

Cancer Researchers in Time of the Coronavirus Pandemic: A Time to Repurpose and Rethink

*Mayank Singh**Chandra Prakash Prasad*

All India Institute of Medical Sciences New Delhi

Department of Medical Oncology (Lab) AIIMS New Delhi

Since the outbreak of the COVID-19 pandemic the cancer researchers and patients around the world are looking at a uncertain future. The lockdown that followed the outbreak has derailed all the cancer research activities around the world. Labs have been shut and ongoing experiments and drug trials have to be halted. It has resulted in to a catastrophic loss to patients and researchers. Since securing grants for research in today's competitive world is hard and there are deadlines to be met so many postdocs and principal investigators around the world are looking at a uncertain future. The pandemic has resulted in diversion of resources to contain COVID-19 pandemic which will lead to funding crunch in near future. In this review we try to address different issues faced by cancer research labs and discuss potential ways to survive this pandemic professionally.

Introduction

No reservations in saying that as a researcher life is tough. One devotes years asking novel scientific questions and performing experiments, and its years of resilience that pay with exciting results. And one fine day suddenly COVID-19 pandemic arrives and researchers cannot step back in to the lab, putting a halt to the work that would have might change the way in which we treat cancer. These are desperate times and thereby require desperate measures. There are no choices left at this point for a cancer researcher as one cannot step in to the lab to perform experiments on hard fought primary cell cultures derived from cancer patients which might not be the same when you revive them (after months of freezing). One cannot do anything about the murine model developed in the lab for osteosarcoma. This has actually been the scenario around the world since the outbreak of the COVID-19 pandemic, almost all the cancer researchers from trainees to post docs have to put a halt to their research activities. We are living in an internet age so it will not be wrong to presume that modern society is well equipped to deal with disruption of workplace that comes with a pandemic. Many office workers engaged in IT and other related sectors already used to have flexible working hours and used to connect with colleagues around the world via internet-based apps from home. However scientists whose second home is a laboratory has been given a massive blow by this pandemic. Experiments have to be set aside for a indefinite amount of time, setting back many research projects around the world. Many labs are struggling to maintain basic upkeep of sensitive equipment and animal facilities, and facing hard decisions of what to let go. Technicians and other non-technical staff are worried that they will end up with pay cuts. Almost all research fraternity are unable to focus on the work and fear of getting sick by COVID-19 virus is getting worse with every day as the pandemic cases are reaching new heights with every passing day.

What's at stake

In our opinion it's the tax payer money that funds majority of research grants. The stalling of funding will have a bearing on many important research projects which run for a long period of

time resulting in eventual deliverables. The disruption in continuity will result in failure to achieve the project goal leading to wastage of hard work and finance. In research, consumables are important commodities i.e. chemical, kits, plasticwares etc. Antibodies, kits, chemicals and culture ware (including flasks, media, serum etc) which are expensive and comes with shelf-life of 6 months to a year. So, by the time we are waiting for COVID-19 pandemic to end, we will lose a large sum of money on-shelves. Unfortunately, in south-east asian countries like India, COVID-19 arrived in-around March 2020. It's normally the time for the release of yearly instalments for on-going project grants, and as most of the government money has been shunted into the management of COVID-19 pandemic, researchers might get either reduced or delay in their next round of funding.

Money/time or both

Apart from money, the other important entity which researchers are losing is time. Research faculties, Postdocs, PhDs, Research Assistant, Technicians, if not associated with hospitals for COVID-19 are losing their precious time. Mid-level as well as final year PhDs, who have already planned their crucial or final experiments have to wait at least for 4-6 months, before they can actually start their work again. So, there is almost a delay of 9-12 months in their academic career (in best case scenario). Because of COVID-19 pandemic, we are observing delay in shipments of research consumables or delay in custom clearances. Quality science requires open borders which is not the case today as flow of reagents around the world has disrupted resulting in disruption of collaborative research also.

Cancer researchers staring at uncertain future

Things are very tough for both early career researchers like post docs who have just started their carrier in cancer research as they stare at reduced funding for cancer research in years to come, as the focus has shifted to COVID-19. Similar is the case with senior researchers who are at the brink of grabbing that tenure track position as they now compete for limited cancer grants which were already very competitive and hard to get. Altogether along with cancer researchers, cancer patients around the world stare at a very uncertain future. Funding crunch has already started to show up around the world. As an example Cancer Research UK (CRUK) announced that it will drastically scale back its research plans after the cancellation of a range of fundraising events and the closure of charity meant it will lose up to a quarter of its donated income over the next 12 months (which comes to about £120 m). Macmillan Cancer Support which is UK's second biggest cancer charity said that due to termination of fundraising events foundation is expecting the loss of up to half its fundraising income this year. which counts to about £100 m. This massive financial hit taken by two of the UK's biggest and best-supported charities is likely to put further pressure on ministers to launch a financial rescue package for charities which provide frontline health and social care services. The cancellation of "social fundraising" events in light of social distancing measures have resulted in cancellation of big fundraising events such as the London Marathon and closure of thousands of small and big charity events that has given cancer research a big halt in UK. CRUK has admitted that the reduced financial and research capacity could set back its fight against the disease for many years which would directly impact its goal to see three in four people survive their cancer by 2034.

Cancellation of Symposium /or Conferences

The overall cancer research has been harmed with prominent meetings in field of Cancer research being terminated or rescheduled. American Association for Cancer Research (AACR) made the decision to terminate the AACR Annual Meeting 2020, originally scheduled for April 24-29, 2020 in San Diego, California and finally decided to hold a virtual meeting American society for clinical

oncology annual meeting, scheduled for May 29-June 2 2020 in Chicago. These cancer meetings serve as a mean to develop new collaboration and brain storming important trials in oncology which helps in advancement of Cancer treatment all together. The cancellation of these and other smaller meeting hurts the overall goal of cancer research. European Association of Cancer Research (EACR) is planning for virtual events for the rest of 2020 in order to bring researchers together.

Non-COVID-19 Researchers

During COVID-19 pandemic, the research labs have been shut down around the world, lab animals have been slayed, core research facilities closed as researchers have started working from home. So, how to best utilize your time if you as researcher/or research lab are not directly involved in COVID-19 management? For all the PhD students and Post Doc fellows our advice will be to utilize this time to brush-up concepts in area of your research. It's also a good time to look back in your research data and try to formulate the additional experiments for upcoming manuscripts and preparing for new experiments when you get back to the lab. For Research Faculties, in case they are still going to hospitals/laboratories can plan for their research proposals for next grant cycle. They can consider writing reviews within area of their expertise and try discussing the recently produced data with the collaborators. As per the EACR (European association for cancer research) blog, this is a great time for researchers to learn some new skills like honing up your dry lab skills like learning new bioinformatics tool and try to have as much virtual meeting with your lab group as possible and let it focus on other parts of life beside research. As researchers we don't get that much of the family time, I think this is a great time to devote with your children and make up for the times you lost when you were busy making world cancer free.

Research Labs at the forefront of fight against COVID-19

There is no denying the fact the fight against coronavirus cannot move ahead without understanding the mechanism through which virus infects humans, as it will help in developing drugs and vaccine against it to bring an end to the COVID-19 pandemic and saving millions of lives.

The research pace against COVID-19 has been something that has not been seen or documented in history of human kind. Situation of health institutions and regulatory bodies are better, if we compared today's situation with Spanish flu of 1918, when even antibiotics were not available. From discovering the sequence of the virus in identifying the mechanism of pathogenesis of the COVID-19 the pace has been prompt [1]. The PubMed search for COVID-19 yields 17,715 results, when last accessed on 1st June 2020 with majority of article appearing after Dec 2019 following outbreak of COVID-19) As of today, we have understood a lot about this virus [2], and that had made possible the development of medication against SARS CoV-2 in such a short duration of time [3], and several of them are still in pipeline at various stages of development. What is promising to see at these times is the way labs across the world are engaged in development of vaccine and drugs against coronavirus by sharing the data through open access platform, which is not normally thru [4]. In conclusion, the governments around the world should take critical decision in consultation not only with clinicians but with experienced virologists engaged in research and development of effective vaccine and therapeutics against coronaviruses. Governments can be better prepared for eventualities where a clinician who is engaged in the clinic with never ending patient load cannot understand. All the scientific and medical organisation of the country should work in tandem under one umbrella to ensure better research and clinical output instead of one organisation being given a lead and thus left with suboptimal results. Repurposing of cancer research lab in developing vaccines and better diagnostic methods against COVID-19 is the need of an hour, as all these labs have the equipment and manpower to do so.

Acknowledgments

Conflict of Interest

The authors declare no conflict of interest.

References

References

1. Chen Nanshan, Zhou Min, Dong Xuan, Qu Jieming, Gong Fengyun, Han Yang, Qiu Yang, Wang Jingli, Liu Ying, Wei Yuan, Xia Jia'an, Yu Ting, Zhang Xinxin, Zhang Li. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *The Lancet*. 2020; 395(10223)[DOI](#)
2. Lu Roujian, Zhao Xiang, Li Juan, Niu Peihua, Yang Bo, Wu Honglong, Wang Wenling, Song Hao, Huang Baoying, Zhu Na, Bi Yuhai, Ma Xuejun, Zhan Faxian, Wang Liang, Hu Tao, Zhou Hong, Hu Zhenhong, Zhou Weimin, Zhao Li, Chen Jing, Meng Yao, Wang Ji, Lin Yang, Yuan Jianying, Xie Zhihao, Ma Jinmin, Liu William J, Wang Dayan, Xu Wenbo, Holmes Edward C, Gao George F, Wu Guizhen, Chen Weijun, Shi Weifeng, Tan Wenjie. Genomic characterisation and epidemiology of 2019 novel coronavirus: implications for virus origins and receptor binding. *The Lancet*. 2020; 395(10224)[DOI](#)
3. Sheahan Timothy P., Sims Amy C., Leist Sarah R., Schäfer Alexandra, Won John, Brown Ariane J., Montgomery Stephanie A., Hogg Alison, Babusis Darius, Clarke Michael O., Spahn Jamie E., Bauer Laura, Sellers Scott, Porter Danielle, Feng Joy Y., Cihlar Tomas, Jordan Robert, Denison Mark R., Baric Ralph S.. Comparative therapeutic efficacy of remdesivir and combination lopinavir, ritonavir, and interferon beta against MERS-CoV. *Nature Communications*. 2020; 11(1)[DOI](#)
4. Science in the time of coronavirus. *Nat Methods*. 2020; 17:355.