

Read the text below, from *Scientific American (SA)*, and choose the best option for the questions.

Interview with Paul Nurse*

This biologist has followed his interests from “fur and feather” to cell cycles and cancer control

Paul Nurse is one of Britain’s most distinguished scientists today. His groundbreaking work on the cell cycle in the 1970s and ’80s revealed how cells
 5 make the decisions to grow and divide, thus laying the foundation for a molecular understanding of cancer. This has earned him numerous honors, including the Lasker Basic Medical Research
 10 Award in 1998, and many regard him a prime candidate for the Nobel Prize. Since 1996, Sir Paul, who was knighted last year, has also been director-general of the largest cancer research
 15 organization in the U.K., the Imperial Cancer Research Fund (ICRF).

(was knighted = foi condecorado como cavaleiro)

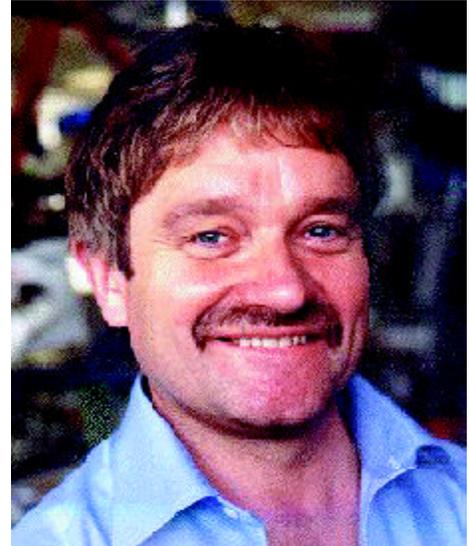


Image: ICRF

SA: When did you decide to become a scientist? Was that quite early, or only at university?

PN: Well, I think actually already as a schoolchild. I remember seeing Sputnik 2 when I was in London. As a young child, eight or nine years old, I read about it in the newspaper and went out in our garden and saw Sputnik 2 fly over, I think in 1957 or 1958, and this was truly amazing. And then when I was a little older I became interested in natural history, and I watched birds, and I collected beetles, and was interested in plants and so on. So my main *entrée* into biology was through natural history. I think that is quite common.

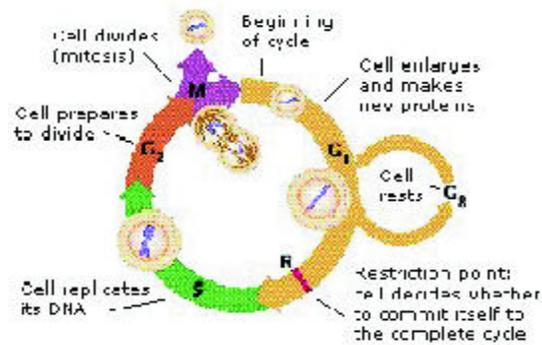
SA: Was it always clear you wanted to become a biologist, not a physicist or an astronomer?

PN: Yes, but originally I was more interested in natural history and ecology, and then I found it so difficult, because the laboratory of this field [pointing to the grass] is too uncontrolled. So as I grew older, as an undergraduate and then as a postgraduate, I really wanted to work more on molecular and cellular things, because you could do controlled experiments so much better.

SA: Who do you consider your most important teacher?

PN: I had a very good teacher of biology at school, who I recently met again actually, a man called Keith Neal. Then I think a very important person was my postdoctoral advisor, when I was in the University of Edinburgh, Professor Murdoch Mitchison, who gave me great freedom as a young investigator and allowed me to work in my own way. I owe him great debt for that. He encouraged me, he spoke to me, but he really made no attempt to control me, a very good situation.

* Paul Nurse was awarded the 2001 Nobel Prize for Medicine.



SA: You are mostly famous for your work on the cell cycle, the cell machinery that controls cell division in eukaryotes. Could you explain what your most important discovery was?

PN: I think the most interesting discovery that I made was to identify components of what is now sometimes called the cell cycle engine. All humans are made up of billions of cells, and they grow and divide. The process that brings about the reproduction of cells is called the cell cycle. I have been interested for many years in what controls progression through that cell cycle, what regulates the cell division process.

SA: You have two daughters, is either one planning to be a scientist?

PN: I have two daughters, that is true. One of them is, at the moment, a sports journalist at our local television station in Oxford, and the other is in her final year at Manchester University doing theoretical physics. So I have one who is a scientist and one who isn't.

SA: Did you ever encourage them to become scientists?

PN: No, but I would be quite pleased if one of them did. But I think they should make up their own minds.

SA: I also know you are a pilot. Do you think flying an airplane and heading a research institute have anything in common, or is it very different?

PN: It's very different, and I think that's why I am attracted to it. I am a glider pilot, mainly, and I fly gliders when I can at the weekend. It's really to do something totally different, having to concentrate on totally different sorts of things, like keeping this airplane up, and going in the right direction, and finding the up currents. It's a major relaxation because it is so different from what I do normally.

SA: Do you think you will always work on the cell cycle?

PN: I am still working on the cell cycle, but I also have a new area, which is related to the cell cycle, which is cell morphogenesis, or how a cell obtains its form, its shape. I think this is another very fundamental biological problem, like the cell cycle, which I find very interesting. It has some relevance to cancer also, because when cancer cells metastasize and spread through the body, they have to undergo a variety of cell shape changes to be able to escape from their tissue and to get into other places. But the basic mechanisms that control cell shape are simply not understood.

SA: Have you had any personal experience with cancer in your family or among friends, and did that change your view of cancer research?

PN: Because I am director-general of ICRF, it actually means that I meet now many people that have been affected by cancer. So although in my own family I have not, one of my friends certainly has. He survived, but that was really a tough time, and it was quite an experience for me. It makes me realize that cancer isn't simply an academic problem, that it is a problem that obviously influences in very important ways people's lives, and I think that changes the way you view the research that goes on in an institute.

SA: Do you think we will see a cure for cancer like our grandparents saw a cure for infectious diseases?

PN: I don't, actually. Cancer, first of all, is many different diseases, many different sites and forms; some people say it is as many as 200 different diseases. There are many different genes that can become defective to give rise to cancer, and they all have different characteristics. So I think the

likelihood of having a common treatment for all of these is just not likely. There will be some treatments that will be useful across the board, but I think it would be a mistake to look for “the cure” to cancer. But what I think we can expect to see is steady improvement by applying this new knowledge to treating and preventing the disease.

Scientific American: Interviews: Paul Nurse: June 26, 2000

1

What was Paul Nurse’s most important contribution as a scientist?

- (A) Describing the process and the components of the cell cycle.
- (B) Discovering that all humans are made up of billions of cells.
- (C) Explaining how DNA is replicated in the cell cycle.
- (D) Investigating the causes of cancer.
- (E) Establishing an interaction between genetic makeup and the environment.

2

What, in chronological order, motivated Paul Nurse’s decision to become a biologist?

- (A) London / Sputnik 2 / experiments with plants and animals
- (B) London / plants and animals / controlled experiments
- (C) A British satellite / animal cells / molecular and cellular things
- (D) Sputnik 2 / plant and animal cells / controlled experiments
- (E) Sputnik 2 / plants and animals / molecular and cellular things

3

This in “This has earned him numerous honors” (lines 7-8) refers to:

- (A) Lasker Basic Medical Research Award
- (B) the biologist’s numerous honors
- (C) Paul Nurse’s findings on the cell cycle
- (D) a molecular understanding of cell division
- (E) the UK’s largest cancer research organisation

4

Paul Nurse states that Professor Murdoch Mitchison is a person to whom he owes a great debt because Professor Mitchison ...

- (A) was his postdoctoral advisor;
- (B) encouraged him without controlling him;
- (C) refused to give him any freedom to conduct his research;
- (D) was a young investigator who worked in his own way;
- (E) encouraged him to become a scientist.

5

The word **groundbreaking** in “His groundbreaking work on the cell cycle in 1970s and ’80s revealed [...]” (lines 2-4) means:

- (A) recent
- (B) lucrative
- (C) straightforward
- (D) revolutionary
- (E) immediate

6

Consider the statements below (refer to the Cell Cycle illustration in the text).

- I) Cell division is the last stage in the cycle.
- II) All cells complete the cycle.
- III) In order to produce proteins, cells do not have to grow.
- IV) DNA is replicated after mitosis.
- V) Mitosis means cell division.

Among these statements, two are true. What are they?

- (A) I and II
- (B) I and V
- (C) II and V
- (D) III and IV
- (E) III and V

7

“False friends” are words in a foreign language which are similar in form to words in our mother tongue, but which do not have the same meaning. Which pair of words below (taken from the text) contains **only** false friends?

- (A) Characteristics / cycle
- (B) Divide / cycle
- (C) Laboratory / actually
- (D) Realize / actually
- (E) Laboratory / characteristics

8

What word below would be **inappropriate** to describe Paul Nurse’s attitude towards his daughters’ careers?

- (A) Authoritarian
- (B) Accepting
- (C) Tolerant
- (D) Liberal
- (E) Thoughtful

9

Paul Nurse's hobby reflects:

- (A) a research belief
- (B) a personal interest
- (C) his own scientific approach
- (D) an academic motivation
- (E) a social preference

10

In what way has Paul Nurse's personal involvement with people affected by cancer influenced his views on the matter?

- (A) He believes family support is a crucial element in the cure for cancer.
- (B) He thinks cancer is simply a personal issue.
- (C) He claims cancer should not be seen only as an academic issue.
- (D) He thinks cancer treatment can affect the ICRF.
- (E) He affirms that institutional research is a family matter.

11

How does Paul Nurse view "the cure" for cancer?

- (A) He does not believe there is a cure for cancer.
- (B) In the near future, scientists will find a cure for cancer.
- (C) Unlike infectious diseases, cancer is curable.
- (D) It is likely that we will see a cure for the 200 different forms of cancer.
- (E) Treating and preventing cancer are not possible alternatives to dealing with the problem.

12

In order of appearance in the text, what themes are developed in the interview?

- (A) Nurse's personal life / cell cycle / natural history interest / views towards cancer / present research
- (B) Nurse's post doctoral thesis / cell cycle / present research / personal life / views towards cancer
- (C) Cell cycle / present research / Nurse's academic honors / personal life / views towards cancer
- (D) Nurse's professional background / cell cycle / personal life / present research / views towards cancer
- (E) Nurse's views towards cancer / cell cycle / personal life / previous research / Nurse's academic honors

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