Good Laboratory and Research practices-Lecture series and workshop

20-09-14-IISER Mohali

IISER Mohali held a lecture series over a topic "Good laboratory and research practices for biology and PhD students" on 20th September 2014.

It comprised of 4 lectures discussing GLP biosafety equipments and safety measures to biological and radiological hazards. The series started with the lecture of Dr. Anand from IISER, Mohali over the GLP discussing the events that has happened in the course of their careers in order to educate the mass of MS and PhD students the significance of GLP in basic research. The talk greatly emphasized on the need of documenting each and every step of experiment that a student conducts. For instance he shared his experience of one of the repeat experiments conducted by his PhD students. While students repeated the experiment conducted by the technician they were not able to achieve same results. So they followed the lab notebook of technician who used to document each and every points in his Lab notebooks (In IISER the research staffs maintain log notebooks in which they pen down each and every detail of their experiments. They don't consider this as raw book, but probably these lab note books act as their log for SOP, DRS and result folder.) and found that the concentration of a single reagent was higher which was mistakenly added into their protocol. Dr. Anand claimed that without going back to records they could not have thought of changing the concentration of that reagent which ultimately led to similar results as to prior experiments. He appreciated the meticulousness of technician to note down everything which prevented them to rediscover the wheel. Dr. Anand quoted one sentence about record keeping that "*Meticulous writing in lab notebooks are critical for troubleshooting the problems faced while repeating the experiments*". Moderated by HOD of department who advised the audience "While conducting the experiment always ask yourself, can someone repeat my experiments 12 years later?" Following points were highlighted as how one can maintain the lab notebooks:

- Mention date in all pages
- Put title of the experiment

- Record details of experimental protocol at least when you perform the experiment for first time.
- Record data for every experiment
- Record mistakes, errors and difficulties on same page.
- Always label (labelling of bottle and reagents in concern with safety for lab staff) each and every thing while you perform the experiment. Don't wait for later. Once the moment is gone you won't be able to track the whole procedure reagent name and shortcomings in your memory.
- Inculcate the habit of recordkeeping from day one.

Later the talk shifted to Patent laws mentioning a point from American Patent Law that says Inventorship is determined by "first to invent" not "first to file". Quoting the examples of industries where due to their very stringent record keeping most of the times they might have invented the drugs much before they are reflected in their record by some research group in the study. The information could also be found on Google patents, since the industries are not in habit of publishing their research as they want to hide certain key components hence they file a patent strongly supported by their records. What I could understand about this point was that while conducting the experiments we should also check if the things have already been done as this will save resource and money. The series of discussion was later touched by the ethical issues in research by Dr. Anand. Another important focus of the talk was scientific misconduct in terms of falsification, fabrication and plagiarism. Hence it was emphasised that every study whether on human or animal should be ethically approved by Institutional ethical committee. Obtaining consent forms are mandatory human studies. Certain points were highlighted for conducting human research which I could correlate with our human study Performa. The points are as following:

- Informed consent from patient
- Clause for patient information privacy
- Confidentiality
- Right to withdraw at any time from study.

Coming back to scientific misconduct the major and hot point of discussion was plagiarism and their consequences elaborated by some of the famous cases that has happened in Indian scientific community to the level of Ph.D degree grants. Plagiarism not only included text copying but also photo manipulation like changing brightness. (However, in conversation with Dr. Anand during tea break cleared the doubt that in case of picture if the color scheme is changed it has to be with respect to whole of the image and not in a specific area). Dr. Anand also emphasized that now a days journals have software to check if the image is original or fake. There was the mention of Gopal Kundu controversy where the scientist was banned to take part in any scientific events for 3 years as in 2010 found by journal that image of gels used by author as a control were the similar images published earlier by same group. The journal found the image of gel was tampered with and submitted the report to Indian scientific community resulting in ban of 3 years. Dr. Anand also highlighted the rate of paper retraction globally in which India topped among other countries UK (13 papers), US (14 papers), Japan (16 papers), South Korea (44 papers), China (48 papers). In India this number was found to be 68 (out of which 44 are retracted for misconduct).

Adding to this one of the IISER faculty said that never think the paper once published cannot be scrutinised even the old papers are now under scanner. Dr. Anand mentioned in his talk that "Scientific misconduct is different from scientific errors, Bad science is irreproducible science, while the exploratory science only moves forward". Due to this there had been article in Nature Drug, Disc 2011 entitled as "Reliability of new drug target' claims called into questions."

There had been instances when full sentences have been found copied in papers. Sometimes we have to use such sentences but one should make sure that these sentences should be in "quotes" with reference. Missing quotes will make you land in trouble. As if you may do it UN-INTENTIONALLY but you cannot prove it UNINTENTIONAL. The solution for this

was given by stopping the plagiarism at doorstep. As in US the Universities are rejecting the graduate school applications which are plagiarised. Similarly in case of powerpoint presentations also copying slides and matter without referencing the source is plagiarism. Speaker quoted very interesting communication to editor published in Nature in 2007 where author (Ihsan Yilmaz) has argued that "since English is not our mother tongue, so under such a pressure of publish or perish like atmosphere if we have borrowed certain English sentences from some English paper than we have not plagiarised it".

The lecture was followed by some well known controversies in which the names of one of the best Indian scientist minds were involved for e.g. Prof A Pandey Controversy, Prof BS Rajput controversy, Raghunath Mashelkar controversy, CNR Rao controversy in which Dr. Rao apologised copied verbatim although reference was used but not in quotes. The reason discussed for this was that due to their extensively busy schedules most of the work is done by junior staff and if such mistakes happen question is raised against the name of PI.

Coming to self plagiarism speaker mentioned that using your own previous text is also plagiarism although it is not possible to change same thing for instance material and method but one should change sentences and rephrase them.

Relating to the seriousness of the event speaker stated that certain PhD degrees have been retracted even in such scenarios. Coming to the authorship issue in publications speaker mentioned that the role of every author should be defined and gifting of authorship or guest authorship is not acceptable. Research teams should always discuss authorship issues as later it may become serious concerns. Relating to this speaker narrated one of the incident in which one of the summer intern which came for training at IIT Mumbai had referred the thesis of some senior fellow for help. However, under

the pressure of mentor he made a manuscript from the thesis and included the name of faculty who was not even aware of the manuscript. Second instance was when authors had forged their affiliation and published a paper. Few years later when objection was raised editor tried to contact both author and mentioned institutes. Institute replied that people with listed names were never the part of that institute. Major concerns listed for authorship violations are:

- Honorary Authorship
- Mutual support
- Guest or gift authorship
- Duplicate authorship
- Ghost Authorship
- Denial of authorship

Similarly in there was a notorious publication scandal in which authors were paid handsome amount of upto 30000–50000 US \$ by certain group if they are able to publish a manuscript in nature. The lecture was concluded by questions raised by students like if we can publish the challenges faced during doing our study? (Yes, its an important thing and we can publish it in supplementary material. There is also one journal Journal of Negative reports where they publish all your negative data) Another question raised that shouldn't it be made a law that upto certain percentage plagiarism is acceptable in scientific publication and beyond that it can be termed as offence (yes).

The next lecture on Biosafety symbols which was not discussed in detail however the role of PPE and waste segregation was highlighted. It was emphasized that the precaution should be taken from the point of generation. The speaker (Dr. Sharman Sherawat) also gave certain weblinks where we can get the rule book for biosafety (osp.od.nih.gov/biosafety guidelines; Cdc.gov/biosafety/publications).

One critical example mentioned that if some unlabelled experimental tubes of Small pox virus which are left in lab unattended in fridge, and if the lab attendant who is cleaning the fridge, with-

out knowing its content may dispose it off, thus bringing back the eliminated disease in the society. So students were suggested not to leave any container bottle unlabelled especially in lab. There was another lecture on Biosecurity by Dr. Ram. He discussed various biosafety levels and the use of biosafety cabins and their work flow. Question was asked as to if there is some specific guidelines to put up biosafety cabinet (yes the BS cabinet has to be placed near wall, has to be attached to duct and should be under annual service as the burners reduce the life of HEPA, should not be placed in front of door from where everyone is coming in and going out. Speaker also showed up a flowchart as to how to get permissions for bSL facility for both private and govt institutions. It is also emphasised on the need of regular training for the research staff especially documented training. Waste segregation topic included the disposal of microbial waste to laboratory and hospital based waste. Speaker emphasised that UV bulbs used in Biosafety cabinets should be replaced after 90 uses as it has life for 90 days or 90 uses. The last lecture was on radiation safety. Basic concept was to maintain the distance from the radiation source. The role of agencies which play key role in keeping check in these cases like AERDs and RSO (special officer) has to be in loop always in case of emergency. No radioactive material can leave the institute it is issued to and no external candidate is allowed to handle the same. Radioactive facility should always be locked to avoid any unauthorised access. Special badges called TLD (Thermo Luminescence Dosing) has to be wore when going into radiation facility. Overall the whole of the series was the amalgam of GLP and biosafety and the adverse events related to them.

Keshav Thakur

Neuroscience Research Lab, Department of Neurology, PGIMER

doi : 10.5214/ans.0972.7531.221211