

URL: <https://stvp.stanford.edu/blog/videos/history-from-bayer-to-affymax>

Ringold talks about the idea behind and the history of combinatorial chemistry to accelerate the process of drug discovery. He then talks about a technology that was invented for a different purpose but was eventually applied to the specific problem of broadly monitoring the expression of gene sequences giving birth to Affymetrix.



Transcript

So when I joined Affymax, that was another company, in that the fundamental problem was making and screening drugs in the pharmaceutical industry was a very slow, inefficient process.. In fact, it haven't changed much for nearly a century since a bunch of chemists at a German company called Bayer made the first medicinal chemistry product called aspirin and called it Bayer Aspirin in the late 1890s by modifying a natural product that came from the bark of the willow tree called salicylic acid and then made derivatives of that.. And acetylsalicylic acid is aspirin.. And they were the first ones to actually do medicinal chemistry to come up one at a time with a derivative of a molecule, very slow process, to turn it into a drug.. But that was done for about 90 years in the industry where really brilliant medicinal chemists might make 50, 60, 70 molecules a year, if he or she was really good, and send it over to be tested one at a time.. Affymax said, "Well, this is kind of goofy.. Why don't we make thousands of molecules at a time and use cloned receptors to screen them in miniaturized ways?" And so, it was really the beginning of a whole new field which is now called "combinatorial chemistry" and "high throughput screening" to try to accelerate the process of drug discovery.. Well, one of the technologies, and I have to give Leighton Read credit because I think he really was the inventor and the inspiration for it when he was at Affymax, was the invention of the "chip technology" where integration of semiconductor manufacturing technology was applied to making compounds on an array.. And the purpose of that technology was to make drugs that would be screened with receptors or other products for pharmaceutical activity.. Well, we spent millions of dollars on it and it didn't work..

Fundamentally, the idea didn't work for the purpose for which it was invented.. But Steve Fodor, who was at Affymax at that time said, "But you know what? Instead of all these other chemistry that's being done, DNA is a lot simpler.. There's only four building blocks.. Everybody knows them A, C, G & T." You can't read anything right now without recognizing the 50th anniversary of the Watson Crick structure, whether it's the New York Times or Time Magazine or Newsweek or anything else.. And there's only one bond which is the "phosphodiester bond" that holds them together.. So once you've worked out the chemistry for one reaction with four building blocks, you can make arrays of nucleic acids on the chip.. And that gave birth to Affymetrix which is now the leader in "gene chip genoray technology".. A very successful company and Steve Fodor went over to round it up and to build that up.. But that was a technology that was invented for a different purpose and then applied to the specific problem of broadly moderating the expression of gene sequences or RNA sequences.. And so, Affymetrix is a Type B company; it was a technology invented for another reason, but applied to a specific product...