News

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Decoy May Block Key AIDS Protein

Because it is not known what causes the human immunodeficiency virus (HIV) to reproduce, many researchers are concentrating on developing therapies that will prevent HIV from entering T cells.

HIV finds its way inside T cells by binding to CD4 protein. The protein gp120 makes contact with CD4, and it is this interaction that scientists hope to interrupt.

Several laboratories are working on "CD4 decoys": synthetic mimics that would bind gp120 and prevent it from reaching CD4. However, most decoys of this sort are seen by the immune system as "foreign" and are destroyed in the bloodstream. Also, the decoys can interfere with CD4's function in the normal immune system: binding to the MHC class II protein.

Stuart L. Schreiber, PhD, and his colleagues at Harvard University in Cambridge, Massachusetts, have developed small synthetic protein fragments that successfully block the binding of HIV to T cells. Called CPFs, these fragments appear to work without affecting normal T cell function.

Because CD4 binds both gp120 and the MHC protein, Dr. Schreiber reasoned that these molecules must have an attachment site in common on CD4. The researchers found a tiny site and discovered that one component of this site, the amino acid phenylalanine, is particularly crucial to the binding of both molecules. Using chemical synthesis techniques developed in earlier studies, Dr. Schreiber made several protein fragments containing phenylalanine altered by the addition of the CPF structure. When gp120 binds to one of these fragments, it is unable to attach to CD4. While CPFs do not stop the reproduction of HIV once it is inside the cell, they appear to stop the spread of infection to healthy cells in test tube experiments.

CPFs may be developed into anti-acquired immunodeficiency syndrome (AIDS) agents for use alone or in combination with other therapies. Alternatively, these CD4 decoys may provide a toxin "delivery vehicle" system in which drugs attached to CPFs are brought directly to HIV An advantage of small protein fragments like CPFs is that they can be administered orally. Larger proteins generally must be injected.

Drugs based on CPFs are still in the early phase of development. In vivo studies have yet to be conducted.

Red Cross Launches Transformation of Blood Program

If crisis is the cutting edge for change and growth, the acquired immunodeficiency syndrome (AIDS) epidemic has awakened the transformation of the American Red Cross blood program.

In a statement issued recently by Red Cross President Elizabeth H. Dole, the plans were unveiled for what she called "the total transformation of how we collect, process, and deliver one-half of the nations blood supply."

"Instead of continuing to patch and bandage a system that evolved in the 1940s," Dole said, "we will move to the next generation. Drawing heavily on our people and our finances, we intend to expand the world of the possible. Rather than just meeting standards, we will raise them. Instead of just fixing problems, we will spend our time preventing them...because of the AIDS epidemic, nothing short of a transformation is needed. The world has changed, and we must change with it if we are to live up to the expectations of the American public."

Assuring safe blood is the goal from the top down. The board of directors already has launched rigorous structural reforms this past year. In August, the Red Cross established a centralized structure for blood services, took aggressive action to address its regulatory compliance problems, formed a new department of education, recruitment, and training for all staff, and increased its own internal inspections with a rededication to quality assurance.

Dole detailed a five-point plan that will be implemented in the next two and one-half years at a cost of $120 million. 'We will revolutionize blood banking," said Dole.

The following is the five-step plan that the board approved.

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