of cell culture facility, and in the last class I told you let us assume that you know, this is our working area, something like this.

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Suppose this is the entry the entry can change it could be in the corner. So, or if you can make entry in the corner say for example, you have such option. You can make in the corner or somewhere out here on this side in this side.

Then you have few advantages then your wing flow or the current air current will remain contain in one site, but nevertheless that is not in your choice you will get a room and you have to really set of the facility. Or couple of rooms what isoever you are not really doing the imaginary work to in a construct room. So, what you talked about is that either in So, let us A B C D the 4 corners of a room. And we talked about either this corner where you have either I 1 or this corner I 2 ok.

Where you will be placing the incubators possibly. And you will have a countertop something like this, that way you will have sufficient surface area, something like this and adjacent to it you have to keep a gas cylinders. You have location for the gas cylinders and; obviously, if you are keeping the incubator like this. So, I will have a little bit more of working bench like here. So, the door will possibly either will open in this direction of this incubator or in this direction depending on, So you have to ensure that how much area of this side tables you are going to make. And if you are doing it in India. So, ensure that the height of this countertops what you are developing should match with the average Indian height which is around you know, something between around 80

centimeter or something I mean that is where you have to. So, you just looked through it because sometimes we make those item pretty tall and it has it is own set of issues ok.

So, now I have already talked to you like these are the places for the incubator, and we talked about that just outside the door or somewhere out here you will have the place for the extra cylinders which should be you know tied up or kept in proper friends. So, that it does not fall down, and you needed to have a cylinder and cylinder trolley to carry the cylinders inside and outside. And preferred to follow something like this. If you take the cylinder you have to take the cylinder to this is what follow one track. Do not kind of mesh up the center of the lab the whole surface area what you are having. Then I told you that you will be having a nitrogen deware, we should have 2 nitrogen dewars one 2 you know store the cell lines. The other one as to bring the liquid nitrogen, because he cannot carry this parent stuff every time.

So, you have to have a space because every day you have to replenish nitrogen. So, you have to figure out where you want to put the nitrogen storage. Next important thing is that you have to have a sink along with a shower. This is a call we have to make. So, you probably want you have a sink somewhere out here. Before you enter to the mainframe which is you wanted to have a sink and a shower. Now here are the entry port you could have 2 sets of doors one here one here.

The reason for 2 sets of doors why I am telling you is, this is say door one this is the door two. So, you come here will leave your say you have to have a shoe rack here, where will be living your shoes. And you have to put on the lab coat or the lab gown what isoever your following. So, you have to have a hanger and everything for the lab coat or the lab gowns then you have to have the place for the mask. And specially those people who have hair falls irrespective of the gender should put the cap. So, instead have a head cap. And it is kind of a good practice irrespective of the fact that whether you are having hair fall or not, to put a head cap and then here to put on the gloves and everything. And you should have a trash air because most of the time these will be disposable stuff, your gloves and all this things. So, you should have a trash which we should be clean everyday.

Whereas if you are entering here. So, you kind of dressed up and you are entering through the main door you prefer to have something called a wind curtain. Which will be

a wind curtain which will be you know there will be moving like this, from vertically down. These wind curtains are very effective tool to ensure that no unnecessary material kind of passes through it to contaminate the system. Now some people what they do they do something very interesting they kind of you know split the lab into 2 parts like with the mainframe like this at 2 level.

So, this is the level say for example, you wanted to have. So, they can you can make it a glass or something, or you can use even these walls for your storage or other purpose or you can keep a microscope on this tables suppose you are splitting the whole facility into 2 parts. Say for example, this is the outer culture room and say in our culture room. I will tell you why such demarcation may be very essential in our culture room. Now see for example So, you have to sink an shower I have already mention.

So, say for example, like you are entering through this door you get all dressed up. So, this is in lu I am showing the dressing area you get all dressed up. Then the next thing you enter inside the lab. So, there are here I just made a small mistake. Do not put on the gloves as your entering first of all keeps the gloves in the lab coat. Come to the sink you wash your hands and you should have a place for disinfectant here. And once you are done and your wipe your hand you put on the gloves here.

So, he carry the gloves from here and he put on the gloves here. Now you are all set, do you know enter the facility. And please ensure personal hygiene eye the more eye like you know. This is something which you should religiously follow, if you are not well if your coughing it is better or rather strongly advise that do not get into the facility. If you have infections do not get another facility. Because you may spoil the work of your colleagues, apart from it the personal hygiene is very important. Just ensure that you know, you have taken necessary care about yourself, because we are the major source or the workers are the major source of contamination into the system ok.

So, this is where you have the disinfect and everything see for example, your lab has a primary culture needed. So, where you have to dissect animals; obviously, dissecting animals essentially means that there will be significant amount of surgery anesthesia surgery involved. So, which is at time can be source of contamination or many a time it is a source of contamination.

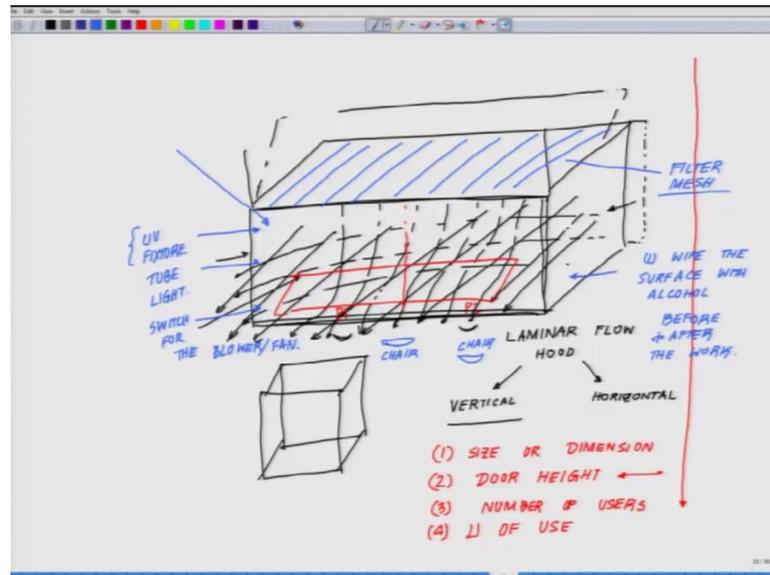
So, in order to do that you would prefer to have the facility kind of a spilt up in such a way that you minimize your contamination issues or you maintain your cleanliness in a better way. So, let us take an examples say for example, your lab works on deriving tissues brain tissues or cardiac muscle or you know skeletal muscle or liver tissue or some other tissue from the rat or a mice. So, the best idea is that say for example, So, the all these rats and mice everything comes in different kind of kgs and everything. So, first of all they arrive from the animal house. So, you have to have a designated animal house and having said this let me mention here you needed for any kind of animal studies you need ethical clearance.

So, ethical clearance essentially means your institute should have a body which essentially have to have a veterinarian, who is certified to tell you that what are the ethical practice of sacrificing animal, what are the basic rules and norms and regulation. And which is further stamped an endorsed by specific government dignitaries or government individuals who have been appointed by the local authorities or by your institute or something. So, there is a whole protocol about animal ethics. So, that ethical clearance is very essential. So, which wherever and which So, where institute you are look for the committee which takes care of the ethical clearance. So, you have done all those things I assume for a minute and you bring your animal to your facility.

So, for example So; obviously, now animal would not go through all the lab coat or everything you are just bringing at a straight. So, this is the catch phrase. So, you are you are getting the animal you have to dissected. So, an knowing this facts So, you have decided that the lab is divided in 2 parts. So, what you can have is you enter here or leave the So, you can have a out here possibly or in this corner maybe a better idea. Somewhere in this corner, where I am shading now you could have a laminar flow hood or small laminar flow hood.

So, what is laminar flow hood? Laminar flow hood is essentially rectangular or circular structure which where the airs. So, something like this.

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That mean draw it and that will make more sense. So, say for example, I am drawing a box here it has its own dimensions I am not getting with that and many a times you. So, this is the box and this is the. So, most all the sides are off, glass or mostly you know synthetic plastic transparent plastics. So, there are 2 ways either you will see an extension on the back of it, or either it could be horizontal or it could be a vertical.

So, on the top of it you will see a kind of an enclosure structure. So, the way it works is that there is an air current which comes down like this is force of the air current. So, it ensures that whatever you are doing you are not contaminating the system or the air current may flow like this. Either criss cross or upside down. So, automatically to make the air flow you will have those fans either rotating from the top or rotating from the side in there several combination permutation combination in do it. So, you could have either vertical laminar flow or horizontal laminar flow hood. And all the work flow hood it could be either vertical or horizontal.

So, the vertical once have an additional attachment at the top, where is the horizontal once have on the sides or on the back mostly on the back. So, now, the way something like this horizontal once are working like this the air is coming from the back which was trying to show you like this. Whereas, from the top it is coming like this. So, say for example, this is a hood in front of me either the air will be coming out from the top like this or the air will be coming out like this pretty much hitting me.

So, that way what will happen whatever work you are doing any kind of (Refer Time: 17:38) or anything will be you know pulled out. And these rooms are pressurizing such a way things are being you know pulled out from them these are almost like a clean room. So, the whole concept is like a clean room. So, if it is a vertical one where the air is coming from the top to bottom and the problem is they are slightly taller and you have to ensure that this vertical one gets inside the facility without any hassel. Because that time So, happen I (Refer Time: 18:11) the year through experience I have seen. That the vertical a laminar flow hood get stuck up at the door and you may needed dismantle certain stuff and bring it in.

So, please ensure whatever size of a laminar flow hood you are getting, where this a vertical or horizontal it should match into the space. So, the smallest of all these you can even get them fabricated by your local fabricator, which I have done on several occasions. So, they will be around you know 2 feet 2 feet means. So, 2 feet like this your working area single individual 2 to 2 and half feet the. So, it will be it will be a cube of 2 to 2 and half feet a cubical structure something like this. Like this 2 to 2 and half feet cube which are the smallest one where one individual can work without disturbing anybody, but there is no option for a second person to sit in this.

What if you are clever you could have 2 of them side by side. That way 2 people can work absolutely individually without disturbing each other. This is what I am talking about when you are multiple user or some people have done I have done this earlier you have a one horizontal one, which is something like this. Where 2 people can work by the 2 people in that case say for example, this is p 1 this is p 2 people can set by the only problem is that. So, there is no barrier between the 2, it is on the common table you are working ok.

So, I will leave it up to your choice how and what kind of laminar flow hood you want. But in nutshell laminar flow hood could be classified into 2 categories the take home message is very clear, one is the vertical where they air is moving from the top to bottom and the air flow it is like a exactly like an air curtain. So, air is flowing like this and out like this and out you are sitting outside right. Or the second thing is that air is flowing from the front from the back side what you are looking at the front from the back side air is flowing towards you like this you know.

So, there are modifications there is something like a semi hybrid and all those kind of things, but do not get in the complexity just keep in mind you have 2 kinds of laminar flow hood a vertical laminar flow hood and a horizontal laminar flow hood. And having said this you realize that you will be needing this laminar flow hoods and just be careful about 2 3 parameters. The size you are looking forward to size or dimension one may sound a trivia point, but it is directly related to your door height it may how much So, ever trivia it may sounds, you have to get this laminar flow would inside the room. So, you have to ensure that they can do it just do not rely because the manufacture will take care of it.

Of course the manufactural take care of it, but they are repairing issue it may have to be taken out and what isoever there are. So, many problems which comes through it third is number of users and frequency of use, how many working hours on a laminar flow hood? So, laminar flow hood will be equipped with 2 3 things or So. By the way the front it has a kind of you know just like windows you have seen you can raise the window like this or you can lift the window like this they have several such options you can lift the window it is a glass a. So, this will have a UV fixture they will have tube light these are the major fixtures and they have a switch for the blowers or the fans. So, try to by models which are very simple and which are kind of if you can get them made locally where very fortunate. And inside if you open this part you will see the filter mesh.

You will have the filter mesh which whose job is thinner trap the impurities or contaminants or the dust and what isoever. So, generally before you start working on laminar flow hood it is good idea to switch on the a UV before that and leave it on for half an hour or So. Much earlier than that what generally we do is you step one you wipe the surface with alcohol before and after the work. So, it means before you start the work you wipe it with alcohol properly thoroughly 70 percent to 100 percent alcohol. After that the way I use to do I will share my experience, but I will leave it up to you I use to switch on the UV and leave it on for you know 10 to 15 minutes.

Followed by that I get in first thing you should do ensure that if you are using when the UV is on put on the goggles otherwise it damages your eyes. So, do not damage your eyes please. Switch of the UV switch on the fan or the blowers switch on the light and generally you are provided here with the chair or a sitting arrangement where you can sit and do the work.

Now, depending on the work you will be performing there are people who keep different kind of a stuff inside the laminar flow hood. So, you have to decide it is advisable that put minimum stuff inside the laminar flow hood, but again this is up to you and your team to decide what all things you wanted to place. But say for example, this laminar flow hood where we started has to be kept for dissection, if this laminar flow hood for the dissection. So, coming back out in facility. So, we decided that we wanted to put a laminar flow hood somewhere in this corner for dissection ok.

Now, if you want to use it for dissection there are certain prerequisite, what you have to take into account? So, what I will do? I will close in here the today's class and the next class from this design this is how far we have reach will resume from here what are the features what you needed them in that dissection dissecting laminar flow hood flow or the laminar flow hood which will be used for dissection, what all things you needed to be provided in an around that facility

Thank you, and thanks for listen to this lecture.