I'm Prof Sir Colin Blakemore, Professor of Neuroscience and Philosophy at the School of Advanced Study, University of London, I research human perception and how our brains put together information, AMA

Sir$_{C}olin_{B}lakemore^{1}andr/ScienceAMAs^{1}$

[1]Affiliation not available

April 17, 2023

Abstract

Hi Reddit, My name is Colin Blakemore. I'm Professor of Neuroscience and Philosophy at the School of Advanced Study, University of London, and Emeritus Professor of Neuroscience at the University of Oxford (where I worked in the medical school for 33 years). From 2003-2007 I was the Chief Executive of the British Medical Research Council, which provides hundreds of millions of pounds for medical research each year. My current research is on human perception, and especially on how our brains put together information from the different senses. But in the past I've also worked on the early development of the brain, on "plasticity", and on neurodegenerative disease (Huntington's Disease in particular). A list of most of my publications can be found here. To my amazement, I was I knighted in 2014 and I was particularly pleased that it was given for contributions to scientific policy and public communication, as well as for research. For the whole of my career, I've been a strong advocate for better engagement between the scientific community and the public about how we use science. In particular, I've campaigned for openness and proper debate about the use of animals, which was vital for much of my own research in the past. I recently gave the 79th Annual Paget Lecture, organised by Understanding Animal Research. My talk, entitled "Four Stories about Understanding the Brain", covered the development of the cerebral cortex, language, Huntingdon's Disease and Stroke. Watch it here. This is my first AMA, I'm here to talk about neuroscience, animal research, philosophy and public outreach, but, well, Ask Me Anything! I'm here from 4 – 5pm UTC (EST 11 – noon / PST 8 – 9 am) Edit: I MUST FINISH NOW. IT'S BEEN FUN TALKING WITH YOU - SORRY NOT TO BE ABLE TO ANSWER MORE!

the WINNOWER

REDDIT

Science AMA Series: I'm Prof Sir Colin Blakemore, Professor of Neuroscience and Philosophy at the School of Advanced Study, University of London, I research human perception and how our brains put toge

SIR_COLIN_BLAKEMORE R/SCIENCE

Hi Reddit,
My name is Colin Blakemore. I'm Professor of Neuroscience and Philosophy at the School of Advanced Study, University of London, and Emeritus Professor of Neuroscience at the University of Oxford (where I worked in the medical school for 33 years). From 2003-2007 I was the Chief Executive of the British Medical Research Council, which provides hundreds of millions of pounds for medical research each year.
My current research is on human perception, and especially on how our brains put together information from the different senses. But in the past I've also worked on the early development of the brain, on "plasticity", and on neurodegenerative disease (Huntington's Disease in particular). A list of most of my publications can be found here.
To my amazement, I was I knighted in 2014 and I was particularly pleased that it was given for contributions to scientific policy and public communication, as well as for research. For the whole of my career, I've been a strong advocate for better engagement between the scientific community and the public about how we use science. In particular, I've campaigned for openness and proper debate about the use of animals, which was vital for much of my own research in the past.
I recently gave the 79th Annual Paget Lecture, organised by Understanding Animal Research. My talk, entitled "Four Stories about Understanding the Brain", covered the development of the cerebral cortex, language, Huntingdon's Disease and Stroke. Watch it here.
This is my first AMA, I'm here to talk about neuroscience, animal research, philosophy and public outreach, but, well, Ask Me Anything! I'm here from 4 – 5pm UTC (EST 11 – noon / PST 8 – 9 am)
Edit: I MUST FINISH NOW. IT'S BEEN FUN TALKING WITH YOU - SORRY NOT TO BE ABLE TO ANSWER MORE!

CORRESPONDENCE:

DATE RECEIVED:
January 16, 2016

DOI:
10.15200/winn.145286.62601

ARCHIVED:
January 15, 2016

CITATION:
Sir_Colin_Blakemore , r/Science , Science AMA Series: I'm Prof Sir Colin Blakemore, Professor of

Hi Dr. Blakemore,

I'm fascinated by the condition synesthesia. From what I understand, it is a blanket term for the confusing of senses, although the actual causes are not well understood. Do you have any information/theories as to how this works? Is there a way to trigger synesthesia in the brain of a "normal" person?

HarveyDjent

So am I! (Fascinated by synaesthesia, that is). I've done some research on it. We used brain scanning to study people who had been blind for many years but still have visual synaesthetic experiences (such as "seeing" colours when they hear particular words, such as days of the week). We found that when they are having these unusual visual sensations there is activity in the parts of the visual cortex that respond to colour in normal sighted people. So, I think that there is general agreement that the extra

Neuroscience and Philosophy at the School of Advanced Study, University of London, I research human perception and how our brains put toge, *The Winnower* 3:e145286.62601 , 2016 , DOI: 10.15200/winn.145286.62601

sensations of synaesthesia (usually colours, by the way) are due to such "extra" brain activity. It might be that people with synaesthesia (about 4% of the population, by the way) have some extra connections between cortical areas that cause this extra activity in the "wrong" areas.

As tiddledeepotatoes below points out, psychedelic drugs can induce temporary synaesthesia, and Jamie Ward's research suggests that it can also be induced, in some people at least, by post-hypnotic suggestion.

I wanted to ask a question about animal research. Currently, there are no real alternatives to animal use in biomedical research. There is the Body on a chip/organ on a chip strategy that is currently being worked on, but it seems like it will help reduce animal use during early testing of pharmaceuticals, but will likely not allow animals to be completely phased out.

Are there any other alternatives or strategies being developed that will reduce animal testing?

kerovon

The starting point for this discussion must be a simple moral statement - that it would be unacceptable to use an animal for research if the same result could be achieved with an alternative method. In fact that's the basis of the European Directive 2010/63/EU on animal research. But of course, a lot of biomedical research doesn't involve animals, at least not living, non-human animals. Think about all the studies of genetics and genomics, the biochemical research, the work on cultured cells. And all the research on human beings. But animals are (unfortunately) still essential for many areas of basic research on whole organs and whole systems in the body. They are particularly important for neuroscience - for understanding how circuits of nerve cells enable us to see, hear, make decisions, form memories and control our movements. What's important, I think, is for everyone who uses animals in their research to think constantly about two things - whether the benefits of the research really outweigh the moral cost of using animals; and whether it might be possible to develop new alternative methods.

Reliable alternative methods have been developed, and are in use, for some standard toxicity testing (for new treatments to be applied to the skin or eyes, for example). You mention the development of body on a chip and organ on a chip technologies. I think that there is likely to be real progress in such approaches. A lot of the preliminary analysis of new drugs for treatment of heart conditions is now performed on computer models of the heart, before moving to animal or human tests. That's excellent progress, but don't forget that the computer models are themselves based on the results of decades of research on the real heart - mainly involving animals.

For information about the support of research on alternatives (and other approaches to improving animal research) see http://www.nc3rs.org.uk

Thank you for doing this. In neurological disorders, and psychiatric as well, how feasible is a patch to monitor Serotonin, Norepenepherine, and Dopamine levels, and then correct them real time, much like a diabetic monitors and corrects their blood sugar. I am a long time PTSD and Bi Polar sufferer and hate "preventative medicating".

RedditTrollin

You have my sympathy. What you are saying is that many psychiatric and neurological conditions involved disturbances in certain chemical transmitter systems in the brain. But, unfortunately, the evidence is still not strong that any particular chemical imbalance actually **causes* the disease. That's certainly the case for Parkinson's disease, which is caused by a reduction in the production of dopamine by a certain part of the brain. But the relationship is much less clear for other conditions.

Also, unlike blood sugar and diabetes, there are no simple blood tests for neurological and psychiatric conditions. It would be lovely to think that someone with a tendency to depression could just wear a patch to measure their blood serotonin and have it topped up by an infusion if it's low. But it's only serotonin in the brain that matters - and that can't easily be measured.

Hello Dr. Blakemore. I'm a highschool senior who is currently trying to decide his major. I've been considering Neuroscience, physics and engineering. If possible could you tell me a bit about the life of a Neurosciencist. How exciting is it? Any problems you face day to day?

Fromearth1

What could be more exciting than studying the most complex, least understood thing in the universe - the brain? But you're interested in physics, engineering and neuroscience, why not hedge your bets and do courses in all three, if you can. Actually those three subjects are getting closer and closer these days. There's a lot of interest in developing new engineering techniques to help people with brain damage, such as "brain-machine interfaces", which involve recording brain activity and teaching the patient to use their brain activity to control some sort of robotic device, which can help them to walk, handle objects, etc.

Student of philosophy and neuroscience here, great to meet you! A few questions about the two:

-Would you rather philosophers study more hard science, or scientists study more philosophy?

-What are your thoughts on the state of reproducibility and accuracy in science research? Are there problems as serious as some people say, or can we relax?

-How do you approach the squishier problems of consciousness or identity? Can science answer these?

bbctol

Great to meet you too!

Tough questions!

I do think that scientists and philosophers would benefit by learning more about the strengths and weaknesses of each other's subjects. In my current field (human perception), science and philosophy are very close. I now do experimental work (labs and all that) in an Institute of Philosophy, and the philosophers collaborate in the experiments. They can bring different sorts of questions and concerns to the experimental work. And, in turn, cognitive neuroscience is offering answers, or at least relevant evidence, for many important questions about the mind.

There's a lot of talk, and concern, about the reproducibility of science at the moment, and we - the scientific community - have to take that very seriously. But it's important to distinguish between scientific results that are difficult to reproduce because of complexities in the experimental procedure and those that can't be reproduced because they are just wrong! There have been a number of high-profile cases of scientific fraud - basically just making up results - in the past few years, and there are very important lessons to learn from such cases. Fraud can be highly damaging to science, because it leads to waste of time and effort by other scientists and it tarnishes the reputation of science. But at least science is a "self-policing" enterprise. Any scientific finding that is of any interest will always stimulate further research, and the non-reproducibility should soon be discovered. We certainly can't relax: we need to find ways to protect against fraud. But ultimately it depends on the honesty and integrity of individual researchers.

I've had a go at consciousness in another reply!

I'm curious to know if brain transplant will ever be a reality since it's the most complex organ in out body.

MessyRoom

There are already treatments for medical conditions (particularly Parkinson's disease) involving the transplantation of cells. The intention is to replace the function of neurons that have been damaged. But there's a huge difference between injecting cells into a functional brain and literally transplanting an entire brain. The main problems would be to keep the brain alive before and during the transplantation procedure and "wiring it in" to the nerves connecting the brain to the spinal cord and out to the muscles. Until recently there's been little progress in reconnecting damaged nerve fibres, for instance after spinal cord damage. But there has been some progress in the past couple of years. So, it might be possible in the future to connect a transplanted brain to the "host" body. But then there are really worrying questions. Would the "person" created by such a transplant be the original person who has lost his or her brain? Or would it be the person who donated the brain. Presumably the brain would carry with it the thoughts, memories, hopes of the donor?

Hello Dr. Blakemore! I would love to know what problem in the neuroscience field that you would love to see solved. Also, what breakthrough do you think would impact this field the most?

iamkelp

Well, after spending 40 years of my life studying vision, I'd love to know exactly what is happening in my head that enables me to have the magical experience of seeing the world. I can tell you all about the way in which different nerve cells respond to different features of a visual science (the shapes, movements, colours etc). That's all necessary for the creation in the brain of a "representation" of knowledge of the outside world. But how do I have these subjective experiences? And why do I not see somethings while seeing other things that aren't there? Visual perception isn't just a sort of photograph of reality. As my dear friend, the late, much-missed Richard Gregory argued, perception is a kind of "hypothesis" about the world, invented by the brain.

Animal experimentation is often misrepresented by a small number of very active, passionate, and poorly informed and/or hypocritical individuals and groups who campaign for banning it entirely. As a result, animal experimentation seems to be at risk in the medium term, even for the most ethical and non-invasive experiments and despite enormous improvements in animal welfare in research (at least in the UK).

In this article, you argue for increased public engagement, which seems like a great common-sense answer, and is apparently what you are demonstrating right now with this AMA. However, many scientists are uncomfortable communicating with the public, or simply struggle to find time to engage the public on top of their research work.

So my questions are: what do you think could be done to improve communication between the public and the scientific community? Do you think public engagement is "part of the job" for researchers (and thus should be remunerated) or constitutes political activitism (and thus should be a private decision)?

tom_qq

I do indeed think that public engagement is "part of the job" - not just for scientists who work on

animals, but for all researchers. But that's not to say that we should expect everyone to be writing for the newspapers or appearing on TV every day. There are so many useful ways of contributing to engagement - talking about your work at local schools, participating in Open Days at your university or institute, writing blogs or even just Tweeting about your area of research. I agree that there's a problem of time - it's hard to expect young scientists to give a lot of time to engagement when they are struggling to publish and to get jobs. But at least those who enjoy doing public communication and have some talent in doing it deserve support, recognition and credit. I think that universities, research councils and Higher Education Funding Agencies should do more to reward those who do give significant time to engagement. It's so important for the public reputation of science.

Why is it if I close one eye my perception of the world doesn't get half as bright? It makes me think we humans should have better night vision than we do.

DoIt4TheMetricSystem

That's a great question, which I too worried about when I first started working on vision. And I'm no closer to an answer!

Have you made any significant discoveries?

Also, can people implement the same way a brain works into how something like a CPU chip, or an entire computer system works?

DatOneGuy-69

Significant discoveries? You should ask other scientists, not me! But I am proud of having been involved in the discovery that the brain is "plastic". It can change the strength of connections between its nerve cells, in response to the way that it is stimulated. So, if you think of the brain as a sort of computer, it is a highly flexible, modifiable computer that changes its hardware and software in response to the way that it's used.

There's enormous interest in trying to simulate brain function in computers. That's what artificial intelligence is all about. But I think that we still have a very long way to go before any single computer program can have the flexibility of function that any human brain has got.