



BASIC//DISCOVERY

Sunday Shoyele, PhD
Associate Professor of
Pharmaceutical Sciences

TREATING LUNG CANCER with NANOPARTICLES

NON-SMALL CELL LUNG CANCER (NSCLC)—THE MOST COMMON

type of lung cancer—is very difficult to treat, but **Sunday Shoyele, PhD**, associate professor of pharmaceutical sciences, has developed a nanotechnology-based treatment. The new approach, which was effective in recent tests with mouse models, uses nanoparticles to deliver a molecule known to stall NSCLC tumor growth and believed to make cancer cells more susceptible to chemotherapy.

The molecule—microRNA 29b—is an example of the category of “silencing RNAs” (siRNAs) that interfere with the pathway by which individual genes are expressed. siRNAs are capable of both shutting down disease-causing processes in the cell and stripping away diseased cells’ ability to resist treatments. The challenge is getting them intact to the point of disease. Dr. Shoyele’s research program focuses on creating efficient and effective ways to deliver these therapeutic tools.

In the case of microRNA 29b, the problem is that the molecule quickly degrades in the bloodstream or is removed by immune cells. Therefore, Dr. Shoyele developed a special delivery mechanism. It is a nanoparticle comprised of three active parts: human immunoglobulin G, which cloaks the particle from the immune system; an antigen that seeks out lung tumors; and the therapeutic payload, microRNA-29b. Those three elements are bound together by a sticky polymer to form a spherical nanoparticle.

In the mouse models, the nanoparticles succeeded in reaching the tumors, which shrunk as a result. Dr. Shoyele is now pursuing comprehensive toxicity tests in animal models and is scaling up the nanoparticle manufacturing process—preparing for the treatment to enter clinical trials. ■