

Introduction to Professional Scientific Communication
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Lecture - 20
Tutorial Session: Oral communication

So this is the final lecture or rather than interactive session for the course introduction to professional scientific communication. So, today we are going to have a discussion as to how effectively can communicate, what is your research problem you are doing a PhD or you are doing a postdoctoral you know fellowship and someone is asking you what is that your research project is and if that person is not from your domain, he may not be a scientist, you may belong to some other field.

So, still you know you are expected to give an answer that is convincing and therefore, the other person can appreciate what you are doing. So, this is also you know an effective way of communication. So, we are going to use our volunteers here students from our department and our lab, where you know I would simulate a situation wherein I am going to randomly ask questions as to what is their research project and they are going to give an answer.

And then we use that answer as our learning point and we will discuss as to how that answer can be better, right. So, that is the example and these are simulated situation not necessary that everyone who is telling that giving the answer you know they are as bad or as good, I mean this is kind of a simulated situation therefore, we can capture the different you know kind of people normally you come across, when you ask questions on the research project and so on. So, that is the focus of this particular session today.

So, let me introduce my participants here, volunteers here, eight of them are here. So, what I am going to do is I am going to ask them, to explain exactly what they are doing in the research project. So, that should be one not more than one minute it should be very short answer at the same time they should be able to tell what they are doing to someone who has not who is not an expert in this field. So, that is the prerequisite right, so that is what the conditions are and I would start with akanksha. So, can you explain exactly what is your research project and in about in one minute time.

Student: Just I told you.

You can hold it close to your.

Student: Ok.

Just like this.

Student: So, hello everyone, so I am basically working on deciphering the role of glycogen synthase in an autophagy. So, it is long known that glucose which is the major energy source in the body of an organism is primarily converted to glycogen and this glycogen is broken down to provide energy to the organism. In our body the neurons which are considered to be very much active, metabolically active, despite the high energy requirement they prefer not storing glycogen; however, they have the active glycogen synthesizing machinery within them.

So, my project mainly aims to decipher that why at all glycogen synthase although it is present in the neurons, what is its role in the neurons? And the second part of my work mainly deals with deciphering the role of glycogen synthase and cell cycle. So, people have found that glycogen it is the amount of glycogen it varies when a cell progresses in the cell cycle. So, my project also aims to establish that if neurons are keeping glycogen synthase inactive. So, is it, so that activating glycogen synthase can trigger the entry of a neuron into its cell cycle thus leading to its death.

Very good, right, so we will go to our second participant I will hand out to smruthi can you in about a minute explain what is your research project.

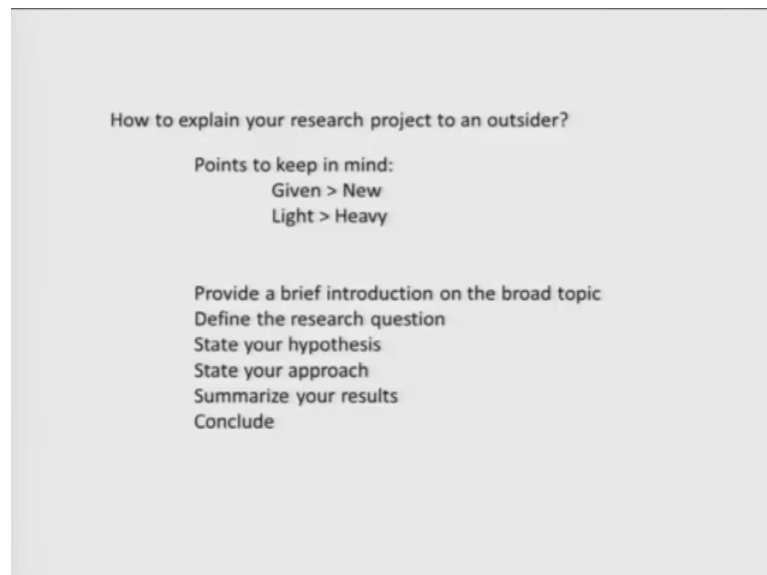
Student: Hello everyone. I am working on the model is sporadic Alzheimer's disease and which has a metabolic basis of its etiology. So, basically I am looking over the insulin signaling pathway and what is the scenario if we look at glial and neuronal crosstalk. So, basically I am finding the overview and some candidate genes involved in the pathway, and the crosstalk between glia and neurons using a co culture system.

And I am parallally I am working on an animal model, which is surgically induced model or of sporadic Alzheimer's disease. So, taking these two models I am just looking on the insulin signaling pathway that what are the main genes, which are mainly compromised

and. So, and what is the status of glia and neurons and in the way I am trying finding out that who are the real culprit for this disease pathology they are glia or neurons so.

Good job. We have had two such examples now, so we basically requested the student to present in about a minute as to what exactly the research projects he or she handling for the PhD program. So, that is the question and you have witness to that answer. So, before we go and look at the aspects as to how you would, or how you should present your project to someone who is not expert in the field let us look into some of the thumb rules, so that is what shown here in the slide.

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The question is how to explain your research project to an outsider meaning somebody who is not working in your field. So, these are some of the thing issues that we have discussed at length in the course that whenever you build something new, they want to say something to somebody who has not been exposed to that topic, or you are not yet introduced as to what you are doing you have to keep two important points in your mind one given a new.

So, this is something that we have discussed whether it is written communication or it is a oral communication, this an very important element. So, you have to always start with something that the other person is aware of he knows about it or she knows about then you build and explain as to what possibly they may not know. So, this is a fundamental

kind of a structure of your narrative, it should be given and you given is something already known to the audience you start there and then move to something new.

The second element is you how do you know convey whatever you are doing in the most simplest form possible to begin with. And then it build the complexity, otherwise the person who is an audience or somebody is asking question or interested in what you are doing he or she may not be able to follow what you are doing.

So, you know you have to always start with something that you as well as the audience or somebody who is talking to you know there is a common point that they know. And then you go to something that probably they may not know, because you are the expert not the other person and then emphasize and tell what you are doing and make it simple first and then build complexity.

So, if you do not do that then probably you are not communicating effectively as to what you are doing. So, the very purpose of the communication is that you are trying to tell the other person what you are doing. So, if you cannot make the other person understand and appreciate or you are doing then you failed as a scientist in communicating, what you are doing, right.

These are two important elements, and then this is with regard to you know any section whether it is an introduction or you are talking about a method that you are using or what would be the conclusion or what would be the impact of your finding, in every section you have to follow this given new simple and then make it heavy what do you call as light and heavy beyond that you know there are several elements in in your narrative like we discussed abstract.

So, as and when somebody asking you as to what you are done or what are you doing for your research? What you should explain is something what you would write as an abstract in a research paper. So, it is about say 200 words probably in 1 and half minutes or 2 minutes will be able to tell that right. So, how heavy are how simple it should be depends on the other person, this is a point again we have emphasized when we say you know when we discussed on the points on oral communication as to you should know about your audience right, you should know who is other person.

So, how much probably they know and therefore, you should pitch it to that level. The first thing is that you should use this principle given a new light and heavy for each one of the other bullet that are listed provide a brief introduction to the broad topic. So, you know you cannot start with something. So, specific and expect other person to know what you are doing it has to be very broad, you know aspect and then define the research question.

So, you have to say give an introduction and ask the question as to this is the question that I am addressing and why that question is important, and to ask this question you are going to approach the problem. So, you always in research in basic research you know you always have an hypothesis most often. So, you have an hypothesis you are the state, and then how are you going to test the hypothesis and if you already have what results you say what is your observation and finally, you conclude as to what do they mean possibly right.

So, this is the basic structure with which you should be able to convey what you are doing right, so that is very, very important. Now, give an example I will give an example as to why this is important if somebody is asking me, where do you live? So, if I say 5 1 0 which is a fact I live my you know the residence the number is 5 1 0, so that is true, but it does not convey anything to anybody especially if the person who is listening to this my answer is somebody who is not in this city, who is not in this state. So, 5 1 0 although it is the answer it is not make any sense.

So, you normally start with something which is common point right, you somebody there in Kanpur this the city that I have currently living in, and I meet someone in Kanpur city and somebody is asking you where do you live then I should be telling you know this you know smaller locality within Kanpur there are number of divisions right. So, I can say for example, I live in the IIT campus. So, everyone in Kanpur city know where is IIT you know is located.

But if somebody is there in Delhi and is asking where do you live I cannot give the same answer at I will you know live in IIT campus then they will be thinking I am living in IIT Delhi campus right that is not the answer. So, you should say you know Kanpur is my city where I live and if it is somebody who is outside the state. So, I should say you know I live in UP and then I should I could say which city it is.

So, depends on to whom you are giving the answer. So, you should always find you know the common point what you call is given said that they also know and then you try explaining it. So, that is basically is what given in the address if you write anywhere in any letter to anyone there is a address postal address is always starts with you know the state, the city, and then within the city there are different in a sub pockets that you call Indranagar or whatever, right.

And then you have a street in that there may be an apartment and then you have a flat and that is how the number is right that is how the address is given. So, that is exactly the very should be answering to anyone, who is ask to be a question right that that you should always remember.

So, if you have used internet and somebody wanted to search as to where is a given particular a shop or whatever is located using Google map, if it zoom in exactly that is street and then show where is the shop is then I cannot make out anything. So, what I should do, I should do the unassuming make it you know such a way that now I can see for example, entire city and then I can relate these are the different section of the city that I know these are the locality, I live in this place therefore, the shop that I am looking at is somewhere for example, on the north west of my current locality.

So, you are able to relate it to it. So, you should know where you are and then relate to where is other location is if he is straight away zoom there then you cannot make out anything as to where it is. So, these are some of the you know examples I give to drive home the point as to how you should be presenting yourself as to what research project that you carry out right.

So, with this little introduction I go back to the same two you know participants, now for example, akanksha right in less than a minute using these principles now you can redo your introduction right. So, you always keep this in mind given new, so you should start with something that is the other person should be aware of and then connect it to something new, should be light simpler and then should bring complexity and there should be a broad you know overview question hypothesis, if you have results and then what could be the impact. So, this is the structural features of any answer if you could now do it again.

Student: So, we all know that the food we eat is mostly for to obtain energy and glucose from it, and this glucose is converted to glycogen and whenever our body does not have the whenever food is not available then this glycogen is broken down to provide energy to us. In our body there are several different organs one such is the nervous system. So, the nervous system the neurons they do not store glycogen, we know that they are very much they are metabolically very active we have to they are always in function, but still they do not store glycogen.

So, my project aims to question that why at all neurons do not store glycogen although their metabolic requirement is so high. So, my first my project aims to decipher that now the second part is that. Fine so, let is look in that, so as you can understand it is not easy, it is very easy to tell that this person or that person did not give a good answer it is not satisfactory it is not convincing it is very easy, but if you are the person to give that answer you find it difficult right that is the fact of the matter right these all just to simulate that kind of a situation therefore, you can appreciate the difference right.

So, you know always you have to start with something given right that you know in a revised narrative akanksha did beautifully that is that all our tissues of the most of the tissues except neuron have the ability to store glycogen.

So, you eat and carbohydrate in your food is broken down converted to glucose transported by a blood and then the tissue which has got cells, store them as glycogen further energy needs, but one exception is the neurons they do not store glycogen they use probably glucose, but they do not store glycogen, but what is interesting is though they do not store glycogen normally they do have the machinery required for glycogen synthesis, one of the main enzyme what you call is glycogen synthase which helps in the synthesis in the in the in the formation of glycogen.

So, if they do not store glycogen why should they have glycogen synthase that is the question that she is addressing, right? So, in the narrative she did well and she is able to give what is called as given, and she is able to introduce what is called as new and of course, she can go on explaining as to what is have hypothesis how she is going to address them what would be the impact of her finding.

So, to help her you know I am just putting in hypothesis, the hypothesis is that though the neurons do not synthesis glycogen, they do have this enzyme called glycogen

synthase maybe because it is very much required for the neurons to survive under stress then conditions such as stress therefore, if that is true if that is the hypothesis my approach would be to you know provide stress to the neurons and then somehow block the glycogen synthase activity and then now see whether neurons can survive whether you know.

So, that is the approach and then if I can show or establish that glycogen synthase is indeed required for the neurons to survive stressful condition, the impact is enormous I am going to say something altogether very different. So, far probably no one has really looked at glycogen synthase has something which can function to protect cells and if this is indeed true and if we could prove then that is something you know new novel discovery that you made, and that could have a greater impact because you can use that understanding in protecting neurons, which is you know after all is the main problem in many of the neuro degenerative disorders.

So, that is the impact one can think of so, that is why you have to structure. So, let us now go to smruthi now can you use this few guidelines and rephrase your answer.

Student: securely I am working on investigating the disease pathology of sporadic Alzheimer's disease, which is a most common form of dementia and its etiology is having some metabolic pieces. So, broadly speaking we have in our brain there are two type of cell populations, one is glia other is neuron.

And glia are known to be the guardians of neurons, but recently some of the papers appeared which have reflected that in under stress condition glia are actually not guarding the neurons they are not protecting it they are itself harming it in some or other way. So, my project is using glial and neuronal crosstalk, I want to check whenever a stress condition arrives in particular disease condition like sporadic Alzheimer's disease like metabolic insult in the living system. So, glial cells are actually the guardians of neurons or there are causing some harmful effects which are the real culprits of Alzheimer's disease its glia or neurons. So, if we would be able to answer this question there could be a better therapeutic implication for this particular disease condition ok.

Good, so you know this revised you know kind of version of the answer is you know able to bring out more points than what it did earlier, but still there are some points that one should keep in mind when you make any answers one is that you should avoid as

much as possible the technical words. So, the technical words should be use only when you have no other option.

So, you should make it as simple that is precisely one of the bullets that is you should be simple, if you can convey whatever you wish to convey using simple words that is the best because then certainly the other person is able to get everything that you want to convey, right.

So, you avoid as much as possible the technical words he used them only when you have to and if you have to you have to define what it means, otherwise it does not convey anything. So, you have to remember these essential points whenever someone is asking you a question often they want to know what you are doing, they want to know what are your contributions they are not asking this to test your knowledge that happens only in exams therefore, it is not to you know it is not the opportunity to you know for you to show everything that what do you know, so that you should keep in mind.

So, you should you know make it as simple, avoid as much as possible the technical jargon, but convey what exactly you wish to do and you do how to you know at times go into the complex questions, but you are to build your case right. So, you have to convey in simple words there for the other person is able to get what you are trying to tell and then you know move towards more complexity that really helps it is called the and holding like really or to help the audience to understand what you are trying to say right.

These are you know you can you know go on asking many such questions and you keep improving and you have to keep in mind that it doesn't come in one day or in one go it takes years. So, you have to practice it one way to do that is to listen to others has to how do they answer, and you do not follow them; that means, there is something that is not said in a way that should be told, then you ask yourself question as to what is missing there, then you will understand what are the bottlenecks when or what are the elements that make it very difficult for you to follow therefore, you can address them when you have an opportunity to you know explain to someone else and try to implement every time you do that then with practice it gets better.

So, communication as I told you before it is like a fine arts more practice you do more better you become and exactly that is the case with scientific communication as well. So, you have to for you to write very good research article, you should have tested the water

for at least ten times she or should have done at least two articles tried your best character by your supervisor or your teacher therefore, you know what issues that you had in your writing and how it can be improved and so on.

So, we looked at several other points that you should keep in mind when you when you to such you know presentations, right. So, these are some of the thumb points now we will go move to two more people you have given a brief background priyanka so.

Student: hello everyone. So, I am working on the project to decipher the role of nuclear protein four that is null four during craniofacial development. So, my interest on this project derive derived from my earlier interest in the project, which I have worked on to understand all genetic etiology of orofacial defect that is cleft lip and palate, which is a multifactorial disorder that is both genetic and environmental factor plays role in this etiology of this disorder and also this is a one of the most common birth defects where you find a gap in the lip and palate.

So, understanding our syndromic form of this cleft lip and palate that is van der woodsen room, which has lower lipids instead of up additionally apart from cleft lip and palate has well. So, understanding this genetic etiology of van der woodsen room I have earlier done a next generation sequencing for whole genome in five affected members of the family, and seven unaffected member members of the family and applying these approaches we have narrowed down to one gene that is nuclear protein four.

There is a intronic mutation in this gene which causes that is disorder in this particular family. So, this gene is expressed during the development as well and we have found that its expression in lip and palate during development using mouse and human embryo as well. So, now I want to work on the characterization of null four gene, like its role of during development in considering the both can you like phase development and lip and palate development as well.

Right, so this is another example right, so let is look into how this narrative can be made better right. So, let is follow the same principle that is you have given then introduce new. So, you should never start with something new that is the thumb rules never ever start with something new. So, I told somebody is asking me where do you live I cannot say 5 1 0 that is not the answer, I give an example and then it should be light and you should make it complex if required right not otherwise.

So, if you can rework on the project that priyanka is looking at we can start, with in a very different way I will try to give it an alternate way of explaining, what she is doing you know the development you must have seen the child is born and then with time there are changes that happens in your body, every event is controlled by gene right. You have genes in your genome or chromosome that regulates as to how you develop, same thing happens when the fertilized egg develops and forms the baby just before birth right.

So, during this formation there are number of genes involved and if there are some defect in the way the genes function, then some of the developmental events are not complete and at the baby is born and one such condition is cleft lip you must have seen few babies born with you know the lip not being fused together, and they may also often have the upper part of the mouth, which you call is the cranial this also part of the skull bone that is also not fused you have a hole.

Now this is a developmental condition one can easily fix it by surgery, but; however, we need to understand as to why such incomplete development happens and that is exactly the project of priyanka, where she tried to look at genes and their sequence in individuals that had this kind of deformity and compared it with the normal individuals, who were otherwise you know having a normal fully developed you know the mouth lip and so on, at the time of birth and she could find one gene when there was a variation.

Now, the question is whether that is the gene that is causing that defect and therefore, she is trying to understand whether this gene does play a role in the development of the upper part of your mouth using model systems, she uses a mouse she uses cell culture models trying to understand the exact function of the gene parent she found variation.

So, that is the project, so we can make it very, very simple to someone who is not exactly in the field by you know removing all the technical words it conveying what you are doing, if the person is asking how did you look at the sequence variation, then you can go and explain as to how did I do that, I can say there are several methods one of the method that I used is next generation sequencing, that is not a front required what is required is to convey that there was a sequence variation in a gene that is more important than how you arrived at right.

So, that is the way you have to build your responses, that you are to keep that it mind remember all these are you know we are giving different kinds of expressions to make

you aware that you know there are often answers which are technically correct procedurally correct, at they may not convey what they wish to convey to everyone right. Unless you are in the field and that is where we are trying to help you know how to convey something that your project can you know as an output that could come out how it could help the society or in the knowledge base and so on, that is example if will go to the final one example will go to.

Student: as we like in our daily lives also we come across like several environmental a stress or like in one such condition like fever or something, when we have our we have higher temperature whatever we regularly have in our body. So, all these bring stress to our body and our body is made up of like cells and tissues. So, it a basically affects all the cells and tissues as well. So, one such condition I am trying to understand when cells are subjected to stress.

So, how in in normal condition whenever the stress is there then how cells are trying to cope up with that. So, in general whenever there is some stress there are some specific machinery inside the cell those who try to recover from that such from such kind of conditions. So, one such condition is like metal stress or any kind of chemical stress or heat shock, heat shock means that whatever I will my body temperature like 37, its above to that like 40 or 42, it causes as a stress and for this in our in cells there are a stress kind of formation, which helps to recover from the stressful conditions.

Fine we will, so that is a you know nicely summarized work, but you can make it much simpler. So, I am going to narrate that and explain how we can make it simpler right. So, she spoke about stress, but we have not said; what is stress? So, that is what I mentioned some time back that when you have any technical term, we need to define what it is and then say this definition is referred to as this and then you start using that word people do not relate to what you mean by that.

So, always you know when you are talking about something that other person may not know you should define what it is, otherwise you know the very first word that you use is something not given that is a new. So, the person gives up there itself, right.

So, our cells are used to a particular body temperature our normal body temperature is 37 degrees. So, all our biological activity is physiological activities or tuned for this particular temperature in all the mammalian species. So, what happens to the cell when

the temperature goes above 37, or goes below 37, because that is not normal? So, when does when the temperature increases above 37, or goes below 37 that is the condition that you call as stress it is a stress because cells cannot function in that temperature.

So, that may be lethal to the cell because that can affect the cell survival; however, this shift in the temperature could be very for a very short period maybe within 10 minutes, maybe within 40 minutes, the temperature may come back to 37 therefore, the cell should somehow survive that small period of higher temperature or lower temperature and wait for the normalcy to come back and then resume activity, and it happens all the time as and when you have a fever your body temperature goes up and then cells experience much higher levels of you know the temperature, which certainly is not good, but still we all survive you know the fever because the cells have the ability to cope up with higher temperature.

So, how does it do and what damages the temperature can cause it can cause enormous right for example, the protein may not be folding properly that itself is a huge stress because abnormal protein can affect the way the in a cell functions.

So, one of the ways by which the cell you know reduces, the load of abnormal protein is by arresting the synthesis of new protein. So, when the cell is under higher you know temperature condition, what do you call stress condition it arrests the translation process the process by which the cell makes protein and that time all the mrn, which well you know actively translating making the protein or put into small regions.

And they are aggregated and certain proteins caged them together and not allowing them to make the protein and such kind of for say you are small groups of such you know, rnas that are not translating or called as stress granules. And rush miss project is to understand how these stress granules which are assembly of rna that are not being translate not, allowed to translate you know are regulated and how they get back to you know initiating the translation when the cells come back to normal temperature.

So, this is you know much simpler way of explaining, but you can make it much more simpler right. So, you can ask questions you can say what is your hypothesis? How I am going to address them? So, you have to practice the one way to practice is you type it out now you see how many technical words that you have try to remove them replace it with simple words, replace them simple words, revise for 10 times, 15 times and then try to

reduce words convey the same meaning, but remove words then you will understand that you are using, so many jargons, so many words that not at all necessary, if you want to convey what you wish to convey right.

So, that is how you practice you do not need to really orally communicate, but you can also start writing and try to remove, remove and finally, arrive at a three four sentence answer, which you know does not have any technical words jargons, but yet you can effectively communicate one final question on this to Rohit, Rohit can you say what.

Student: So, I am looking up animal stress just different type of stress during the, so day to day life, so just I am looking a different what the effect of stress on animals. But he defined is the question or the objectives, but you need to when you make that kind of answers you also need to say why that is important to study that right. You may always say these are my objectives these are the you know question that I am asking, but you need to say why this question is important.

So, yeah that is called as defining the problem if you see the slide, I said provide a brief introduction on the broad topic define the research question and state your hypothesis and then say how are you going to you know test your hypothesis, that is what called the approach and if you have results and what do they mean that is the conclusion that you did.

So, you know even if your answer is only three or four sentences they should have all these things. So, you have to remember that and it is not easy in how to really rehearse many a times and then do that. So, with this we are ending our course introduction to professional scientific communication. So, I hope all of you had some understanding on how effectively can communicate, whether it is writing or making a oral presentation and even during discussion because the last session a kind of an interactive session really focused on a kind of a discussion right. So, that I hope that it was enjoyable and you all could benefit out of this particular course and I wish you all the best in your research endeavor.