Drugs That Can Switch Genes Back 'On' May Represent Future of Cancer Treatment

Kalorama Information

Methylation treatments that can re-activate stagnant “controller” genes might be a common cancer treatment in the near future, according to Kalorama Information. In a new report, the healthcare market research publisher said that of the rapidly-developing epigenetic approaches – treatments based on new theories outside of what was previously the mainstream thinking of genomics (not involving DNA base pair alterations), these drugs are the more realistic bet. The report, Epigenetics: Applications for Pharmaceuticals and Diagnostics (Methylation, Histone Modification and miRNA expression) [1], suggests that most new epigenetic drugs will be methylation-based, while other epigenetic candidates such as miRNA treatments will take longer to see marketability.

Methylation of genes is a mechanism that is associated with cancer but can be reversible with the right drugs. It is the process by which stretches of alternating “Cs” and “Gs” – the cytosine and guanine acids that represent two of the four acids in human DNA -- are modified through the production of methane-derived alkyls and the addition to the “C” acids, the cytosines. When “controller” genes are methylized, they are shut off and in turn, shut down the structural genes that they control.

This is not a good thing, the report says, because some of these genes are oncogenes, intimately involved in the regulation of cellular behavior. When methylated, these regulatory or “controller” genes fail to function, and when control is lost the normal tissue can be transformed into a malignancy. The good news, according to the report, is that the introduction of inhibitor chemicals has been shown to not only stop methylation but actually to reverse this process, or in effect turn the controller gene back “on” and improve the patient’s condition.

“It’s not exactly like turning on a light switch, because it involves a far more complicated chemical process, but it is one way to understand the end result,” said Bruce Carlson, publisher of Kalorama Information. “DNA methylation is the dominant approach, with approved products and products in trial, and our analysts project more approvals from this mechanism in the next five years.”

Only four epigenetic cancer treatments have been approved thus far: Merck’s Zolinza, Celgend’s Vidaza, Eisai’s Dacogen and Celgene’s Istodax. But the report says that every major drug company has a robust research program in methylation and histone modification drug development, targeting a variety of cancers. The next five years will certainly be dominated by epigenetics, Kalorama suggests. In some trials, epigenetic-based drugs are well tolerated and clinically effective against hematologic cancers, even though results vary when used against solid tumors as a monotherapy.

This report, Epigenetics: Applications for Pharmaceuticals and Diagnostics (Methylation, Histone Modification and miRNA expression) [1], describes the ongoing research in this area and forecasts potential markets for epigenetic-based therapeutics and testing. It discusses the key companies in the market, the revenues of current products in the market, and the progress that has been made in our understanding of the basic science of epigenomics and it considers the practical accomplishments being reported by the private sector.

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