Protein Synthesis
IN ACUTE MYELOID LEUKEMIA

UC RIVERSIDE
School of Medicine
CENTER FOR HEALTH DISPARITIES RESEARCH

City of Hope
UC RIVERSIDE
U54 CARE Partnership

UCR/City of Hope Comprehensive Cancer Center Partnership
(Pilot Project #2: Control of protein synthesis by eIF4A1 and mRNA m6A modification in acute myeloid leukemia)

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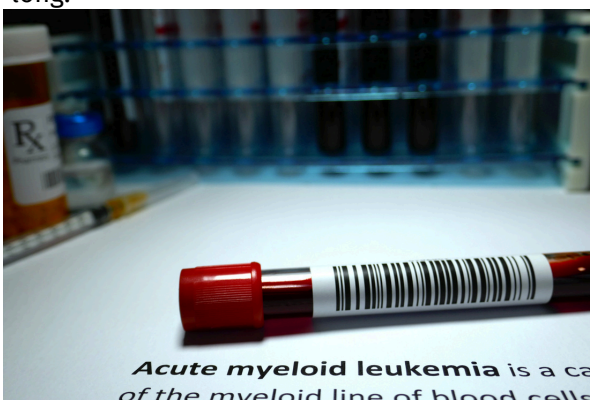
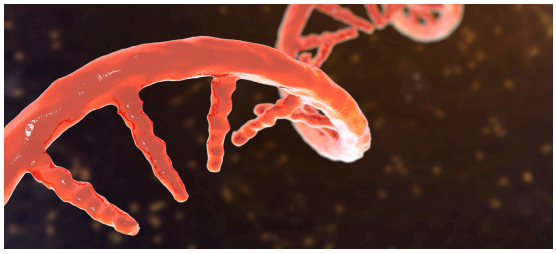
SUMMARY

Leukemia is a type of cancer that does not produce tumors; instead, it is a cancer of blood cells that continue to grow from the bone marrow and infiltrate the bloodstream. Acute myeloid leukemia (AML) is a particularly devastating form of leukemia that threatens both children and adults. As with other cancers, the clonal growth and division of these cancer cells consume a lot of host body's nutrients, and this growth can be especially aggressive. Despite improved medical treatment, most AML patients do not survive for long.



RNA AND TRANSLATION

Cell growth, including for normal blood cells in the body, involves a complex set of processes, all of which require energy. For the production of cell components such as proteins, the key processes include copying an RNA code from the cell nucleus. This RNA code in turn is used to instruct cell machinery to produce a whole array of proteins to perform cell functions. This process of using RNA code to produce proteins is called translation, as the RNA code is taken as an instruction that is translated into manufacturing the proteins needed by the cell. This translation process requires assembly of a whole complex of small components that must work together efficiently to produce the required proteins.



TREATMENT FOR AML

Cancer cells grow and divide in an uncontrolled way compared with non-cancer cells. To do this, they need to make more and different proteins than normal cells. In cancer, and especially in the case of AML, the entire translational machinery is ramped up to allow these cancer-related proteins to be made. Abnormalities in the leukemia cells can also result in abnormalities in how the RNA code is used, further enhancing cancer cell growth. Interestingly, cancer cells' abnormal translation might also be a useful target to treat leukemia cells, which depend on the translational abnormalities to survive. For example, one of the translational machinery components, called eIF4A1, appears to be present at unusually high levels in AML cells. High levels of eIF4A1 allow cancer-related proteins to be translated more efficiently. Because the cancer cells are dependent on eIF4A1 for the translation they need, medicines that target eIF4A1 can block this extra translation, reducing cancer cell growth or even killing the cancer cells.

RESEARCH TEAM

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PUBLICATION

Translational initiation factor eIF1.2 promotes toxoplasma stage conversion by regulating levels of key differentiation factors

MORE INFORMATION

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