A Day in the Life of a Research Scientist

A research scientist is a problem-solver, a communicator and is driven to succeed. Are you interested in Petri dishes or proteins? Do you want to contribute to the discoveries and improvements in human medicine? Whether as a lab assistant or one with advanced training, a research scientist faces a day-to-day, hands-on challenge to explore a project with set protocols and uncertain outcomes.

Lab assistants will typically perform daily activities to keep the lab projects running smoothly. These activities would include making buffer solutions, maintaining lab equipment, checking on supplies, and cleaning glassware. Individuals with more advanced training would play a vital role in planning and performing experiments for one major project or may even oversee a project. As a senior scientist, I am asked to take on more than one project. Typically, an advanced degree is required at the Masters or Ph.D. level for the senior scientist position. After completing my Ph.D. dissertation, I spent several additional years obtaining specialty laboratory skills and novel cancer research techniques from various post-doctoral opportunities.

A day in the life of a research scientist may vary greatly. A typical 10- 12 hours spent per day in the lab setting may be hectic or more hectic depending on the number of skilled individuals in a team, on the research outcomes previously obtained and on any impending deadlines.

For instance, a typical morning for a senior scientist in the cancer research field begins with maintaining *in vitro* mammary carcinoma cells (cell lines).

7:30am Bottles filled with enriched tissue culture media are placed in a water bath which is set at 37°C. Next, stacks of culture flasks containing cancer cell lines are taken from an incubator. These culture flasks are inspected under the microscope. Which cell lines need to be fed? The cell lines in flasks that do not require feeding are placed back into the incubator. Which culture flasks show contamination? Do we have enough culture media for the feeding procedure?

8:00am Laminar flow hoods must be sterilized before use in the culture cell feeding procedure. Also, a quick inventory of necessary supplies is made: sterile pipettes, alcohol swabs, and sterile tissue culture flasks. I cannot afford to forget to wash my hands, wear my safety glasses and wear disposable gloves! From the inspected culture flasks, any of the cell lines needing to be fed will be refreshed with the enriched tissue culture media after a viability count. Any inspected cells remaining will not be discarded; instead, will be harvested for several experiments to be performed this afternoon.

9:30am Project #1: Yesterday, several of us had set-up a series of experiments on cell growth and colony-forming unit studies using our cell lines in the presence of potential anti-tumor agents. Would today give us a clue as to which novel compound obtained from the organic chemists possess activity to eradicate mammary carcinoma cells compared to the control systems? The gathering of data from the potential anti-tumor agent-treated cells and those from untreated cells requires several of us to complete.

11:00am From the informal discussions that follow, there is some indication of cytotoxicity. We must further examine our data, change the protocol and plan on performing another study for tomorrow.

11:15am Lab space is at a premium. I make my way down the hall to my cubicle-style office. I contact our *in vivo* study groups to compare our data with their work.

11:30am My 12noon meeting with the Director of Research is approaching. In preparation for this meeting, our staff of scientists is gathering at my office to once again review their recent findings and anticipated follow-up experiments. However, due to the enormous amount of data and the number of support research scientist, we decide to move our meeting to our make-shift library room. Time spent on discussing research is personally the most rewarding period of the day. All of us had contributed to the research in some form. We communicate our findings, make suggestions and reflect on the directions of our research.

12noon The lunch meeting is scheduled for one hour with senior scientist from many departments. The weekly and monthly goals are reviewed. Each of the senior scientists gives a short speech of their work. Just as I bite into my apple, the meeting is interrupted by an urgent message for the Director. It appears that the Vice President of Research and Development requires the presence of our Director.

12:20pm As we break from the Director's meeting, I walk down two flights of stairs with the physical and analytical chemists to discuss the progress on Project #2. The discussions focus on the structural integrity of the cell membrane and nuclear components from the cells treated with the potential anti-tumor agents. Follow-up studies are planned with transmission electron microscopy and with spectroscopic analysis.

1:00pm I walk back to our laboratory and am so excited at the prospects of Project #2 that I skip lunch altogether. I discuss the details further with the research scientists involved in these experiments.

1:30pm Cell lines that were harvested in the morning are now being prepared for use this afternoon. The research scientists determine that we have enough cells to supply the physical and analytical chemists. I make a request for some of the material to be used for the team of Project #3. The scientists reluctantly offer some for Project #3's protein studies. In contrast, the rest of the material must come from coordinating our efforts with tomorrow mornings harvesting of the cell lines.

2:00pm Project #3 involves the characterization of cellular components which may serve as targets for attack by the potential anti-tumor agents. Along with others in the team, I spend the majority of the afternoon isolating and identifying nuclear extracts and proteins. Purification procedures are performed which include high performance liquid chromatography. We set-up and run gel electrophoreses. I make a request for some of the nuclear extracts to be reserved for our latest team in Project #4. Both of these teams have been working in tandem and often share precious reagents. Project #4 team has been working all day in the labs of the molecular biologists on nucleic acid purification and DNA/RNA hybridizations.

6:30pm I walk back to my office to return messages received from our collaborators. They also have put in a long days work. Later, several research scientists visit my office to further discuss their progress.

7:30pm Before I leave for home, I must take care of one more message. The Director has a meeting with the Vice President at 8:00am tomorrow and wants a summary from each of the senior scientists. So, I once again review the data from today and outline the accomplishments from our lab. I make one last stop before heading home. I walk to our make-shift library to peruse the latest work by others in the journals of *Cancer Research*, *Oncology*, and *British Journal Cancer*. I will follow-up with the main library on some of the more pertinent articles.

If you are interested in becoming a research scientist, degrees in biochemistry, chemistry or biology will be a good start. Programs in nanoscience and biotechnology will certainly prepare an individual for a research career.

Finally, a summary of "take-home-messages" for a successful research scientist career includes three items: (1) making both lab safety and lab hygiene high priorities, (2) performing as part of a cohesive team, and (3) building bridges with collaborations from other disciplines.