BRITISH BROADCASTING CORPORATION *RADIO 4*

TRANSCRIPT OF "FILE ON 4"- 'CANCER RESEARCH'

CURRENT AFFAIRS GROUP

TRANSMISSION:	*Tuesday 20th November 2007*	*2000 - 2040*
REPEAT:	*Sunday 25th November 2007*	*1700 - 1740*

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PROGRAMME NUMBER: *07VQ3929LHO*

"FILE ON 4"

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ACTUALITY OF FUNDRAISER

CHILDREN: Five, four, three, two, one! [sound of klaxons]

NORTHAM: Each year, thousands of people pound the streets, take part in sponsored bike races, even have a full body wax in public to raise funds for one of the very best of good causes – research into cancer. Expensive and time-consuming studies in laboratories have rendered many cancers treatable, bringing added years, even decades, for patients and their families. Every penny counts.

WOMAN: I'm running for my friend, Margaret, who died in 2005 and I'm running for myself, because I've survived breast cancer two years ago, and it's two years this month since I finished my chemotherapy.

NORTHAM: But this week File on 4 reveals a scandal - millions of pounds in charitable donations and from taxpayers are being wasted on worthless cancer studies, simply for lack of good housekeeping practice in the laboratory. The extraordinary fact is that many scientists fail to carry out simple and inexpensive checks to ensure that they are working with the right experimental materials. As a result, thousands of studies have been invalidated and the cause of progress set back.

SIGNATURE TUNE

ACTUALITY IN LAB

PILKINGTON: All of my labs have some sort of commemoration for people there whose lives have been lost through brain tumours, and this one happens to be Luke Frost, an eleven year old child who died from a malignant brain tumour seven years ago.

NORTHAM: At the cutting-edge of cancer studies, Professor Geoff Pilkington runs the biggest laboratory in the country, specialising in brain tumour research. It's at the University of Portsmouth. As the basis of their experiments, he and his team maintain a stock of research materials, known as cancer cell-lines, which they grow in flasks kept at body temperature in a warm cabinet.

PILKINGTON: Here we have culture medium. There is …

NORTHAM: That's this little bit of liquid on the front side

PILKINGTON: Tiny little bit of liquid there, which is in the base of the chamber there.

NORTHAM: So these are cells from a tumour which you are now growing in laboratory conditions?

PILKINGTON: That's right. We cut that up into very small pieces and then the cells will start to divide and the whole of the base of this flask will be covered with cells. Once the base of the flask is filled with tumour cells, these cells will continue to grow and then we'll transfer those from one flask into perhaps three or four additional flasks.

NORTHAM: And start new cultures?

PILKINGTON: And start subsequent cultures. Each time …

NORTHAM: So this is your variant on making yogurt?

PILKINGTON: It is, it is, in a manner of speaking.

NORTHAM: One of the problems of working with cell-lines from different cancers is that to the naked eye they all look fairly much the same – a cluster of tiny dots on the bottom of the flask. Using the right cells is vital for much research, but even under a powerful microscope, it can be hard to tell them apart. In fact, as Professor Pilkington learned the hard way, it can even be difficult to tell what species they come from.

PILKINGTON: There are two instances that I'm aware of in the laboratories, whereby we've had what we call squeaky contaminants, and these are whereby our human cell-lines, where those have become contaminated with either rat or mouse cell-lines.

NORTHAM: How could experts make such fundamental mistakes? Professor Pilkington made it his business to find out.

PILKINGTON: The source of contamination, we think in the, with the rat line, was a chemically induced rat brain tumour, cells from which had been left over in my laboratory and they'd been cultured at the same time as the human brain tumour cells. So if you have people working and they're not careful about how they clean the area after they've finished their work, or perhaps their aseptic technique has been poor and they've moved a pipette from one solution to the other and just forgotten about it, these events can take place.

NORTHAM: Sloppiness, to put it crudely?

PILKINGTON: Well, it's poor technique in the laboratory and this can be where you have a multiple user laboratory, it can be one particular worker who is rather less meticulous in their work than all the others, and everybody else's work will suffer as a result of that.

NORTHAM: The effect on the cancer studies was disastrous. Researchers who thought they were investigating the growth of human tumours were led into blind alleys because their cell-lines were simply false.

PILKINGTON: Well sadly we had to just throw them all away.

NORTHAM: And what happened to all the work that you'd done based on those cells?

PILKINGTON: Most of that work was completely destroyed and so therefore whole programs of research had to be redone using verified human brain tumour cells.

NORTHAM: This is time, effort and therefore money down the drain, isn't it?

PILKINGTON: It's hugely expensive, it's incredibly frustrating and it means that the laboratory is put into some degree of disrepute in a way, because you don't want your lab to be associated with something which is purporting to have cells which clearly they're not. And the only way you can deal with this is to be upfront and honest about it and get rid of those cells and then re-evaluate everything you're doing in the lab.

NORTHAM: You struggle in a number of ways to raise money for brain tumour research here in Portsmouth. If some of that money then ends up being wasted, that's – to put it mildly – frustrating, isn't it?

PILKINGTON: It's an incredible frustration because, as you rightly state, brain tumour research is extremely poorly funded. It's hard-fought money and when we get money into the laboratory we need to produce good strong results, good strong data, and we need to report back to those organisations, which are mainly charities who are funding our research.

NORTHAM: And how do they respond when some of that money has simply been wasted?

PILKINGTON: Well, of course in most cases, they'll never know about it, because we will do our utmost to rectify the matter in house.

NORTHAM: Professor Pilkington's experience of contamination of cell cultures is by no means unique. Many laboratories suffer similar catastrophes, even with well-established lines of cells, which are sold all over the world by specialist companies. There's also a lively informal system of exchange in which scientists send each other cell-lines, blissfully unaware that some have become contaminated and are not what they purport to be. These mistakes can go undetected for years – on occasions even for decades.

ACTUALITY OF CHRIS TSELEPIS AT MICROSCOPE

TSELEPIS: Okay, so if you have a look through this microscope here, I've set up a slide and you should be able to see some cancer cells there that are staining in brown.

NORTHAM: A major error was recently uncovered in the Cancer Research UK laboratories in Birmingham University, where Dr Chris Tselepis is studying the formation of a particularly menacing cancer that affects the gullet or oesophagus.

TSELEPIS: So you should see groups of cells and colonies.

NORTHAM: There's a lot of them here.

TSELEPIS: That's right. It's, the majority of the cells there on that slide will be adeno-carcinoma.

NORTHAM: Did these come from somebody's oesophagus?

TSELEPIS: That's right.

NORTHAM: This is an important field of study. Each year in Britain alone, more than 3,500 people die of this type of cancer of the oesophagus – known as adeno-carcinoma. That's more than are killed on the roads. Dr Tselepis knows that an effective treatment is urgently needed, and is examining the role stomach juices play in causing these cancers.

TSELEPIS: The incidence of oesophageal cancer, in particular adeno-carcinoma of the oesophagus, is rising faster than any other cancer in the western world.

NORTHAM: And once you've got it, what are your chances?

TSELEPIS: Well unfortunately they're fairly slim. Approximately 4% to 8% survival rates post five years, so in essence on diagnosis out of a hundred patients, only approximately four to eight of those will be here in five years time.

NORTHAM: And this is the fastest rising cancer in the western world?

TSELEPIS: That's right.

NORTHAM: And if you could find what it is in stomach juices, as you call them, which is provoking cancer, what would you be able to do about it?

TSELEPIS: Well potentially one could block these causative agents.

NORTHAM: You might prevent cancer?

TSELEPIS: Definitely.

NORTHAM: For more than twenty years, researchers have studied this oesophageal cancer in the laboratory using a particular experimental culture of cancer cells known as TE7. It has formed the basis of published studies. But Dr Tselepis

NORTHAM cont: and an international group of colleagues did a little detective work and, two months ago, reported a most unwelcome finding. TE7 is not what everyone thought it was. It's the wrong type of cancer, and the implications for two decades of research are grave.

TSELEPIS: There's many many people worldwide who are studying this disease, and here we have a scenario where lots of these studies are using a cell-line, and they've been using this cell-line to try to identify causative agents for this cancer. And it now transpires that it isn't what they thought it was.

NORTHAM: What effect could this have on the development of treatments?

TSELEPIS: I think it will have a great impact on treatment of patients with adeno-carcinoma. If there's a study which is claiming that a particular drug has a particular effect on a cell type and potentially you could use this drug for the treatment of patients with oesphageal adeno-carcinoma, well that clearly is going to be misfounded.

NORTHAM: So people may be working with cells which you've said are wrongly identified, and in good faith they're wasting time and money?

TSELEPIS: Yep, that's right.

NORTHAM: Fortunately for Dr Tselepis, this misidentification has only a minor effect on his own research, which is more broadly-based. But the general damage done by false cell-lines troubles one of Britain's leading scientists - Karol Sikora, Professor of Cancer Medicine at Imperial College, London. Professor Sikora is quick to point out that no patient is likely to be directly harmed by such invalid laboratory work. But it does create confusion where we most need clarity.

SIKORA: It certainly causes millions of pounds worth of lost time and effort that could be better spent on more productive research. One of the problems, of course, is that investigators are competitive, eager to get the results. They

SIKORA cont: don't want to waste their time doing what they regard as a technical exercise, typing the cell-lines. They believe someone else should do it for them. And that's led to this sloppiness, I guess, in science.

NORTHAM: And if, as we have heard from the horse's mouth, there are cases where eminent scientists have found that research that's been done in their laboratories was completely invalidated and had to be repeated, losing years of work in some cases, this is a serious delay in the development of treatments, isn't it?

SIKORA: It could be, and there is a lot of noise in science and sorting out that noise costs money. By noise I mean different groups getting different results, so who's right? You can have horrible arguments take place at conferences when two competitors come up with different conclusions. Sorting that out takes time, and that time could be better spent progressing. So it does take away from the driving force of science, having the mess.

NORTHAM: The extent of the problem of false cell-lines has been authoritatively assessed and made public. Concerned at the implications for their own work, scientists at the German Government's collection of tumour cell cultures checked the identities of the samples they're sent by researchers all over the world. Their chromosome specialist, Dr Rod Macleod, reports an alarmingly high level of misidentification.

MACLEOD: Over a long period of time we have found about 17% of all tumour types, we have found discrepancies between the purported and actual identities.

NORTHAM: You mean people have been working with something that they thought was different from what it really is?

MACLEOD: That's right.

NORTHAM: 17% sounds extraordinarily high. Are you really saying one in six of the cell-lines that you've looked at turns out to be either misidentified or contaminated?

MACLEOD: Precisely so. And that might very well be an underestimate, because in order to identify the false cell-lines we need to have a previous example. And our database is still very limited.

NORTHAM: When you found these figures, what did you think?

MACLEOD: We were frankly astonished.

NORTHAM: When scientists learn that they have been working with a false or a falsely identified cell-line, what response do you get from them?

MACLEOD: Initially denial, people just don't believe it, and I'm afraid it's all too understandable if you've sunk in many years of research into work with a false cell-line, to see it going down the plughole, it's very difficult to suddenly admit that it's wrong.

NORTHAM: People don't say in the spirit of scientific enquiry, thank you very much for pointing this error out to me?

MACLEOD: Eventually some do, but that's seldom the first response, put it that way.

NORTHAM: We've found a similar reluctance to acknowledge the problem. File on 4 sent questionnaires to hundreds of scientists in more than eighty universities. Only thirteen of them replied. Some of them say they've had no difficulty over false cell-lines. Others report that they have and that their work has been hampered.

READER IN STUDIO: It took approximately six months to recognise the problem.

READER 2 IN STUDIO: Some research results were never submitted for publication, research programmes were delayed and PhD students had to re-do experiments.

READER IN STUDIO: Progress in that line of research halted.

NORTHAM: We asked the UK's leading charity, Cancer Research UK, which spends more than £300 million a year on studies, for an interview about the potential waste of large sums of this money. For two weeks we kept asking. Finally we were told no-one would be available. In a statement, Cancer Research UK say there are robust procedures to ensure good science.

READER IN STUDIO: All Cancer Research UK scientists have access to the charity's cell-bank, which provides a high quality, regulated central service. The checking procedures for this resource are stringent and include cross-species checks, a DNA authenticating service and a quarantine facility, which can screen lines obtained from external agencies.

NORTHAM: But even 'robust' systems may contain loopholes. One of the laboratories Cancer Research UK supports is at the University of East Anglia, where the Chair of Cancer Studies is Professor Dylan Edwards. Is he required to authenticate cell-lines before starting work on them?

EDWARDS: No, they don't make any formal requirement of us. I think there is an expectation that the scientists will do that, that they will guarantee that their work is good and solid.

NORTHAM: It's not written into any kind of arrangement that you have with them that you have to authenticate first?

EDWARDS: No, not at all, no. We have legal requirements as regards how we, the safety of our workers working with human material, but not in terms of authentication of the cells, no.

NORTHAM: Do, for example, Cancer Research UK insist that you use their established cell-lines that you get from them?

EDWARDS: No, not to my knowledge. We've certainly been in the past quite able to use whatever cells we've got our hands on from other sources basically.

NORTHAM: With no requirement to check them first?

EDWARDS: No.

NORTHAM: As for the major public funder, the Medical Research Council, which spends more than £70 million a year on cancer studies, officials there recognise the possibility that some of this may be misspent because of error over cell-lines. But Dr Rob Buckle of the MRC insists that he has no evidence that this is happening on any significant scale.
If it's true that money is being wasted on worthless research, you can't tell me that MRC money has somehow been exempt from that, can you?

BUCKLE: No, I can't say that at all. But what I'm saying is we're not aware of any particular study that's been compromised by this, and we're not aware in general terms that the researchers and our advisors who do the peer review have found this to be a major problem.

NORTHAM: Do you think that some of your scientists may be covering it up, as we've heard that some scientists do when they reach the embarrassing conclusion that they've been working with the wrong cell-lines? They just quietly get on with something else.

BUCKLE: Well, this is of course a possibility, but we have peer review for that very purpose, so that is assembling experts who can bring objectivity to their assessment of a project, and how the project's outputs, which are the publications generally, are validated.

NORTHAM: You don't think there's a danger that you might be sounding complacent about what scientists tell us is a very substantial problem leading to the waste of a huge amount of money?

BUCKLE: Well I hope we're not being complacent. We are consulting with our expert advisors on this, and clearly if scientists who've spoken to you feel that they want to raise this with the MRC, then we'd be happy to hear from them.

NORTHAM: The scale of losses from working with a false cell culture can be huge, though they're rarely calculated. At the University of Michigan, Professor Justin McCormick uncovered a case of misidentification and decided to work out how much it cost in lost time and wasted research funds. His conclusion is breathtaking. The project was a piece of fundamental science investigating the mechanisms by which normal human skin cells can become cancerous. The difficult part was getting cancer cells to form in laboratory conditions. One of Professor McCormick's colleagues thought he'd cracked it.

MCCORMICK: I attempted to repeat an experiment of a colleague who had written a number of research papers demonstrating that he had changed normal human cells into cancer cells in the laboratory.

NORTHAM: And if true that would have been something of a breakthrough?

MCCORMICK: It was a breakthrough - it would be a breakthrough, let's put it that way. Unfortunately when I tried to reproduce his experiments, I was never successful. After trying this for three years, I suddenly realised that perhaps this researcher had not been successful and that I needed to test whether indeed he had succeeded or not. They were in fact cancer cells from a patient that had a tumour and the cells had been placed in culture, and somehow they had become mixed with the normal cells he was working on, and this led him to believe that he had converted those normal cells into cancer cells.

NORTHAM: Which meant that there was no breakthrough at all, it was just contamination. Professor McCormick was so frustrated that he began to add up the lost time and money.

MCCORMICK: Our estimate of the amount of money involved, it would be that it lost $20-40 million because research funds had been invested by the United States National Institutes of Health and other research organisations around the world attempting to repeat an experiment that in fact failed.

NORTHAM: $20-40 million is a huge amount of research money.

MCCORMICK: It is, but probably even more important than that is the fact that the field was delayed three to five years, since researchers were really working on attempting to do this. They wasted their time and the time of all the people involved, and also it didn't cause the field to progress in any way. Just a sad day.

NORTHAM: Professor McCormick's disastrous waste of time and money happened twenty years ago, when $20 million was worth even more than it is today. We've been unable to find anyone since then who's gone to the trouble of calculating the losses from a case of contamination. The costs mount rapidly because scientists rely on each others' work, published in reports in the scientific journals which are widely read, so errors become multiplied by repetition. At the University of California in Berkeley, Professor Gertrude Buehring is an expert on leukaemia and breast cancer. She's made a detailed search of published studies which have been based on false cell-lines, to discover what proportion represent a pure waste of time and money.

BUEHRING: We looked at publications all the way from 1969 up through 2004 – and there were thousands of them really that we went through – and we found that in about a third of those publications, they were using their cell-line in an invalid way, as if it were the cell type of origin, and obviously having no idea that it was a contaminant.

NORTHAM: That's a substantial proportion of thousands of publications.

BUEHRING: It certainly is.

NORTHAM: Had they been withdrawn and acknowledged?

BUEHRING: No, not that I, I've never seen one withdrawn.

NORTHAM: Doesn't science progress by people looking at what's been published and then developing their own research from it? And if that publication is invalid, there's a problem, isn't there?

BUEHRING: There certainly is. A tremendous amount of time and money invested in research, scientists building on each others work, and they're all using the wrong cell-line. It's worthless.

NORTHAM: There's a problem too of scientists continuing to depend on cell-lines long after they've been shown to be false. This has been tracked by the distinguished author of the laboratory Bible on cell culture at the University of Glasgow.

ACTUALITY WITH IAN FRESHNEY ON COMPUTER

FRESHNEY: I maintain a database on cross-contamination or misidentified cell-lines.

NORTHAM: And there it is?

FRESHNEY: It's rapidly growing. At the moment it numbers over a hundred examples of misidentified cell-lines.

NORTHAM: So you show the cell-line on the left …

FRESHNEY: The cell-line in the first column here, yes.

NORTHAM: Then what it's thought to be?

FRESHNEY: That's right.

NORTHAM: Then what it really is.

FRESHNEY: Then what it's contaminated by and that species, what that cell type is and then ….

NORTHAM: Who unmasked it.

FRESHNEY: Who unmasked. What I'm starting to do now is try to get an idea of the number of times that these cell-lines have been used erroneously and I don't really have a final figure for that. But in some situations, for example, the KB cell-line, which is supposed to be an oral cavity tumour of humans, it is human, but it's actually contaminated with a cervical adeno-carcinoma, and I have 2,200 references to that cell-line, which I haven't checked them all, but almost invariably these will be misuse of that cell-line

NORTHAM: What's the most recent use of that particular cell-line which has been known for at least thirty years to be contaminated?

FRESHNEY: Right, if you key in the name of the cells …

NORTHAM: KB cells.

FRESHNEY: … and search for that, there's 2,500 already and the last one here is October 2007.

NORTHAM: Last month?

FRESHNEY: Last month, yes.

NORTHAM: So someone thirty-something years later has just published an article in a journal assuming that this is, what, is this oral cancer?

FRESHNEY: Yes.

NORTHAM: And in fact it's cervical cancer?

FRESHNEY: Yes.

NORTHAM: The article last month misidentifying these cancer cells goes on to make a further mistake – using as samples of breast cancer a cell-line that was exposed early last year as actually from an ovary. Despite these two errors, the study found its way to print in the respected British Journal of Cancer published by Cancer Research UK. A correction is to be made. We wanted to ask the editor of the Journal how these errors slipped through his peer review process and came to be published. But he was not available for interview. We contacted the study's principal author, Professor Lou of the Chinese Academy of Sciences in Shanghai. He too was unwilling to be interviewed. He accepted that he may be mistaken about these cell-lines, but argued that this did not invalidate his work. But Dr Ian Freshney is concerned that by presenting his findings as if they were relevant to oral and breast cancer, Professor Lou may unintentionally mislead future researchers.

FRESHNEY: The problem that arises is that other people will read this paper and then they will then say, 'Oh, this applies to breast carcinomas, so this is a good drug to make resistant breast carcinoma cell-lines or cells sensitive to chemotherapy, and that is wrong because it is not a breast carcinoma. The cell-line that they used was in fact ovarian carcinoma.

NORTHAM: So the implication for patients is what?

FRESHNEY: The implication for patients is that an opportunity to produce a useful compound is going to be discredited because the wrong cells were used. What this paper's going to mean is that people will interpret it as being useful for head, neck cancer and for breast cancer, which it is clearly not. It's not established that it's got anything to do with head and neck or breast cancer. The fundamentals of the work are probably fairly reasonable and valid, but the application of the work is discredited by the fact that the cell-lines were not properly authenticated.

NORTHAM: Do you expect that, when you update your database in coming months, you will find Professor Lou's paper quoted as if it applied to breast cancer?

FRESHNEY: Yes, I think there's a very serious risk that that will happen, just as they quoted a large number of other papers from other institutions using the same cell-lines.

NORTHAM: One of the most surprising facts about false cell-lines is the way that among scientists the problem has been known about for decades and allowed to persist. In the early days of cell culture, it was recognised that many supposedly new cell-lines were in fact contaminated. Then, in the 1970s, an outspoken American, Dr Walter Nelson-Rees, working on cell collection for the US National Cancer Institute, began to point out the uncomfortable truth that study after study was completely invalidated by contamination. Dr Nelson-Rees decided he had to make this information public, causing consternation among the scientists concerned.

NELSON-REES: In more instances than not, they at first absolutely balked – that cannot be true and Nelson-Rees is wrong and we have to earn our contract, our money and we have to support our families. It wasn't until twenty years later, with the advent of DNA studies, that they found out that in fact Walter Nelson-Rees was right. But early on people said, 'You cannot be, because we're finding certain characteristics of, say, a lung cell,' when in fact what they were studying was some bogus trait that the cells had.

NORTHAM: When you found that they were working with cells which were not what they were purported to be, what were the implications for their research in that case?

NELSON-REES: Well, I just didn't believe what they had to say. If they were telling me that they were studying lung cells with certain antigens very specific for lungs, I simply didn't believe it. Whatever was published from that laboratory was, in my opinion, wrong.

NORTHAM: And what do you make of the fact that, thirty years on, this kind of contamination is still happening?

NELSON-REES: It's a scandal. I do not know how it can be corrected.

NORTHAM: In an attempt to put right this longstanding problem, this summer nineteen eminent specialists from Britain and America wrote to the United States Health Secretary, calling for tough action to eliminate such waste of time, effort and money. The response from the US Government has encouraged the signatories. We can reveal that the Director of the federal research agency, the National Institutes of Health, has written back to say:

READER IN STUDIO: There appears to be abundant evidence that contaminated or misidentified cultures have compromised the validity of many studies and publications.

NORTHAM: But the response from scientists themselves has left the originator of the Open Letter, Professor Roland Nardone of the Catholic University of America, wondering whether there really is a widespread will to put matters right.

NARDONE: I've had unsolicited letters of support from people around the world, from respected individuals, people who are in charge of major repositories. However, the response from the bench scientist has been notably lacking.

NORTHAM: How do you explain that?

NARDONE: They morphed into ostriches is the best explanation I have. That is why our plan calls for something that will ensure compliance, and the heart of our plan is a zero tolerance with respect to authentication. We're advocating no authentication, no grant; no authentication, no publication in a good scientific journal. If we can get the cooperation of the granting agencies to insist on authentication, the researchers will fall in line and adopt it without any problem. And if we don't have this insistence on compliance, we're going to lose the battle.

NORTHAM: The authentication Professor Nardone calls for would come from a technique of DNA profiling, comparing a cell-line with a list of known contaminants and, if it doesn't match, giving it a clean bill of health. The cost per sample can be as little as £180. But do scientists routinely check their samples like this? At the University of East Anglia in Norwich, the Chair of Cancer Studies Professor Dylan

NORTHAM cont: Edwards, has had some unhappy surprises of his own as cell-lines proved to be from the wrong part of the body or even the wrong species. He now takes great care to buy cultures only from reputable suppliers – though even some of them have proved occasionally unreliable. But should he be routinely having each cell-line authenticated?

EDWARDS: I think if we are, as scientists, policed in such a fashion that this is necessary, we will all accept it because it is actually making for better science in the long run.

NORTHAM: Why don't you just do it anyway?

EDWARDS: I think that that's a good point. I mean, there are other systems that we relied on along the way that have been our standard way of looking after cells, that we've trusted and been careful about.

NORTHAM: Without the kind of pressure that would come from funding councils and scientific journals, do you think on the whole scientists will comply with an authentication regime or will it take that sort of pressure to make them do it?

EDWARDS: We're all, as scientists, wanting to get into the very top journals and if there is, we will comply with any requirement in order to get into those journals. That will be the main driver. I think that individual scientists obviously will work to do their very best to keep their science true as much as they possibly can, so we will police ourselves to a certain point, but unless a system like this is somehow enforced from outside, then I think that we would probably carry on along the system that we've been doing.

NORTHAM: In other words, it will take outside pressure to make people like you conform, will it?

EDWARDS: It may well do, yes.

NORTHAM: We wanted to ask the editors of leading journals and funding bodies how they respond to the suggestion that they should impose a zero tolerance policy – no authentication, no grant, no publication. The editorial staff of the leading British journal, 'Nature', were unavailable for interview. Once again, we'd have liked to talk to the British Journal of Cancer and its parent body, Cancer Research UK. But they too were unavailable. Other major funding bodies have been more forthcoming. At the Biotechnology and Biological Sciences Research Council, we were told that a zero tolerance policy is under review. But at the leading source of public funding, the Medical Research Council, which spends more than £70 million a year on cancer studies, response seems more cautious. There, Dr Rob Buckle sees little role for the MRC in enforcing compliance with a code of authentication.

BUCKLE: We're quite aware that in laboratory practice these issues can arise. And they would arise where good research practice wasn't being followed. We do feel it's the responsibility of the research community to monitor this. Certainly, as soon as you start talking about regulation, we have to think, ensure that it's proportionate and doesn't actually inhibit research.

NORTHAM: Why not simply say, if you want a grant from the Medical Research Council, you must take the fundamentally obvious step of authenticating the cell-lines you are working with?

BUCKLE: Well, there are two things there: a. that good research practice does require that …

NORTHAM: But we know it doesn't happen everywhere.

BUCKLE: It doesn't happen everywhere.

NORTHAM: So why not make it happen everywhere?

BUCKLE: We would expect labs to authenticate their work or use properly-sourced cells in terms of the publications that come out of the work are the next step towards, well they move the field forward and they're the next step to winning research funding.

NORTHAM: When you say you would expect them to authenticate their cell-lines, why not make them, why not demand it?

BUCKLE: Well, as I said, we have to be careful that there is a problem that needs regulation at all levels here. So we want to find the right balance between proportionate adherence to the guidelines and regulatory practices.

NORTHAM: To those of us outside the scientific establishment, it may seem almost unbelievable that forty years after it was first identified, the problem of false research samples should still be unsolved – especially when a relatively cheap authentication process is now available. But even within the establishment, voices are now calling for science to put its house in order. Voices now joined by Britain's leading expert on cancer medicine, Professor Karol Sikora of Imperial College.
If people are contributing either through taxation or through charitable giving and they hear that a substantial proportion of it is money down the drain because the research is invalidated because of these basic errors, they're going to be pretty irritated, aren't they?

SIKORA: They will, and I think we as a scientific community have to do something about it. Just no grant or no publication, but no publication is probably more powerful. If one of the leading journals, which all of us want to publish in, said, 'Okay, you've used cell-lines, wonderful, just give us the certificate of authenticity.' Now we can tell all that and it doesn't necessarily cost a lot of money.

NORTHAM: Time to sort this out?

SIKORA: Time to do that indeed, yes.

SIGNATURE TUNE