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Column

Murder most mysterious

The death of ex-spy Alexander Litvinenko has highlighted how long it can take to diagnose a poison. Nicola Jones asks how hard can it be?

Nicola Jones

Former Russian security agent Alexander Litvinenko in his bed at University College Hospital.

EMPICS

You'd think, in this day and age, that diagnosing the culprit in a suspected poisoning wouldn't be that tricky. Bang the symptoms into a database, plug the blood into a mass spec and spot the toxin.

But it ain't so, as the tragic death of ex-spy Alexander Litvinenko last week revealed. Instead, real life seems shockingly similar to a cross between House, the American television show in which a brilliant but crotchetty Hugh Laurie and his telegenic young sidekicks butt heads diagnosing this week's ultra-obscure disease, and Spooks (MI5 to viewers in America), in which equally telegenic members of the secret service dash around London in search of fiendish spies, traitors and terrorists.

Nick Bateman, professor of clinical toxicology at the Royal Infirmary of Edinburgh, UK, and a director of the National Poisons Information Service, which advises UK doctors on poisons, assures me that in real life the eponymous Gregory House would be promptly struck off for his whimsy. But that show does bear a grain of truth about what it's like to track down a mystery ailment: it really is done by throwing around various theories and following all manner of wrong leads before a leap of intuition, a photographic memory for old case histories and a clever test lead to the truth.

Quick match

Litvinenko was apparently poisoned while investigating the murder of journalist Anna Politkovskaya, a strident critic of the Russian government. Litvinenko fell ill on 1 November, and was immediately admitted to hospital. The hunt for whatever ailed him was on.

> **"You have to look for symptoms — you could do ten million tests and still not get the right toxin."**

His symptoms were consistent with something that was making his cells stop dividing. Some chemicals can do this. At first thallium was reported as the prime suspect (by the press, at least — it was declared "unlikely" by the hospital treating him). This heavy metal is sometimes called the 'poison of choice' for its colourless, tasteless qualities, and the small amount (about a gram) needed to kill. Then hair loss pointed, potentially, to a radioactive element. Speculation about the possibility of radioactive thallium took off.

It wasn't until after Litvinenko's death on 23 November that the true culprit was announced: on the morning of 24 November, Britain's independent Health Protection Agency declared that a significant amount of the radioactive isotope polonium-210 had been found in his body. Again, you might think that simple to detect; again, no. polonium-210 emits weakly penetrating alpha radiation rather than gamma rays, so the radiation would be absorbed by the body and undetectable outside. That alone could throw doctors off.

The only way to crack a problem such as this, says Bateman, is by looking for and trying to understand symptoms. "You could do 10 million tests and still not get the right toxin," says Bateman. There are that many possible poisons? "Everything is poisonous, it just depends on the dose." But really, there are tens of millions of poisons? "Don't even ask."

Clever computer

Even with a coherent list of symptoms there's no computer program you can plug them into and get an answer spat out. Well, there are such programs, but Bateman says a good doctor will always beat them. "Computers are only as good as the people who program them," he says. "They're never as good as people; they aren't very creative."

Some lists do help. TOXBASE, for use by doctors in the United Kingdom, helps by listing the symptoms of different toxins. So once you suspect thallium, you could use this to see that this heavy metal usually causes neurological problems, and perhaps rule it out.

You'd also, at that point, do a mass spec of urine and blood to look for the suspect element, says Bateman — presuming that it wasn't a 'hit and run' exposure in which the poison would already have passed from the system. Why, at that point, polonium-210 didn't leap off the page is still a mystery to me. Maybe it did. The hospital where Litvinenko died is understandably no longer taking calls from the media — the doctors are too busy saving lives.

Not for you and me

It might not have mattered much if the culprit was spotted early, it turns out. I ask whether you can do anything for someone with polonium poisoning: "No. Nothing," says Bateman. Radiation is nasty stuff. He remembers one case of a man in Brazil who bought a radiation treatment device from a scrap yard, and took the 'pretty' active source home for his kids to play with. "He managed to kill himself and

quite a few members of his family."

Thankfully, most of the time the doctors Bateman advises don't have to worry about problematic diagnoses. Usually there's a story to go along with a poisoning: a witness or an empty bottle. The majority of cases in Britain are intentional self-harm, or by children accidentally consuming poisons. And there are stomach pumps to deal with most of that.

No one keeps statistics on how many people pass away before a mystery poison is pinpointed, says Bateman. To his knowledge, it's "very, very, very, very rare". I guess that's why this case grabbed the headlines: Spooks and House don't collide often. When they do a great story is nearly certain. And so is a tragic end.

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