As the country’s primary funder of biomedical and behavioural research, the National Institutes of Health (NIH) holds sway over most major developments that take place in US medicine. This year’s budget request laid out four overarching priority themes that exemplify the nation’s medical research priorities, and as 2014 drew to a close, Congress agreed on a massive spending agreement to finance these focal areas. While many have bemoaned the new budget, pointing out that it does not allow agency spending to keep pace with inflation, several areas have received a significant boost, including two initiatives that look set to engender far-reaching impacts across several institutes – the BRAIN Initiative and Big Data to Knowledge (BD2K). International Innovation looks at some of NIH’s plans for the coming year, and how these could impact biomedical progress across the nation.
TODAY’S BASIC SCIENCE FOR TOMORROW’S BREAKthroughS

A TOTAL OF US $65 MILLION HAS BEEN DEDICATED TO THE BRAIN INITIATIVE IN THE 2015 BUDGET

With the knowledge that a thorough understanding of basic research can lead to significant benefits for human health, the National Institutes of Health (NIH) devotes a significant proportion of its budget to this kind of work, and is in fact the largest funder of basic biomedical research in the world. As well as supporting talented and forward-thinking researchers working in isolation, the organisation is bolstering large, collaborative projects such as the Knockout Mouse Phenotyping Program and the Encyclopedia of DNA Elements (ENCODE) project. However, the crowning glory of US basic research is the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative which was first announced by the Obama Administration in 2013 and has been the recipient of a significant portion of funding once again.

BRAIN INITIATIVE

“We have a chance to improve the lives of not just millions, but billions of people on this planet through the research that’s done in this BRAIN Initiative alone. But it’s going to require a serious effort, a sustained effort. And it’s going to require us as a country to embody and embrace that spirit of discovery that is what made America, America.” – Barack Obama, US President

Heralded as a groundbreaking project that will do for neuroscience what the Human Genome Project did for genomics, the BRAIN Initiative holds a special place in US biomedical research. This expansive undertaking includes input from five government agencies, as well as private sector commitments from the likes of GlaxoSmithKline and research efforts from institutions across the US.

It is hoped that the Initiative will revolutionise the study of the brain, unlocking the mysteries of debilitating diseases such as Alzheimer’s, post-traumatic stress disorder and traumatic brain injury.

www.braininitiative.nih.gov

PRECISION MEDICINE

$215 MILLION IS BEING REQUESTED TO FUND THE PRECISION MEDICINE INITIATIVE IN 2016

NIH’s extensive remit includes disease prevention, diagnosis and treatment, and an increasing proportion of work in these areas is being geared towards more ‘precise’ strategies. The goal of many modern medical strategies is to either identify individuals who are more likely to succumb to a particular disease and thus preempt disease onset, or target patients that have already succumbed to disease with tailored therapeutics.

While much was made of this up-and-coming branch of medicine in the budget proposal, the true ambition of NIH’s goals, and indeed those of the US Government, were made clear in the President’s State of the Union address to Congress on 20 January. In it, he announced a forthcoming programme called the Precision Medicine Initiative, which he hopes will usher in a new age of precise, personalised treatments for everything from cystic fibrosis to mental disorders. A large focus of the project will be cancer, as this is an area that is already showing immense promise in terms of more tailored approaches.
BIG OPPORTUNITIES IN BIG DATA

NIH HAS COMMITTED $24 MILLION ANNUALLY OVER FOUR YEARS TO SUPPORT GRANTS FOR THE INITIAL PART OF THE BD2K PROGRAMME

With data pouring in from technologies as diverse as genomic sequencing machines, novel imaging strategies and smartphone applications, there is a need to convert this relatively new phenomenon of ‘Big Data’ into worthwhile therapies. Not only do scientists need to learn how to manipulate and mine these datasets, but the wider medical workforce must be taught the skills to manage, analyse, store and preserve these data in order to realise their true value. Furthermore, Big Data must be shared responsibly so that the necessary people have access to the tools they need, when they need them.

BIG DATA TO KNOWLEDGE (BD2K)

“The era of ‘Big Data’ has arrived, and it is vital that the NIH plays a major role in coordinating access to and analysis of many different data types that make up this revolution in biological information.” – Dr Francis Collins, NIH Director

With the goal of taking better advantage of the exponential growth of biomedical research datasets, this trans-NIH project aims to:

• Facilitate the broad use of biomedical digital assets by making them discoverable, accessible and citable
• Conduct research and develop the methods, software and tools needed to analyse biomedical Big Data
• Enhance training in the development and use of methods and tools necessary for biomedical Big Data science
• Support a data ecosystem that accelerates discovery as part of a digital enterprise

www.bd2k.nih.gov

NURTURING TALENT AND INNOVATION

THE MEDIAN AGE AT WHICH NIH INVESTIGATORS RECEIVE THEIR FIRST RESEARCH GRANT IS 42

NIH acknowledges that while the challenges lying ahead will only become greater as new research avenues open, its budget is unlikely to demonstrate corresponding growth. Therefore, the organisation is aware that its workforce must be as proficient as possible. As a result, a large portion of NIH’s budget is dedicated to nurturing the next generation of biomedical researchers, and an array of initiatives such as the Strengthening the Biomedical Research Workforce Program and the Early Independence Award have been implemented. Despite this, there have been concerns voiced by many that the younger workforce is being excluded by the grant system, and the report accompanying the 2015 budget directed NIH to take action and attempt to bring the average age of grantees down.

Another historic shortfall for the NIH grant system has been the lack of candidates of different racial backgrounds, with an NIH-commissioned report showing that white applicants were disproportionately successful when compared to black applicants. A collection of programmes under the collective banner of the Biomedical Research Workforce Diversity Initiative was subsequently launched to counter these problems. In total, the efforts to harness the full potential of the biomedical workforce – ensuring that the most innovative and talented researchers prevail, regardless of age, race or any other factor – will hugely benefit US medicine in the long run.