

2001 nobel prize in medicine contributions



**ASSIGN
BUSTER**

Cancer Biology Writing Assignment #1

Topic #1

The Nobel Prize in Physiology or Medicine (commonly referred to as the “Nobel Prize in Medicine”) is awarded annually by the Nobel Assembly at the Karolinska Institute, a Swedish medical school and research center. [6] Established along with four other awards in 1895 by Swedish chemist Alfred Nobel, this award recognizes exceptional discoveries in the fields of medicine and life sciences. Recipients of the 2001 Nobel Prize in Physiology or Medicine were Leland H. Hartwell from Fred Hutchinson Cancer Center in Seattle, Sir Paul M. Nurse from the Imperial Cancer Research Fund in London, and Timothy Hunt from the Imperial Cancer Research Fund in London. As a group, the prize was awarded “ for their discoveries of key regulators of the cell cycle”. [4] However landmark their collective contributions to science were, their individual contributions cannot be discounted. This essay will detail exactly that: the individual contributions made to the field of medicine and cancer biology made by 2001 Nobel Prize in Medicine winners Leland H. Hartwell, Timothy Hunt, and Sir Paul M. Nurse.

Leland H. Hartwell contributed by utilizing a yeast, *Saccharomyces cerevisiae* , that helped identify a class of genes that controlled the cell cycle. [3] By isolating yeast cells with mutated genes, Hartwell was able to identify over 100 cell-division-cycle (CDC) genes, including a “ start” gene (CDC28) and “ checkpoint” genes. As a whole, these genes help control the cell cycle. [7]

Timothy Hunt contributed by discovering proteins, called cyclins, during his studies of sea urchins. Cyclins, named in part due to Hunt's love of cycling, help control the progression of cells through the cell cycle by forming and degrading periodically during every cycle. ^[1] Following his discoveries in sea urchins, Hunt was able to extend his findings to other species. ^[6]

Sir Paul M. Nurse (knighted in 1999) used another yeast, *Schizosaccharomyces pombe*, to identify, clone, and characterize cyclin-dependent kinases (CDKs). CDKs contribute to driving cells through the cell cycle by phosphorylating other proteins. Like Timothy Hunt, Nurse was able to extend his findings to other species due to the function of CDKs being maintained during evolution. ^[8]

Together, these three scientists' discoveries contribute to a better understanding of the eukaryotic cell cycle. Firstly, although the yeasts used by Hartwell and Nurse (*Saccharomyces cerevisiae* and *Schizosaccharomyces pombe*, respectively) are very distantly related, the gene identified as the "start" (CDC2) was the same in both cases. ^[6] Next, as previously mentioned, Hunt and Nurse were both able to extend their work to other species, including humans, after initially demonstrating their findings in yeast and sea urchins. These extrapolations led to a greater understanding of the human cell cycle as a whole and the diseases involved, including, most notably, cancer. Finally, and perhaps most importantly, all three scientists used discoveries made by the others to aid in their own research. For instance, the cyclins discovered by Timothy Hunt bound

themselves to the CDK molecules identified by Sir Paul M. Nurse. Hunt's discoveries were made possible in large part due to Nurse.

The discoveries made by Hartwell, Hunt, and Nurse contributed significantly to cancer biology as cancer is often caused by chromosomal mutations often made within the cell cycle. ^[6] Therefore, the discoveries made by these three scientists vastly increased the biological understanding of how cancer forms and also allowed for innovation in cancer treatment and prevention. In fact, the findings made by Hartwell, Hunt, and Nurse have influenced science beyond just cancer biology; understanding more about the characteristics and operation of the cell cycle can also aid in understanding, treating, and preventing other diseases caused by chromosomal abnormalities.

Finally, it should be mentioned that Timothy Hunt drew scrutiny in 2015 after making a few controversial remarks regarding women scientists. At a conference in Seoul, South Korea, Hunt was invited to give a toast at a lunch for female journalists and scientists. In his speech, Hunt scrutinized the role of women in the laboratory, stating, " Let me tell you about my trouble with [female researchers]. Three things happen when they are in the lab. You fall in love with them, they fall in love with you, and when you [criticize] them, they cry." While a recording of the speech has not been unearthed and second-hand accounts of the comments vary, the majority of lunch attendees confirm these comments. ^[5] However, many have argued that Hunt was misquoted at times during his speech and the comments were taken out of context. ^[9] Timothy Hunt promptly issued a public apology and

Hunt's wife, a female scientist herself, defended her husband amid the scrutiny.

References

1. Evans T, Rosenthal ET, Youngblom J, Hunt, T. Cyclin: A protein specified by maternal mRNA in sea urchin eggs that is destroyed at each cleavage division. *Cell* ; 33(2): 389-396.
2. Galderisi U., Jori FP, Giordano A. " Cell Cycle Regulation and Neural Differentiation". *Oncogene* 2003; 22(33): 5208
3. Hartwell LH, Mortimer RK, Culotti J, Culotti M. Genetic control of the cell division cycle in yeast: V. genetic analysis of *cdc* mutants. *Genetics* . 1973; 74(2): 267-286.
4. Milestones in cell division. *Nature Cell Biology*. 2001; 3: E265.
5. McKie R. Tim Hunt: " I've been hung out to dry. They haven't even bothered to ask for my side of affairs". *The Guardian* . June 13, 2015. <https://www.theguardian.com/science/>

2015/jun/13/tim-hunt-hung-out-to-dry-interview-mary-collins. Accessed January 30, 2019.

6. Nobel Media AB. The Nobel Prize in physiology or medicine. *Nobelprize.org*. 2018. https://www.nobelprize.org/nobel_prizes/medicine/. Accessed January 30, 2019.
7. Nobel Media AB. The Nobel Prize in physiology or medicine for 2001 – press release. *Nobelprize.org*. October 8, 2001. https://www.nobelprize.org/nobel_prizes/medicine/laureates/2001/press.html. Accessed January 29, 2019.

<https://assignbuster.com/2001-nobel-prize-in-medicine-contributions/>

8. Nurse P. Genetic control of cell size at cell division in yeast. *Nature* . 1975; 256: 547-551.
9. Saul, Heather: “ Richard Dawkins demands apology from Sir Tim Hunt’s critics amid claims leaked transcript shows ‘ sexist’ comments were ‘ light-hearted banter’”. *Independent* . June 25, 2015. <https://www.independent.co.uk/news/people/richard-dawkins-demands-apology-from-sir-tim-hunts-critics-and-claims-leaked-transcript-shows-sexist-10341160.html> Accessed January 29, 2019.