

GENETICS, SOFTWARE

# EVOLUTION IS NOT BY CHANCE ALONE

9.12.2015

Evolution isn't down to chance alone, the [New Scientist](#) has been reviewing last year "Arrival of the fittest" by Andreas Wagner. Just by sheer numbers

The problem is that the library is so vast ... that the odds of evolution stumbling across the specific "book" it needs ... are practically zero. Something else must guide evolution through the library.

And Wagner tells us that

many different proteins can perform the same function ... the structure of the library makes it easy for evolution to move from one meaningful book to another. When Wagner and his colleagues tried browsing adjacent "books" – proteins that differ by a single amino acid – they found that most worked just as well as the original. ... In fact, you could move, step by step, from one end of the library to the other without changing the meaning.

This allows populations to accumulate a lot of genetic variation while still remaining viable. In Wagner's metaphor, readers spread into many different rooms of the library. And that's where the big pay-off comes. By wandering far afield, you come to rooms with very different sorts of books nearby. In real terms, you end up in places where changing just a few more amino acids gives you a protein with a radically different function – an evolutionary breakthrough, close at hand.

So any genetic variation in humans has been mainly mapped for diseases (with minor success). Maybe genetic variation should be mapped for gain of function?

