MEDIA MONITORS

Transcript

Station:	**ABC1**	Date:	**09/06/2010**
Program:	**NATIONAL PRESS CLUB ADDRESS**	Time:	**12:30 PM**
Compere:		Summary ID:	**C00039279396**
Item:	**ADDRESS BY BARONESS SUSAN GREENFIELD CBE, DIRECTOR OF THE ROYAL INSTITUTION OF GREAT BRITAIN. BARONESS GREENFIELD IS THE ASMR MEDALLIST 2010.**		

Demographics:	Male 16+	Female 16+	All people	ABs	GBs
	2000	1000	3000	1000	1000

COMPERE: Ladies and gentleman, welcome to the National Press Club for today's National Australia Bank address. It is indeed a pleasure to welcome Baroness Susan Greenfield here today. She's all the things that you've just heard in that introduction and was director of the Royal Institution of Great Britain until January this year, and she's also this year's medallist of the Australian Society for Medical Research, many of whose members are here today. And I'm very pleased to be able to ask the chief executive officer, Warwick Anderson to present that medal to her.

WARWICK ANDERSON: Thanks, Ken. And I will if somebody brings it up, because I left it on the table.

[Laughter]

Look, it's a great pleasure and an honour for me to be asked by the Australian Society for Medical Research to present the medal. It's the most

wonderful organisation. Represents over 11,000 Australian health and medical researchers and it's the peak body in this country in advocacy; public, political, scientific advocacy for the important role of health and medical research.

The medal's donated - it's given annually and it's given to a eminent local or international scientist based on their contribution to medical research and their advocacy on behalf of health and medical research. And it's hard to think of a more worthy winner than this year's medallist, Professor Susan Greenfield, who you've heard is from Oxford, works on neurodegeneration which is a matter to many of our hearts and has played a remarkable role in public advocacy.

She likes Australia, because I've got a quote here from her in 2008, where she says something which I think is true, that people in Australia just get on with it and if they believe in things, they get them done. And I think that is a good description of Australian health and medical research with its many, many achievements over many years.

So, Susan it gives me great pleasure on behalf of the Australian Society of Medical Research to award you the 2010 medal.

SUSAN GREENFIELD: Thank you.

WARWICK ANDERSON: Congratulations.

SUSAN GREENFIELD: Thank you. Thank you.

COMPERE: Thank you very much, Warwick. Congratulations to Susan Greenfield.

Let me just finish off that introduction. You've heard most of it already, but Baroness Greenfield was the first woman to head the Royal Institute of Great Britain which of course now has its first international affiliate, the Royal Institute of Australia based in Adelaide, which began operating last year - late last year. And like the famous original it is - intends, as many people in this audience do today, to promote better knowledge and inform debate about the achievements and the issues raised by science and technology.

She's also - I don't think we've actually spelled out the details - but she's professor of pharmacology at the University of Oxford, and leads a multidisciplinary team investigating these neurodegenerative orders[sic] at the - leading that there. She's also director of the Oxford Centre for the Science of the Mind, which is getting in to the more abstruse areas of her speciality. She's also, apart from that, well known as a radio and television presenter and a best selling author.

Please welcome Susan Greenfield.

SUSAN GREENFIELD: [Laughs] Okay. Thank you.

[Applause]

Well, thank you very much, Ken and Warwick for that very generous introduction. There's one thing you missed, however, and I'm very proud of this, that in 2006 I was voted the Honorary Australian of that year.

[Laughter]

So, I truly feel…

[Applause]

Thank you.

I truly feel whenever I come here, and I come here with increasing frequency, that I'm coming home. And I'd like to say how enormously flattered and honoured I am to be given this award because I feel it just cements even further, if that were possible, my affection and admiration for all of you who live and work and are Australians.

What I'd like to talk about in this brief address, as you've heard, is something that isn't just dear to we scientists, but I think anyone who is a citizen of the twenty-first century, and that is the issue we're facing as we are ageing. As someone said, yes ageing is a problem, but the alternative is far worse.

[Laughter]

And I think what we need to do as we anticipate - as we do more than any other generation - as we anticipate living for longer, is the quality of life that we'll be leading. And of course, that inevitably means your mind.

And what I want to do really, just to orientate us a bit or to give us some framework, is to tell you one story and three experiments. So, like Four Weddings and a Funeral, but not quite the same thing.

[Laughter]

So, let's start first with the story, which I think will bring to you how very important and how very precious your mind is. So we go back in time, now, when dinosaurs roamed the earth, and that's when I was a student at Oxford, and imagine if you will, and forgive me those of you who are scientists and for whom this is an everyday experience and do forgive me if you're still eating, 'cause I hope this doesn't put you off your food.

But anyway, so they come in - imagine if you will you're in a laboratory and they come in with these Tupperware pots, okay, and you're wearing surgical gloves, because in the pots there are human brains. And these human brains are in a fixative which is why you're wearing the gloves, and you roll your

sleeve up and you put your hand in to the pot and you hold in one hand a human brain. And when I did this, I thought well if I wasn't wearing gloves and I got a bit under my fingernail, would that be the bit that somebody loved with? Or would it be a memory? Would it be a habit? Would it be a hope?

And that - this is the story by the way, in case you're counting - this is the story - the story is therefore just to think about how the essence of you, what you're feeling and thinking right now - I hope you're not asleep. I don't know, I'm assuming you're conscious, yeah? That however close you are to the people at your table; however articulate you are as all you media people are; however poetic or musical; no-one - no-one can get inside your head and see the world through your eyes. Nor can you through them. You can't have a first hand perspective of the world from someone else. Only you. And for 100,000 years no-one has had that perspective, that only you have. And somehow it comes down to something that you can get under your fingernails.

And that's the story because it brought home to me just how very precious and special the brain is, as opposed to say the lungs or the heart or the liver, which are, as we all know, transplanted with increasing facility when they're diseased. But as yet, we await anyone having a brain transplant. I don't think anyone would want one. You might volunteer other people for one, of course, but - if that was

possible. I don't think, you know, you'd want one yourself.

Okay, so this brings home to you I hope in these fir… little story, just how important the brain is because it is the essence of you. It is what makes you the person you are.

And no-one has had a brain like yours for these 100,000 years, and nor will they ever again. And therefore when we're looking at the aging population as we are getting much better in advancing with heart disease and with cancers, we are now facing the spectre of dementia - that is to say a disease of older people.

And in the UK, for example - I've got the figures here - there's 700,000 people who are already victim to this disease. And by 2021 it's going to rise to just under 1 million. Here in Australia it's currently 245,000 rising to over 1 million by 2050. And by the 2060s, and I'm addressing the politicians here, the expenditure for caring and trying to treat these disorders will exceed those of all other conditions.

So even if you're not convinced, as you must be, of the humanitarian need, the quality of life issue for really prioritising, combating these disorders, then surely there is also the economic argument too.

So let's think about how we can approach this terrible issue. And this is the other three

experiments. And I'll start first with the first experiment that illustrates, I think, just how sensitive your brain is to the environment, and how it can become the essence of you - if you like, your mind.

And this is an experiment by someone called Pascuale-Leone, and it involved three groups of adult human volunteers, none of whom could play the piano. Now if by any chance you ever get to volunteer for such an experiment, let me give you a word of advice - don't be in the control group.

Because the control group, for five days, just had to stare at a piano. \\

Yeah, well perhaps you might like to do that. Sort of time out, you know. You could just relax a bit. The second group however had much more fun. They learnt five-finger piano exercises. And there was a third group that were the most surprising at all. Now when the experimenters looked at the brain scans of the three groups, they found perhaps sadly but predictably, that the control group who just stared at the piano, their brain scans were literally unimpressed. Literally. Nothing had happened. However, the people that had learnt five-finger piano exercising, even after five days, amazingly, there was an astonishing change in the brain scans.

The areas relating to the digits were much much larger over the five days.

But more remarkable still were the third group - this group had merely had to imagine they were playing the piano. And their scans were almost the same as those who had physically played it.

Now what does this tell us?

We could speak about this all day long. First, I think this old tired notion of mental versus physical, of mind versus brain - as if people like me are consigned to the squalor of the physical brain, whereas others go around in some rarefied world talking about mental events, and moi, and emotions, and so on, and thoughts, and you know, the two don't mix.

And of course they do.

The other is that it tells you the important thing as far as the brain is concerned is not the actual contraction of the muscle but the thought that has preceded it. And the man who developed L-dopa therapy, a treatment for Parkinson's still used today, back in the 1960s, he came up with a wonderful quote.

He said, thinking is movement confined to the brain. Thinking is movement confined to the brain. An interesting thought which I'll leave you with.

Now what this illustrates is what we in the business call plasticity, not meaning of course that the brain

is plastic, but from the Greek *plastikos*(*), to be moulded. Because it shows how sensitive the brain is, not just to the external environment, but to anything that happens or that you are making happen.

Now what's exciting about this plasticity is we're learning much more about it in brain research. And it, if you like, it distinguishes us as a species as particularly special. Now other species have brains that adapt. But we do it fantastically.

We don't run particularly fast, we don't see particularly well, we're not particularly strong compared to other species in the animal kingdom. But heavens, what we do much better than they is we learn.

So I like to make comparisons with the benighted goldfish, and I don't know if anyone is a goldfish fan here, but let's be brutal - goldfish don't have great personalities, do they. And one day I'll say that and somebody will come up and fess up that they've got a genius goldfish.

But on the whole, let's face it, if you have a goldfish and it died, you could sneak off to the petshop and buy another goldfish, so by the time your kids came home they wouldn't know any difference.

Now you couldn't do that with pet cats or dogs. And even if they might want you to, you certainly

couldn't do it with their brothers or sisters. Because the brilliant thing is, as the brain becomes more sophisticated, so you shift, and this is the exciting… so you shift from the narrow instinct, the dictates of the genes, the rigid stereotyped repertoire such as the poor old goldfish - all he has to do is flap its little fins and open and close its mouth and swim around - to the much richer repertoire of, as we get much more sophisticated and complex, culminating in us, to the idea that you're shifting from the dictates of the genes to an adaption from the environment.

And guess what. If you have individual experiences - guess what happens? You become an individual. Now we know how this happens now. We know that if you make cells… brain cells work hard, then rather like muscles they will get stronger, and they will become more effective and efficient. But the way they grow is not just to get big like the muscle gets big. The way a brain cell grows if it's made to work hard, if it's active, is it grows these lovely branches.

Now you might wonder, what's the point of growing branches apart from the aesthetics? Well if your brain branches, you're increasing the surface area of the cell. And that means you can be an easier target to other brain cell connections coming in.

So we can trace a link. A stimulating, interactive environment, or doing certain things in a certain

way will make certain brain cells active, which in turn will make them grow branches, which in turn increases their surface area, which in turn enables them to make more connections.

So you can see that as you are growing, this is what's happening to your life. You are born, in the words of the great psychologist William James, into a booming buzzing confusion. And you evaluate the world in terms of raw sensations.

What other choice have you got?

How sweet? How fast? How cold? How bright?

But gradually, a visual pattern, albeit an abstract one, if it occurs always at the same time, and probably accompanied by certain sounds, let's say a voice, certain smells, certain textures, certain colours - let's say your mother - gradually that conglomeration of erstwhile abstract senses will cause you to shift from a pure sensory evaluation to what we call a cognitive one, from the Latin *cogito*, I think.

So what's happening is you are starting to shift from a bombardment of raw senses that do not mean anything into a world that starts to mean something because you are able to see it in terms of what you have experienced already.

So you start off as a one way street, so you're the passive recipient of raw senses coming in. But gradually, as the connections adapt to you and you alone, even a clone, an identical twin will not be having those same experiences.

So therefore you become a two way street. And what will happen is these raw things coming in - these experiences - can now be interpreted. You'll understand them. They will have a significance to you that they don't have to someone else.

And at the same time incidentally they will be modifying connections as they go along.

So you can see that what we're looking at here is a most marvellous dialogue between your brain and the outside world that continues until you die. And that makes you the unique and special person that you are. So far so good, if we talk about this being the mind, the personalisation of the brain, then you can see what makes you different from the person sitting next to you now.

But now, let's think of phrases like, blowing the mind, or sadly, losing the mind.

Of course you can temporarily disable those connections by - people that take drugs, or putting yourself in a situation that is stripped of all cognitive content. You know, techno techno techno techno - where you just have flashing lights and so

on, and people do this; wine, women and song; drugs and sex and rock and roll are all ways in which we can literally let ourselves go and have a sensational time.

You never say right, tonight, we're going to have a cognitive time. Great, let's go and have a cognitive time. Don't think that would get many takers. But sadly, there's other ways - more permanent ones - where one does actually recapitulate that booming buzzing confusion, that shift from the cognitive back to the sensory. And I'm talking of course about dementia where what happens is there is an atrophy, a loss of those branches, and thereby a dismantling of the connections.

And you can imagine what happens then - that if you are dismantling those connections, you are removing the checks and balances that you've so carefully nurtured, that you've so carefully grown. And you actually retrace back again, retrace back to being like a child.

And anyone here whose lives have been ravaged - and it would be that - by caring or loving someone who's been a victim of dementia will know that what happens is slowly the person gets more confused and disorientated because they cannot understand with the same ability, the same mechanisms that were available to them when they were healthy - because they are retracing, if you like, the steps back into a world - the world of the booming buzzing confusion.

So the first experiment then was the one with the piano playing - which I hope illustrated to you the sensitivity of your brain in just how special you are.

The second experiment I wanted to highlight concerns the input from the genes. Now, I should do a huge health warning for everyone listening or watching.

I cannot, obviously, in this short time give an exhaustive review of all the approaches to dementia, and I just want to do the disclaimer that there are some marvellous experiments and approaches, toxicology, epidemiology into molecular biology and genetics, all of which hold great promise but which I am unable to cover this afternoon.

But I just want to flag one particular highlight experiment that I think is another classic experiment that really does make you think, and that does concern the role of the genes.

Most people who are not in the business tend to think nowadays if you - dare I say it, if you read the press, that you have the gene for this and the gene for that, and I sadly seem to be missing the gene for good housekeeping and I've clearly got the shopping gene, for example [indistinct].

[Laughter]

I also don't have the gene for cooking or for singing or whatever. But people literally do believe this sometimes, the way that because of the wonderful advance of mapping of the human genome, that we are facing a time when you'll have a gene for this and a gene for that.

Sadly, that's not the case. And even - and this is the second experiment I want to talk to you about - even when there is a very close relationship, which is quite rare in terms of brain disease, between a single rogue gene and an aberration or a dysfunction, even then you can see it's not as easy or as straightforward or as direct as you might think.

And this experiment was by Vandelan(*) et al some 10 years ago. And what they did was explore in mice a condition of Huntington's disease, which used to be known as Huntington's chorea, a disease that characterises in late - presents in late middle age by wild, involuntary flinging of the limbs in a caricature of dance, hence the word chorea, after the Greek for dance.

And what one is able to do nowadays is to modify the gene of the mice so that they were destined to have the mouse equivalent of Huntington's chorea and the impact of this could be measured by actually looking at little movement tasks where as normally the mice would age so the movements would get worse, they'd get a score.

Why were they doing this experiment? The whole point was - and this is why it's so fascinating - they wanted to see the impact of the environment nonetheless.

So what they did was to take one group of gene - one group of mice - again the controls, you always have to have controls, nothing happened to these mice, they were not tampered with in any way.

The second group did have their genes modified so that they would, as they aged, move worse and worse. They would have the mouse equivalent of Huntington's chorea.

But then they also took mice who had been similarly modified, who were therefore genetically identical and they gave them a different environment. They gave them what was called an enriched environment. And enriched for a mouse doesn't mean, say, they come to the Press Club and have a nice lunch and network and chat. Enrichment for the mouse is little ladders and wheels and interaction and little toys to play with.

And this is the only difference, the only difference between these two groups, and yet they found that when you did that, the age of onset of the condition was much delayed and the degree of impairment was much more modest in these mice.

So I'm not saying that genes aren't important. Of course they are. They are necessary, but they are not sufficient for explaining brain function or dysfunction. They have a highly interactive and complex role that they play, and for Alzheimer's, sadly, there is not a single gene, one bad gene that gives you Alzheimer's and that's the end of it.

So genes are important, and many people are doing very worthwhile and exciting experiments trying to disentangle the interaction, but we have to look beyond merely a gene if we are, I think, to make progress.

And what I want to end with is the third experiment, which is perhaps not surprisingly, given that I have the privilege of standing here, to tell you a little bit about the work in progress in my own laboratory where I do what we call anticipatory therapy. And that would be - and this is a dream, but it's - this is the goal we'd like.

It's in two phases. Like perhaps many dreams, you try and have two for the price of one. So really, it's two dreams I have there.

So, dream one is that you could go to the doctor for a routine blood test, rather like you might go for a screening for cholesterol or something like that, and there is available a marker that actually registers that you are about to get neurodegeneration in a

year or two's time, even before the symptoms have come on.

Now, that sounds a bit unexciting or a bit sad in a way. But actually it might help, arguably, people to plan ahead. It would certainly help with clinical trials. And we know, we know that if you do start people on medication early, it can slow things down even with existing medication. So that in and of itself would be something that would be a worthwhile advance, and many people are working on that, ourselves included.

The second dream, another independent one, would be that although one doesn't have a cure for Alzheimer's disease, you can at least stop any more cells dying.

And imagine again someone going to the doctor and saying, okay, you have memory problems now, you have cognitive problems, you're disorientated and confused, but take this medication that we've now got. Take it every day for the rest of your life - or perhaps it will be a nasal spray - but if you do this, then no further cells will die. You won't get any worse.

And that, again, I'm sure those of you who are familiar with the current rather dismal clinical picture would know that this actually would be again a huge advance.

Now, put those two things together. Imagine being able to go to your GP and they say, well actually there's bad news and there's good news. The bad news is you have an elevated marker in your blood even though there's no symptoms at the moment. And if it goes untreated, then in a year or two's time, then you could be, sadly, about to get Alzheimer's disease. However, the good news is we now have a medication that stops any more cells dying, so start taking this medication right now and the symptoms will never come on.

Now that is the dream, and I do suggest very strongly that it's a dream still. But what we're doing in my lab is we believe we've identified a pivotal molecule that could be important. It could be one of the prime mechanisms, the release of this molecule and its action in the cells that are particularly vulnerable in neurodegeneration. And we've also identified a potential target. So at least in a dish, we can actually prevent the cells dying when we block the target for this evil molecule.

Now, it's far cry from what you do in the lab to what you translate through to medication, but every journey starts with a simple step, and we believe and we're excited that this approach could be one that wouldn't involve complex ethical or controversial issues or expensive brain surgery, direct brain surgery. It could be one that could be rolled out if we could get it to work, if indeed we can actually prove the concept that we are exploring at the moment.

But that's what science is all about. It's about actually having a new idea. And even if we are, in our specific example, eventually proven not to be correct and who knows, then at least that is a strategy I would advocate as something that could be a way forward for combating this terrible disease.

So it is a terrible disease and in Australia - and again, I speak to the politicians here - did you know - doesn't it make your heart sink when people say did you know that, because obviously you don't, but anyway, it's a way of introducing a fact. Did you know that delaying the onset of dementia by five years in Australia would have the potential to save, get this, $67.5 billion by 2040.

I'll repeat that because it is quite dramatic, isn't it? Five years has the potential to save $67.5 billion by 2040. So how can this not be a totally high priority for medical research, indeed for all of us who are citizens in the twenty-first century who want to have not just a healthy body, but an able and clear mind to enjoy living in the twenty-first century.

Well, I think there's four crucial take-home messages that are needed here. Inevitably, the first one is money. Research costs money, but we scientists are quite cheap to run in terms of personal salary, but nonetheless the research we do is expensive. And you do need to have the courage to invest in new ideas to let a thousand flowers bloom.

If there was a very clear and obvious approach to curing Alzheimer's, then don't you think we would have done that already? And I think that sometimes we do suffer by a certain risk-averse attitude that actually is counter-productive.

Second and something that is very close to my heart, if you want to maximise good research and good research potential, it is a no-brainer to disenfranchise 50 per cent of the talent. And that's what happens currently for women in science where, because inevitably, many may wish to start families at a time when they don't have tenure, they are hugely disadvantaged.

And until we put time and money into thinking about how to level the playing field for women in science, it will carry on that we are wasting talent and we are not acting to recruit the schoolgirls because they see that happening. And I can't emphasise that enough, how we cannot just take it as a given that it will just shape down and be just fine for women in science. It won't be, unless we really care and we show that we care by backing it with resources.

The next and third point I would address to the scientific community, that it's all very well in the old days, it's all very well to be in your ivory tower. To be laughed at, to be a dysfunctional nerd and to pull up the drawbridge - if you can have a drawbridge on an ivory tower - and just talk to each other in words that only one man and a dog can

understand and to look down your noses at everyone else, even if they're paying you, which is what has happened.

Increasingly, as science is becoming central to society - wonderful quote from Carl Sagan, the astronomer: It's suicide to live in a society dependent on science and technology where no-one knows anything about science and technology.

A plea to the scientists, my colleagues. It is no longer good enough just to worry about your grant and your lab space and what committee you're on and your teaching load, and whether someone's got a bigger lab than you next door. It's really not good enough. You now have to be at the centre of society because science is now at the centre of society. You have to communicate with the press because they will then lobby the politicians. It will go up in the public manifesto and therefore we'll get more money anyway.

Finally, we have to think about the next generation. If we are living - whether we like it or not - in a society where we're talking about climate change and GM foods and not to mention the medical problems such as Alzheimer's, we need as many kids as possible not just knowing what a gene is and not just being scientifically literate, but we need them to be out there and becoming scientists.

Even if they're not going to be at the bench, they can be in the media, they can be in politics, they can be in war, they can be in finance - because heavens, those sectors need scientifically literate people.

And that will only happen if we really think through science education, talking to the next generation, and above all, making the twenty-first century therefore something that's going to be really exciting, wonderful time to be alive.

Thank you very much.

[Applause]

KEN RANDALL: Thank you very much Professor Greenfield. We have a period of media questions now, starting with Simon Grose.

QUESTION: Simon Grose, sciencemedia.com.au.

I've got a two part question about mobile phones, brains, and the media.

SUSAN GREENFIELD: Mmm hmm.

QUESTION: Last month, we saw the interphone study come out, which was mooted as to be the, one of the largest studies of - empirical studies of potential effects of mobile phone use on brain cancer particularly.

I got embargoed advice of this. And so when I opened the papers and looked on the net news sites the next morning, I was amused to find a range of stories from - using mobile phones causes brain cancers to using mobile phones doesn't cause brain cancer.

So I'm interesting in your take, or your current views on the effect of mobile phone use on brain health. But also this, as an e… as a kind of workshop of science in the media interacting.

Those are my two questions.

SUSAN GREENFIELD: Mmm hmm. Okay. So let's break that into the two. It's a bit like a dream isn't it. My dreams again - in two parts. So let's do the specific one. I think the most cautious point I can make and one that is very important, and it's hard to convey this. But that is that absence of evidence isn't evidence of absence.

And quite often - because how could I for example prove that there wasn't a teapot in orbit around Mars? I could never do that.

And so this is the issue for example with mobile phones. That if you come up with negative information, that it hasn't - a study hasn't caused something - it means that in that study they can't see evidence for it, yes? So what I found very interesting - and this does widen out to how the media treat stories, and this was certainly with GM

foods, coming from the country of course where there was great scares on GM foods.

People would say - I'm not going to eat GM foods until someone proves they're safe. I will use my mobile phone until someone proves it's dangerous.

Yeah, and I think those of you who are familiar with this, that there are elements that are not necessarily logical or consistent or scientific, but they are very important elements nonetheless: basically, what's in it for me.

Eating GM foods. What do I gain from it when I can get other foods that are not just… my mobile phone, I gain a lot from that, so I don't want to. So as far as I understand it, the jury is still out in terms of a categorical answer.

But it is bedevilled by those kinds of issues that the general public, your readers, or listeners, viewers, might find it hard to understand because the way science is done is that you can only prove something is positive. You can't prove something negative.

And that widens out then into how the media treats scientists. And I think here we have a kind of clash of tectonic plates, and both sides need to come forward a little bit. And I think the issue is, the agenda is different.

For a scientist, the main thing they want is money because that will enable them to do their research, yeah. If they don't have money they can't be scientists. If you don't have a grant, you can't do experiments, right.

And their time scale is say over years. Ideally you want several years in order to explore - I don't know, mobile phones for example how long that study took.

Now if you're a journalist, what you want, otherwise you're go…. you want lots of readers and viewers. Different agenda. Yeah.

And your time scale is, what, oh, my experience - mmm, on a good day about half an hour in order to get here?

Now you can see how these two cultures are not going to automatically get on with each other or understand each other. And where I think the mistake comes is that the scientist assumes is that the journalist shares their agenda. They want to know about the truth.

And so therefore they will use pluperfect subjunctive twice removed when they're talking, when it could be the case that, you know, this and that, absence of th… evidence and stuff. And the journalist says, heavens. I don't give a stuff about that. I want to sell my story. I want it to be exciting.

I want a definitive answer, why can't you tell me that you boring scientist? Why are you kind of faffing around with the subjunctive, you know, why aren't you telling me yes or no? I want - I don't want these shades of grey. I want the real answer.

So you can see how the scientists really do need media training. That's why I'm so delighted to have been part of the science media centre in Adelaide which now serves the whole - where you have a database of scientists who are prepared to talk in words that people can understand - rather than fluffing around, sitting on the fence in that way.

But by the same token - you journalists really have to realise it's no good demonising us as kind of dysfunctional nerds, you know. We do need to have our story properly told rather than told bluntly, so that the nuances and the conditional components do get across to people.

So I think it really does require more effort on both sides to do this in order to serve the reader or the taxpayer who's paying this. It amounts to the same individual. They have been properly served by us. And I think in the past, it is they that have been the victim of the stereotyping and the culture clashes [indistinct].

KEN RANDALL: Thank you. The next question's from Peter Jean.

QUESTION: Peter Jean from *The Canberra Times*, professor. I was interested in what you're saying about the experiments about where… the piano for example.

SUSAN GREENFIELD: Yeah.

QUESTION: And we're often told that if you want to stave off dementia or Alzheimer's we should keep cognitively busy. What - I mean, what advice would you give to people in that regard?

And the second part of my question is, you know, diseases of the mind are things people often just don't want to think about. How difficult is that to engage the general public with, and to engage politicians to provide funding - when it's something they just really not think, rather think about at all?

SUSAN GREENFIELD: Okay. Let me just do that question - sorry, everyone's got questions in two parts, that's quite impressive. Can I take the second part first - because I think that that's…

When I was growing up, I'm a baby boomer generation, and cancer was then the great spectre. And my mother - and she wasn't atypical - she wouldn't, you see, even say the word cancer. She'd say, the c word. In case it gave you cancer. You know, even saying the word gave it to you. So was - such was the fear in those days. And look how things have changed now.

Cancer of course is still a very serious condition. But as we know - you can have cure. People go into remission. We know a lot more about diagnosis and prevention and so on so that people can say the word without the fear that it used to evoke.

And I think that Alzheimer's Disease is still at that stage, or like that. I think if people say it, even, you're going to give it to yourself. And people don't like acknowledging it. And that's why I do applaud, I don't know if you know the British writer Terry Pratchett. You might know him.

He's very famously come out. He now has Alzheimer's. And he appears regularly in the press. And regularly talks about it. Promoting the importance of research into Alzheimer's. He himself has put money into this.

And I applaud him from the bottom of my heart, because I think the more people that are suffering, or the more carers perhaps who are able to come out and talk about it - and talk to people about it - the more it will come centre to the agenda, I think, that we can't pretend it's not there.

It is something that is so devastating. Because heart disease and cancer are serious. But you're still the person you were. And I think the reason that all of us shudder at the thought of dementia - loss of mind is, it's the loss of you, it's the loss of your individuality.

And that's why the more we can talk about it, think about it, and above all - let me say this again, put money into this, put money into the research into this, otherwise we will stay as we are. Even frightened to say the word.

Now in terms of cognitive exercise, there's another thought as well. It's not just cognitive exercise. There's some brilliant work by someone called Rusty Gage in the states, who's shown - get this - physical exercise can help as well.

Now that stands to reason if you think about it - because the more you have a good blood supply going to your brain, the more oxygen you have going, then that has to be good news for the neurons, for the brain cells.

And he's shown that certainly in mature rats, as well as in human subjects, that you have something called neurogenesis, that is to say the growth of new brain cells in certain rats when they exercise quite extensively.

So it's something that we all intuitively, sneakily know, or don't like to admit it. Or perhaps in this country everyone loves exercise and sport. But yeah. Is that the more sport and exercise you can do, this has to be good. It has to be good for your brain and the body if you can exercise properly. Also alleviates depression along the way.

In terms of cognitive exercises, ours involved once looking at software for older people that actually gave them certain tasks to do, and although that may or may not be beneficial, it's very hard to prove, because you have to have right control groups, and it's very hard to have one person not doing something and doing it at the same time.

My own view now is that no-one likes to work hard at doing exercises. And for example I lived in France for a year, and found that when I was learning French, as I had to do within the first week of being there - because no-one spoke English - that your brain does feel it's been to the gym when you learn another language.

So my particular advice would be it's great fun learning another language because actually it's socially useful, you can see your performance, hopefully, increasing and it's fun to do. And it really does exercise your brain.

My main advice would be you should really do what you enjoy doing because then you'll do it. So whether it's playing computer games, although I have other thoughts on that with young people, but if you're an older person and you are at home, you're by yourself, you're not very mobile, then clearly, it would be a preferred activity to just watching the television.

So doing something interactive, something that you know stretches your brain, but above all you enjoy, can only be a good thing. But on the other hand, we have to be very careful. That's not going to guarantee you don't get it. Look at people like the brilliant writer Iris Murdoch, who was the star of the film Iris, or the - sorry the subject of the film Iris, who clearly used her brain all the time and was nonetheless a victim.

All you can do is to do your best, and making your brain and body work hard is doing your best. It's living life after all. Having arguments is good as well, I think.

[Laughter]

COMPERE: Thank you. The next question's from Stephen Johnson.

QUESTION: Good afternoon, Baroness. Stephen Johnson from Australian Associated Press and I might have an argument too now.

I'd like to also ask a two part question, so please forgive me. The first question is, if we can find a cure for dementia, how long could humans possibly live for maybe during the next century? What could the lifespan be? And part two of the question - I hope these questions aren't too convoluted - you said that there's no one gene which causes dementia or Alzheimer's, so if there's no one gene causing

dementia, does that mean finding a cure for this debilitating illness is harder than we thought originally?

SUSAN GREENFIELD: Okay, so let me - I think this is a test of my cognitive skills to have a - see if I can remember the two things.

People have debated long and hard about expanding the longevity of people and I think what we must anticipate in this century is not so much that we're going to live to be 200 years old, but that more people - more people - will live, let's say, to be a hundred, which is the normal span.

Now, there's lots of studies going on in terms of trying to enhance longevity and this has been done either on fruit flies - the Methuselah fruit fly who lived for longer with a single gene - or indeed a rather interesting idea of restricting calories in mice. You may be aware of this one, where putting mice on a very, very restricted calories seemed to enhance their life. But I think that no-one would want to do this, because they did stop copulating when they did this.

[Laughter]

So there is perhaps a high price to pay, and I don't know if people…

It's an interesting question, whether you'd like to do this or not. You know, you'd get very thin, you're hungry all the time, and you don't have a love life anymore. But you do live a long time, or perhaps it's you feel you're living a long time because your life has become so boring. Maybe that.

[Laughter]

There is also experiments as you may know, on so-called telomeres, which are the, kind of, shoelace ends of the chromosomes and people have found that these deteriorate, apart from in egg, sperm and stem cells and cancer cells, and to try and make ordinary cells not have this deterioration might also be very, very helpful.

But the issue, I think, with longevity which is very interesting, is not so much how many more years, and let's hope that more people live to be a hundred, it's what do we do with this time? Just think about it. If - if you have children by the time you're in your 50s - or 50 or so, let's say at the moment, that would give you decades more of life. And in our privileged society here in the Western world, paradoxically science and technology and biomedical services delivering us more time. More time than any other generation's had, and more decades of life more than any has had.

But no-one is actually addressing the question, what do we do with that time? Do we just play computer

games? I mustn't get onto that too much [indistinct]. What do we do with our lives? And I think that is a really important issue to address. We're all of us as a society, if indeed we are creating society, thanks to science and technology, where we are truly living longer.

Now as regards the gene issue, your question had the tacit assumption that a cure could only come if we knew the gene - if we manipulated the gene. There was a great phase in the 1990s where people thought that if you did discover the gene for this or that, then everything else would be plain sailing, forgetting that you had to access all the genetic material in all the cells and unless you wanted to target the egg or sperm, and immortalise the condition, then you'd have a real problem trying to actually gain access to modifying it.

So gene therapy in and of itself, for example with cystic fibrosis, hasn't necessarily been as rapid and as fast as people originally anticipated.

My own view is that genes are like sparking plugs to cars, and yes if they go wrong then you'll have a bad condition, but there is more to a car than a sparking plug, yeah? And what you have to look at is the whole context, and my own view is that it can not necessarily be the gene that is at issue, but other things that can happen.

So, my own particular theory is that the cells that are vulnerable in Alzheimer's or indeed Parkinson's, you can often get the two as a co-pathology, it's that they have special features that means that if the brain is damaged, unlike other areas of the brain which will present as a stroke, here they will kind of shoot themselves in the foot and try and grow again, and in so doing, bring in to play mechanisms that are toxic. And I could go in to more detail if you like, but therefore the cure would be to intercept that process, yeah? It would be to intercept that process, which would not involve modifying genes, and my own view is that in the future the most immediate and effective way would be to get an oral or nasal spray medication, accompanied by a pre-symptomatic blood test, rather than do anything that was, as I say, very expensive or ethically questionable or technologically, you know, full of wizardry but hard to actually do. And that actually could be a way forward.

Especially if it is a mechanism of aberrant development if one - this is in to the future - couldn't just stabilise, but actually make them like young cells again so they grew again. I think that would be good.

That's in the future, though. I'm very aware I'm on record as saying all this. Please don't say Baroness says cure for Alzheimer's tomorrow. Please don't say that, because people's hopes are raised in a very cruel way if you say that to them.

COMPERE: The question from Steve Lewis.

QUESTION: Steve Lewis from news Limited.

Just a sort of follow on. I will break from tradition and ask you a one part question. You've touched on some of the issues, but clearly - in Australia there has been a robust debate in the last decade or so about the ageing of the population, but it essentially boils down at political levels to the extra cost that will impose on future generations. We've had intergenerational reports. So the debate is essentially about the, I guess, the punitive affects of the ageing of the population.

It seems to me, and you've outlined some of these today, that there's wonderful advancements and benefits for society. So I want to ask you a question. How do you - is it time to shape, I guess, a populist campaign to start talking about some of these benefits? How would you go about it if you were a full time resident in Australia?

I'm trying to shape something that talks about the positive affects of the ageing population, rather than just the negative affect, which essentially is what dominates the political debate.

SUSAN GREENFIELD: Yeah. Thank you. Thank you for that.

Okay, so this is what I'd do - and thank you for that lovely question, especially the fact that's was only

just one question rather than two that tax my memory.

So, I think as far as take home messages that I would say. The first, and this is a very important one, is Alzheimer's disease is not a natural consequence of ageing. I'll say that again, Alzheimer's disease is not a natural consequence of ageing. It's a disease of older people, and the two things are not the same. So that's the first take home message.

The second thing is that we should think about ways of making our lives very exciting as we are getting older. Traditionally people think that, you know, it's all down hill, but in this new twenty-first century where you are looking at decades more of life - already the British Government I hear are raising the pension age for economic reasons, but I think soon they'll latch on to tell you it's good for you to work probably. Wonder they haven't thought of this already, actually, as I think of doing.

But seriously I think if one can get home to people this phenomenon of plasticity which whenever I talk to people about it, astonishes them. But when you think about it, it seems very obvious that you're adapting and you're changing and you're not the same person you were a year ago or six months or a month ago even. That you're evolving and changing all the time as a result of your living your life, going through your unique space and time narrative that

we call our life story. That as that's happening, your brain is getting more and more individualised.

So, when you start off - in the words of someone when you're very born - when you're born, brand new baby, you are a citizen of the world. I love that phrase.

But according to the culture you're born in, the society you're born, the family you're born in and the experiences you have, slowly you become an individual. Slowly you develop a mind, as you are growing you develop your mind. And I think if people realised that whilst, even dare I say it here where everyone's so keen on sport and exercise and so on, even though it's good for you, of course the body does get baggy and saggy and wrinkly. You know, to greater or lesser extents.

But your brain - and this is my message here - your brain does not get like that. It can be more like a fine wine, in that as it gets older, it becomes special. It becomes more individual which is why in other societies, quite understandably and correctly, older people have a reverence. People actually respect older people because of their wisdom. You never talk about a wise child. You talk about wise older people. And I would love to see a revival of the culture that exists in other societies which is a reverence for the white beard, reverence for people who've lived their life and have actually learnt things from it and can share that with you for

wisdom. Because nothing, nothing substitutes for experience and wisdom.

You know, it might be that you have a very agile brain. Let's say, you know, learning to drive, you might learn to drive faster than someone older, but that doesn't mean to say you're a better driver, yeah.

So, it's using experience to evaluate what's happening. And I think if we can get that across to people, that it doesn't matter that you might have a few wrinkles, yeah - it doesn't matter you might be a bit stiff moving. What really matters is that you've lived a life and you've learned from it, and you're willing to talk about it and share it with people. and I think that would be a wonderful message to get across.

KEN RANDALL: Thank you. Laurie Wilson.

QUESTION: Laurie Wilson from A-PAC, Baroness.

I want to pick up on the theme raised in Steve Lewis's question. Also, a point that Peter Jeans(*) from *The Canberra Times* made earlier when he made the point that this is something we don't really want to think about…

SUSAN GREENFIELD: Mmm hmm.

QUESTION: … and, therefore, the politicians may not want to think about. In your position, you have access to the

political class, the decision-makers, and I'm just wondering how you see their mindset at this - at the moment, because, in terms of the figures you quoted for Australia, sixty-seven and a half billion, I think, was the figure…

SUSAN GREENFIELD: Mmm hmm.

QUESTION: … that we could save over…

SUSAN GREENFIELD: Mmm hmm.

QUESTION: … you know, a period of time - 2040, if we just delayed the onset for five years of Alzheimer's.

SUSAN GREENFIELD: Mmm hmm

QUESTION: That's a strong argument.

SUSAN GREENFIELD: It is.

QUESTION: But it seems to me, in many ways, a more important argument is, is the equity issue here, the quality of life, the social obligation.

SUSAN GREENFIELD: Mmm hmm.

QUESTION: Do you get a sense that politicians - I mean, not necessarily here, because I don't know how much you deal with them, but in the UK are, if you like, more like - are they closer to accepting that

argument? You've made your pitch for the expenditure, but, you know, is there, in fact, an attitude that says, yes, this is something we really need to deal with?

SUSAN GREENFIELD: That's a difficult question. It's a bit like, how long is a piece of string, because, I think, if you ask any politician, it's a bit like motherhood and apple pie. You know, of course [indistinct] - of course we have to put money into this, something must be done. And, of course, we must do this. But then you look at the priorities, and you find, sadly, that science is very rarely mentioned in the Queen's speech, for example, and science research.

We had a debate in the laws recently on the cuts to universities that were occurring, and that's because I'd forgotten to mention politicians as the third group. If we talk about the difference in a trend and time span of the media and the scientist, we can now introduce the politician. Their agenda is to stay in power, otherwise they wouldn't be politicians. And they will do that by delivering to the public what they think the public need or want. So the issue is, how much they perceive the public is really caring, and my own view is that, perhaps, it's not as high on the agenda as some other things, in terms of swaying the political mind to be pragmatic and actually prioritise and actually get down and do something.

Certainly, and this is a related issue, when I did a report for the government in 2002 on women in

science, very little money was voted in for helping women returners, that had had children, for example. You know, and I think that you have to put your money where your mouth is, and whilst any politician you speak to will, of course, agree with what I've said, I think that the amount of money involved might seem too much, in terms of public opinion, compared to other things, the time scale might be too long if we're talking about science research. It might all seem a bit too uncertain. Investing in research, by definition, means you're not going to get necessarily an immediate result straight away, as you might with other things. And, therefore, you might look askance slightly at these things.

So, it's a very important point, and I think - rather like we were talking about generally, I think it would be very nice if the public could engage with politicians, and scientists, and one could start to look at the issues and really make them happen, rather than just talking about making them happen.

KEN RANDALL: Mark Metherell.

QUESTION: Mark Metherell from *The Age* and the *Sydney Morning Herald*, Baroness.

I wonder if we could go to the area - I don't think you really wanted to talk about, because I've run out of subjects to ask you about what you spoke about, and that is the impact of information technology,

screen-based information, texting, the whole, you know, iPads and iPods…

SUSAN GREENFIELD: [Indistinct]

QUESTION: … and this, that and the other. Is there a - sort of, a physically measurable neurological impact that's happening to us as a result of this, do you think?

SUSAN GREENFIELD: Okay, thanks for that. I'm very happy to talk about it. It's just that I thought that people expect me to talk about Alzheimer's. So once I get onto another hobby horse, there was a danger I might have strayed too far.

But now you've led me by the hand away from it, that's fine, I'm more than happy to talk about it, yeah.

Okay, so if you're working with humans, the only way you can really evaluate what's happening is by how they behave, or you can look at trends in society, or you can, perhaps, look at brain scans, but no-one will want to put a child - a healthy child - who didn't have a clinical need, I don't think, into a scanner, because that would be distressing for them and, in any event, it would be hard to interpret the data because the time scale level, which brain scans work for several seconds, they're analogous, in my view, therefore, to Victorian photographs, where you can see steady states, but you can't see dynamic processes. You know, [indistinct] photograph where

you could see the buildings, you couldn't see the people moving around. So, they're brilliant for clinical purposes, but for trying to capture - you know, freeze frame moment of thinking is much harder.

So, in terms of neurological evidence, that is harder to obtain. On the other hand, one can look at reports and trends that I find worrying, that I think at least should prompt us to explore these issues, and to try and think about how we might modify software, how we might research more into what is so addictive about it.

And I look, for example, in the UK at the threefold rise in prescriptions for the drug, Ritalin, for attention deficit disorder that's occurred over the last 10 years. I think it's the same here when I've spoken here before. I think there is a similar issue.

Now, that may be that people are prescribing it more liberally, or that the condition has now been more acknowledged of attention deficit disorder, or - and these are not mutually exclusive - perhaps, the environment is changing. Perhaps it's mandating a shorter attention span.

I'm not saying it is, but I'm saying, wouldn't it be worth exploring. We shouldn't be complacent and assume, in our arrogance, that we are inviolate to the environment, especially what I said.

The other is degrees of empathy, where I've had letters from teachers saying they feel that children nowadays empathise less, or understand less with others, and this might be because - might be because [indistinct]. If you are not rehearsing, looking someone in the eye in three dimensions, but, instead, you have 900 friends on Facebook, as someone boasted to me they had, one does question what kind of relationships they might be having, given that the human brain, as I hope I've persuaded you, rehearses and gets good at whatever it's doing all the time.

So, all I'm saying, just very gently, is you can't just give ev… you can't ask a rat to do this, which means the evidence is not as easily obtainable as for other things, like career(*) or Alzheimer's.

By the same token, I think we are being complacent in the extreme if you just dismiss me as a whinging middle-aged Luddite. You know, I think that we owe it to the next generation to at least explore the possibility, and if it's wrong, it's wrong. But, on the other hand, given the [indistinct] to the environment, I would much rather be, myself, engaging with software writers, and with educationalists and with parents to think about what they perceive might be at risk and how we might sustain it and maintain that it is delivered in some way.

KEN RANDALL: Professor Greenfield, can I ask you the final question today, and it's expanding on that a little, I

suppose, and going specifically to young people, to children, and even younger adults.

There's been a number of policy arguments arisen in Australia in recent times, some just recently as this week, about the desirability of fixing ages for driving cars, drinking alcohol and, more recently this week, there's been some focus on addiction from computer use, internet use…

SUSAN GREENFIELD: Mmm hmm.

KEN RANDALL: What do you think about immature brains and the influences of those various sorts of factors?

SUSAN GREENFIELD: Well, that's a super question, one that I could answer - I'd enjoy to take half an hour, but I'll try and do it in sound bytes because I'm aware.

KEN RANDALL: [Laughs]

SUSAN GREENFIELD: What's very interesting about the immature brain is that the frontal part of it, an area called the prefrontal cortex, is underactive or not fully developed until late teens, early 20s, which is quite interesting.

We also know that there's certain conditions where this area is underactive. For example, in schizophrenia, it's less active. And also, and this is perhaps the hardest to understand, in obese people who are also more reckless.

Now, what could schizophrenic people who have very much an orientation to the senses and to the outside environment and shorter attention spans, and like children can't think metaphorically and interpret proverbs, what does that have in common with, perhaps, people that eat a lot and are reckless at gambling.

And the answer is, in my own view, that it mandates the - of trumps(*) the cognitive in favour of the sensory.

So, just in a - to summarise, it seems that this frontal part of the brain, which is a Johnny-come-lately in evolutionary terms, as well as in developmental terms, seems to match up with scenarios, when it's underactive, where people are putting a premium on the senses at the expense of the past, the present, the future or consequences.

Anyone who eats knows the consequence of eating. But they do. Anyone who gambles knows the consequence of gambling, but they do. And that is because, in my own view, there's been a shift, a skewing of the premium of the here and now over the consequences.

And my own suggestion is that when people play games, again, it's the boom-bang-a-bang, as I've called it, the yuck and the wow factor, that actually will dominate over the consequences. When you play a game, you can just play the game again.

Doesn't matter. And, you know, when you rescue the princess, you don't care about the princess, do you? You don't care about her when you rescue her. Whereas, when you read a book, you care about the princess. So there's a difference.

Now, what's very interesting is this underactive prefrontal cortex is also related to an excess of a chemical called dopamine, which has been linked to reward and addiction, and it's the final common path of all addictive drugs [indistinct] release more of this chemical messenger in the brain.

That's not to say that dopamine is the chemical, hasn't got addiction trapped inside it, but it so configures the brain into a way that you're in the here and now, you're highly aroused, and that can be rewarding and, also, addictive. And I think that the more experiments that could be done exploring that model, the more we might get to answering your question.

Thank you.

KEN RANDALL: Thank you very much.

[Applause]

MEDIA MONITORS

* * END * *

TRANSCRIPT PRODUCED BY MEDIA MONITORS

target-monitor-analyse