What do you do // when you have a headache? // You swallow an aspirin. // But / for this pill to get to your head, // where the pain is, // it goes through your stomach, / intestines / and various other organs first. //

Swallowing pills / is the most effective / and painless way /of delivering any medication in the body. // The downside, // though, // is that // swallowing any medication leads to its dilution. // And this is a big problem, // particularly in HIV patients. // When they take their anti-HIV drugs, // these drugs are good / for lowering the virus in the blood, // and increasing the CD4 cell counts. // But / they are also notorious / for their adverse side effects, // but / mostly bad, // because // they get diluted by the time / they get to the blood, // and worse, // by the time they get to the sites / where it matters most: // within the HIV viral reservoirs. // These areas in the body // -- such as the lymph nodes, // the nervous system, // as well as the lungs // -- where the virus is sleeping, // and will not readily get delivered / in the blood of patients / that are under consistent anti-HIV drugs therapy. // However, // upon discontinuation of therapy, // the virus can awake / and infect new cells in the blood. //

Now, // all this is a big problem in treating HIV / with the current drug treatment, // which is a life-long treatment / that must be swallowed by patients. // One day, // I sat / and thought, // "Can we deliver anti-HIV directly / within its reservoir sites, // without the risk of drug dilution?" // As a laser scientist, // the answer was just before my eyes: // Lasers, // of course. // If they can be used for dentistry, // for diabetic wound-healing / and surgery, // they can be used for anything imaginable, // including transporting drugs into cells. //

As a matter of fact, // we are currently using laser pulses / to poke / or drill extremely tiny holes, // which open / and close almost immediately / in HIV-infected cells, // in order to deliver drugs within them. // "How is that possible?" // you may ask. // Well, // we shine a very powerful // but / super-tiny laser beam onto the membrane of HIV-infected cells // while these cells are immersed in liquid / containing the drug. // The laser pierces the cell, // while the cell swallows the drug / in a matter of microseconds. // Before you even know it, // the induced hole becomes immediately repaired. //

Now, // we are currently testing this technology / in test tubes / or in Petri dishes, // but / the goal is to get this technology in the human body, // apply it in the human body. // "How is that possible?" // you may ask. // Well, // the answer is: // through a three-headed device. // Using the first head, // which is our laser, // we will make an incision in the site of infection. // Using the second head, // which is a camera, // we meander to the site of infection. // Finally, // using a third head, // which is a drug-spreading sprinkler, // we deliver the drugs / directly at the site of infection, // while the laser is again used / to poke those cells open. //

Well, // this might not seem like / much right now. // But one day, // if successful, // this technology can lead to complete eradication of HIV in the body. // Yes. // A cure for HIV. // This is every HIV researcher's dream // -- in our case, // a cure lead by lasers. //