AI Designed Drugs: Can Algorithms Be Held Accountable?

In 2020, a machine learning software at MIT University discovered something no human had: an antibiotic that could kill some of the world's deadliest drug-resistant bacteria. It sifted through millions of chemical compounds before landing on one that killed a deadly strain of bacteria resistant to most treatments. It was a breakthrough. The molecule, named halicin, was powerful, effective, and entirely machine-suggested. But as AI begins to reshape drug development, a new question looms: who should be held accountable when the machine makes a mistake?

The Code Behind the Cure

Designing a drug used to take a decade, sometimes more. It involved meticulous lab work, endless trial and error, and billions of dollars. Now, machine learning models can do in weeks what once took years. They analyse enormous datasets, everything from molecular structures and binding affinities to known side effects and failed trials. They don't get tired. They don't forget steps. And they don't need coffee breaks.

But they also don't understand what they're doing.

AI doesn't "know" what cancer is. It doesn't "care" about public health. It simply predicts outcomes based on data; lots of it, and that is the root cause of this elusive issue. The medication it creates may have identical problems if the data it uses to learn from is inaccurate, distorted, or out of date. Genetic variants that are frequent in other parts of the world may be missed by a model that was trained mostly on clinical trials from Western populations. A compound that looks safe on paper might behave very differently in the real world. In other words, algorithmic drug design isn't immune to human error because it simply hides it behind a layer of code.

When Mistakes Are Made, Who Pays the Price?

Drug failures aren't new. Even with strict clinical trials, side effects emerge, recalls happen, and lawsuits follow. But when an AI model is involved, responsibility becomes harder to trace. If a machine-suggested drug harms someone, who's to blame? The developers who trained the model? The company that distributed it? The regulators who approved it? Legally, there are no clear answers. Unlike a surgeon or pharmacist, an algorithm can't be sued and disbarred. It can't explain its decisions nor defend them in court. And because machine learning often functions as a black box, even its creators might not fully understand how it arrived at a specific drug candidate.

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There’s also the risk of what isn’t seen. If an AI model consistently fails to recommend treatments for certain demographics due to data bias, people will be excluded from life-saving care, and may never know it. We’ve entered an era where a line of code could decide what medication you receive. However, with that power comes a silent danger: if no one is clearly accountable, no one truly has to answer for the harm.

Beyond Innovation- Building Ethical AI in Medicine

AI’s role in medicine is only going to grow. Machine learning has the potential to improve millions of lives through research into uncommon diseases and personalised cancer treatments. It's crucial to remember, though, that innovation without control could lead to unfairness as t he humans who create, train, and trust AI must also assume greater responsibility. That means designing transparent models that can explain their reasoning. It means testing algorithms on diverse, global datasets. It also means establishing clear legal frameworks for accountability, before lives are lost, not after. It is no secret that artificial intelligence has the ability to design the drugs of the future. Only humans, however, can guarantee their ethical, just, and safe usage. The true question is not whether AI can save lives, but rather if we will have the courage to confront it, question its operation, and accept responsibility when it fails. After all, when our health is at stake, we cannot afford to ignore the risks involved in refusing to challenge these systems.

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