Profile

Bryan Traynor: serious science from a funny fellow

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For the **ALS GWAS** see **Articles**
Lancet Neurol 2007; **6:** 322–28

For the **study identifying *KIF5A*** see *Neuron* 2018; **97:** 1268–83.e6

For the **study identifying *C9orf72*** see *Neuron* 2011; **72:** 257–68

To take a break from research, Bryan Traynor, Chief of the Neuromuscular Diseases Research Section at the National Institute on Aging in Bethesda, MD, USA, likes nothing more than to kick back and watch a good action or sci-fi flick. "The more mindless the better", he says. "I'll watch any movie as long as the budget is over $100 million and it hasn't got any awards from any competitions, particularly anything from Sundance or the Toronto film festivals", he goes on. "I like to joke that as movies are generally 100 minutes long…it costs $1 million per minute to entertain me."

Films have long been a favourite pastime of Traynor's who, reminiscing about his childhood in Dublin (Ireland), recalls watching old black and white Sherlock Holmes movies on a Friday after school. "I loved this whole thing about Sherlock Holmes where it's very observational and you can tell things about people based on the minutest of details", he says, pointing out that science and neurology, in particular, provide similar intrigue. Indeed, Traynor says, it was the fascinating and unusual symptoms displayed by patients with neurological conditions that first captured his interest as a medical student.

During rotations on certain hospital wards, Traynor recalls, "I felt it was a bit, I hate to use the word monotonous, but it was…like, ok, pneumonia, pneumonia, pneumonia, ooh [tuberculosis], pneumonia." Neurology wasn't like that at all, he goes on. "I went on my first ward round and I was just completely hooked. Every single patient was different, and they had a different set of symptoms and diagnoses." That enthralling fortnight "was really quite transformative", he says, "I had found what I wanted to do."

After completing his medical and neurology training in Dublin, Traynor moved to the USA because, as he puts it, "In those days, Irish medical doctors were bred for export, like beef. There were very few end-stage consultant jobs available, so you had no choice but to leave." It wasn't a tough decision, however, Traynor says. "I've always had a love for the United States…and for American politics. In part, that's one of the reasons why I wanted to move to [Washington] DC." It's also why his two cats are named Bill and Hillary.

In our brief conversation, I laugh a lot. Traynor clearly has a sense of humour, which, having devoted his career to studying one of the most debilitating and heart-breaking diseases—amyotrophic lateral sclerosis (ALS)—is probably an essential coping mechanism. Traynor gained both his medical doctorate and PhD for his studies into ALS, having been drawn to the disease because, quite simply, "it's god awful", he says. In by far the majority of cases, ALS strikes without warning. A patient might first notice some difficulty speaking, or a loss of strength, but the condition then rapidly becomes, what Traynor describes as "a dreadful galloping weakness." From diagnosis to death can be a matter of a few years.

"You see these lovely people just melting away in front of you and then you see the caregivers, the loved ones, the spouse, and their worry and their angst…and you [think], if there is one thing you want to do, it is to help these people." Indeed, he says, the motivation behind his research is undoubtedly, his patients.

ALS is like a giant puzzle, says Traynor who is, little-by-little, figuring out the individual pieces by identifying genes associated with the disease. He did one of the first ever genome-wide association studies (GWAS) of ALS, and later identified a number of gene mutations that cause the disease—including mutations in KIF5A, discovered earlier this year. One such discovery stands out above the rest as the most memorable, however, says Traynor: that of the mutation in gene C9orf72—the most common genetic cause of ALS.

"That was quite an amazing moment to be sitting in front of the computer and to have finally worked it out", says Traynor. He explains that having identified a short region of the genome in which the mutation must be located, he estimated, "we'd have it in two weeks." It actually took four years and a lot of detailed DNA analysis. "We sequenced the snot out of it", Traynor says bluntly. And it paid off. The high coverage sequence data revealed a type of genetic error that can sometimes be missed—an expansion in copy number of a repeated six-nucleotide motif. "I must say, being Irish, I have the gift of the gab and I'm not often at a loss for words. But, at that moment [of discovering the expansion], I really was", says Traynor. "I can only think of one thing that might be equivalent and that would be solving the mystery of who really won the [Florida vote in the] 2001 presidential election—was it Bush or Gore?"

This career highlight makes up for Traynor's rather rocky start in science. One of his first experiments at school, he tells me, was placing a shiny metal pencil sharpener into the flame of a Bunsen burner, as a dare. "I didn't realise at the time, but the reason [some sharpeners] appear silver is because they have a magnesium alloy in them, so when this thing ignited, it really went up", he recalls. "The rest of the story is pretty predictable, you know: yelling, screaming, fire extinguisher, principal's office, detention, and a life-long fear of pencil sharpeners."

Ruth Williams