Electronic Systems for Cancer Diagnosis
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Lecture – 54
Demonstration of Cleanroom Equipments
Incubator Shaker

So, we have studied about cell and tissue culture techniques. We know that this samples which are been extracted are cultured in Petri dish or in any other dish with solution like PBS which is the culturing media.

So, how do you provide the environment that is required, the optimal conditions required for proper growth of these cultured cells and tissues?

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Here we have the incubator. The incubator provides the right temperature, humidity, CO 2 levels which are required for optimal culturing of cells and tissues. So, let us see: what are the different options that the incubator provides us.

(Refer Slide Time: 01:30)

Now, this is the degree Celsius. Yeah. So, this is the degree Celsius for temperature setting, this button helps us to set the optimal temperature and it says that 37 degree Celsius is the optimal temperature for the culture growth. So, it is set at 37 degree Celsius. So, it takes time to ramp up, this is the current temperature and once we set it to 37 it takes time to ramp up the temperature and then what is the amount of CO 2?

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In order to provide CO 2 that is this white if you can see there is a tube which goes through the cylinder, this cylinder is at one corner of the lab and that is the CO 2 cylinder

there is a wall to open and then you have these gauge which is on top of it to see the pressure.

(Refer Slide Time: 02:19)

So, there some amount of CO 2 which is flowing through the cylinder and it is given to the incubator and the percentage of CO 2 for optimal growth is 5 percent. So, it is set at 5 percent and these are the options the top and bottom option to play with the; to play with the settings so you could adjust the settings with the help of these knobs. And, then you have the 90 degree Celsius, the humidity this again talks about the humidity where a optimal humidity for the incubator to work is 95 percent.

(Refer Slide Time: 03:17)

Now, that we have seen all these features and the purpose of an incubator. Let us see how it looks like. So, this is the incubator and here is the glass door. So, we turn this knob, as you open this you can see their multiple slots. So, each of this rack you could keep the cell or tissue culture Petri dish inside these and in order to maintain humidity it is important that there is some amount of water the di water has to be placed at the bottom we prefer to put di water, so that there is no contamination. So, all of this is how the incubator can be used and it becomes an essential part when you are doing the cell and tissue culture again.

So, we have seen how an incubator is required to provide the necessary temperature the CO 2 levels humidity. All of these controlled environments can be provided using the incubator for proper cell and tissue culture growth. So, these are the multiple options the panel here with the display which is the degree Celsius, which is the temperature and the percentage CO 2 levels. And, then the top and bottom arrow for settings and then you have this calibration to can calibrate the device and then auto here option is to cleanse the entire incubator. So, you do that once every time you after utilising it over a period of time you have to cleanse the entire to prevent any kind of contamination inside this device.

So, now that we have see in the different features, the optimal temperature condition for a proper cell culture growth is 37 degree Celsius, humidity has to maintain has to be maintained to around 95 percent and CO 2 is at 5 percent. So, where is CO 2 coming from? We have a cylinder at the corner in the lab in the facility here, so the it have a

valve you open the valve check for the pressure knobs and then there is this CO 2 which is supplied to the incubator. Let us see so this is how it is. So, this is the so like you can see there are different shelves and to accommodate different to accommodate n number of Petri dish.

(Refer Slide Time: 06:45)

So, let us open the glass door and each of these can be have an individual rack facility and at the bottom always ensure that there is some water, we maintain some water to certain extent in this bottom level you know for the humidity control the entire device you need to maintain some amount of humidity and hence you have the bottom rack filled with water let me close this.

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So, now that you seen how an incubator becomes an important part in laboratory for cell and tissue culture growth. Let me show you another device which is a new device in the laboratory we have not fix it yet, but this is the shaker incubator.

As we have seen how the incubator becomes an important component in order to provide a proper culture environment for your cell and tissue the bacterial culture yeast or any other bio material which you want to study in just to provide optimal conditions for growth, let us see how the shaking incubator provides addition features like, it would provide agitation to the entire culture. The shaking why a shacking even required when you shake it is more like steering action so when the shake happens, a it incorporates you know uniform distribute a uniform distribution of nutrients throughout the culture medium also incorporates enough oxygen which would be required for the culture growth.

Let us see how to operate this shaker incubator initially let me power it on, this is the entire setup and the there vast types, the variations across features and this what we have in the laboratory here is a table top like you can see it is mounted on a table, small incubator and inside what is there is an experiment which is being conducted a cell bacterial culture growth is happening inside and say and here let us see what are the options that are available.

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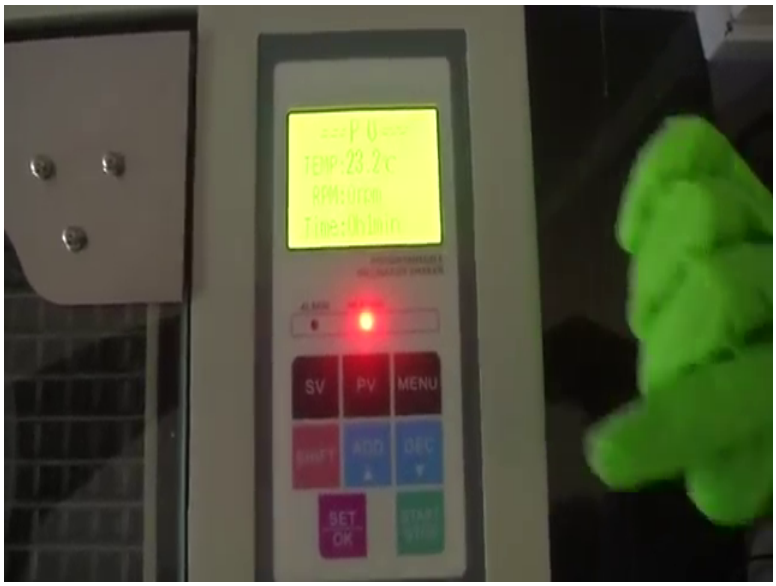

Here if you could see there are like I mentioned here, there is a display say the options which are available are temperature, let us say I start, as you can see there is temperature, there is RPM and time, you could set each of this. For optimal growth you like I mentioned earlier, there is 37 degree Celsius temperature which has to be maintained and then the RPM which is which you could set it for the desired rate and then the time for which the incubation has to happen. So, all of these features could be set using the options which are provided here.

(Refer Slide Time: 10:07)

Now, let us see how each of this can be controlled and while you can see inside, I have stop the incubator and open the lid make sure you take precautions not to run and then use them. So, these are a few devices which we are working on for culture media.

(Refer Slide Time: 10:28)

Let me remove this and let me show you the inter feature.

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So, this is the casing where it would actually vibrate and the entire set up like you can see there are lot of springs on which you could place your medium. Now, let us say I have assume I have a 50 ml tube in which I have a bacterial culture and then I put it here

and then another medium through this and you need to give sufficient like I mentioned earlier you need to give them sufficient, incorporate sufficient amount of oxygen give a proper if in case their nutrients it should be there should be a uniform mixture and then what happens is let us say I start, if you can see how it rotates this is a there is a sort of agitation which it would provide for the set RPM and the temperature would be maintained inside for the set temperature. For cell and tissue culture the optimal temperature 37 degree Celsius and then the required RPM can be set for the desired time.

(Refer Slide Time: 11:17)

This ensures uniform mixture; the entire nutrients would be sufficiently distributed to the entire sample or the culture growth the amount of quantity that you had taken to study. So, this is the advantage what the shaker incubator can provide rather than the conventional incubator what we have already seen. Also when you want to have an incubator, look for features where you could look for programmability like increasing the temperature or setting the RPM.

So, all these features should be available you have a control over adjusting the RPM temperature and then the amount the kind of interior here it is the stainless steel interior. So, it is free from rust and other things and gives long life. So, these are the features which you should look for while you choose an incubator. Now that we are seen now I hope you understand how a shaker incubator provides advantages and how it enhances the entire process of cell and tissue culture growth.

So, let me stop it now yes this was a the this is how the entire system can be operated and used in case you would you would like to use them to enhance the entire process of growth of any sample which you want to study.

Thank you.