Genetics, digital revolution driving pharmaceutical renaissance

Modern drug-making got its start when one man made an accidental discovery. In the 1930s, Alexander Fleming noticed that a certain common mold stopped the growth of bacteria. Shortly thereafter, chemists identified penicillin as the active compound in the mold and the rest is medical history.

This era of serendipitous medical discover, however, seems to have ended. As Oliver Leven writes for Genetic Engineering & Biotechnology News:

> By the late 20th century with the rise of combinatorial chemistry, molecular biology, genomic and pharmaceutical sciences, scientists expected to overcome serendipitous discoveries such as Fleming's. There was a very clear expectation that the "secrets of life" would soon be understood and could be translated into targeted research toward new drugs. However, the promise of biochemical pharmaceutical sciences has not been completely fulfilled.

Instead, he argues, the combination of automation, computing power, and scientific sophistication we have today might make a new age of serendipitous discoveries possible. It's now possible to look for useful pharmaceutical effects *en masse* by taking an organism like yeast and systematically knocking out each of its genes and observing the effect. Alternately, a new chemical compound can be developed and tested across a wide range of cells and conditions. This high-throughput, high-content scanning means we have the brute biotechnological power to forego a targeted approach to finding new drugs.

It's the same sort of wide-ranging observation that led Fleming to penicillin, only at the scale of molecular biology instead of the level of moldy bread — and with the ability to study more samples than any one man could ever have hoped for.

Read the full, original article: The Renaissance of Phenotypic Research

Additional Resources:

- Pentagon, scientists closing in on rapid DNA technology, USA Today
- Dysfunction at FDA threatens medical genetics industry, Forbes
- NIH tries a new approach to speed drug development, Washington Post