

There is an incredible  
shift taking place in



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There is an incredible shift taking place in medicine today. Traditionally, drugs that we're used to seeing on pharmacy shelves are chemical in nature - things like pain relievers, statins, and antacids. Although many of these can trace their roots back to the wild (aspirin, for example, is similar to a compound found in willow bark - and the first statin was discovered in a fungus), the conventional pills that we are used to taking are usually made non-biologically. What do we mean by this? Conventional medicines are created in factory settings, using other chemicals as building blocks.

The internal molecular structure tends to be well-defined and relatively simple. Now, however, science is taking a different turn - and is leaning into a new class of drugs known as biologics. Unlike conventional medications, biologics are not synthesized chemically.

Instead, they are created biologically, using genetically engineered microbes or mammalian cell cultures. Biologics can be whole cells (alive or dead), they can be the biomolecules that cells produce (like antibodies), they can even be comprised of some internal components of cells (like enzymes). Essentially, a biologic - as the name suggests - is not created with a rigid chemical structure, but is instead comprised of biological components. While biologics aren't new (vaccines are some of the earliest known biologics - or, at least, are some of the earliest legally-regulated biologics), they are one of the fastest-growing categories of drugs in the United States. What makes them so different? Biologics often target molecular processes that conventional drugs cannot - allowing them to treat a growing list of diseases like cancer, Lupus, Crohn's disease, kidney failure, and many more. With all of this innovation comes a downside - biologic drugs tend to be very expensive.

And because biologics are created from actual biological material, it is challenging to come up with “generic” forms of these medications (called biosimilars). Unlike generic versions of conventional drugs, biosimilars are often only similar to (not identical to) their competition, which means that they will require their own trials to ensure that they are safe and effective treatments. Which, in turn, means that it is incredibly difficult to create a biosimilar that comes with a lower price tag. As biologics continue to be developed to treat a range of illnesses (including diseases that are notoriously hard to treat), their lifesaving power will be limited at best if the cost makes them inaccessible to the patients who need them.