Advances in Vector Control Strategies

Public health campaigns focusing on long-lasting, insecticide treated nets (LLINs) and indoor residual spraying (IRS) have saved hundreds of thousands of lives over the past decade. These insecticides have been very effective but scientists are starting to see signs of insect resistance. BASF is now working with the international health community to develop urgent new solutions for vector control. Without them, millions of people could be at risk.

The Growing Threat: Resistance

It has been more than 30 years since a new public health insecticide appeared on the commercial market. This has allowed mosquitoes and other disease-carrying insects to develop resistance to many existing treatments. That’s because some insects that have survived the conventional treatments have developed a genetic resistance to the insecticides. The rapid evolution of resistance to existing insecticides highlights the urgent need for replacements.

Researching Innovative New Solutions

At the heart of the campaign to develop new public health insecticides is the Innovative Vector Control Consortium (IVCC), set up in 2005 with a grant from the Bill and Melinda Gates Foundation. Since 2010, BASF has been collaborating with the IVCC to develop innovative malaria prevention products. The BASF insecticide chlorfenapyr has proven effective in agricultural and urban pest control worldwide since 1995. BASF scientists and the IVCC are now investigating new applications for chlorfenapyr as a resistance management tool in the public health sector.

Targeting Cell Energy Production

Rather than kill pests on contact, chlorfenapyr works by disrupting energy production in the mitochondria in the insect’s cells. This mode of action makes cross-resistance unlikely in mosquitoes that are resistant to conventional neurotoxic insecticides. In addition, chlorfenapyr’s mode of action delays mortality in affected insects for 24 to 48 hours, allowing them to reproduce and pass on susceptible genes to the next generation. Chlorfenapyr has shown no cross-resistance to other insecticides used in mosquito control and its delayed action also limits the possibility that resistance will eventually develop. Chlorfenapyr is currently under evaluation for public health use by the World Health Organization and research is ongoing to develop both LLIN and IRS products based on this novel active ingredient.

“(In 2005) we knew that insecticide resistance was going to be a big issue, but we didn’t realize quite how important it would become.”

– Janet Hemingway, IVCC chief executive