Evidence of gene selection by ivermectin in the *Onchocerca volvulus* 2-tubulin gene polymorphism in the Mbonge sub-division of Cameroon.

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Opinion

Ivermectin (IVM) is still the sole safe medicine for mass onchocerciasis control, and its efficacy is critical to the success of control programmes. However, relying on a single treatment for decades could be problematic due to the development of IVM resistance, as seen in cattle nematode infections and canine filarial heartworm. Drug resistance is a genetic phenomenon that results from changes in the parasite population's genetic profile, which can be interpreted as selection for specific gene variants.

The beta tubulin gene has been connected to IVM selection in *Onchocerca volvulus* and is also known to be associated with IVM resistance in veterinary nematodes. The link between *O. volvulus* worm genotype and IVM selection might be discovered by analysing the parasitological response profile of *O. volvulus* to IVM and genetic investigation of the -tubulin gene. Onchocercal nodules were surgically removed from onchocerciasis patients in two groups with differing treatment histories: one that had received recurrent doses of IVM for at least the previous three years, and the other that had not. In both IVM exposed and naive worms, Reverse Transcription (RT) PCR of -tubulin transcripts indicated similar expression levels.

In Cameroon, 2.81 million people are affected with the disease, with another 5.2 million at risk of infection. The disease has a nodule prevalence of over 40%, with a skin microfilaria prevalence of around 60%. According to a study conducted in three drainage basins with diverse hydrologic profiles in rain forest areas co-endemic for onchocerciasis and loiasis in Cameroon's southern region, the Meme drainage basin showed the highest prevalence of nodule (39.1%) and microfilarial (mf) (52.7%).

Various governments, policymakers, and decision-makers in the vanguard of the fight against onchocerciasis have made ongoing attempts to manage and eradicate the illness, relying primarily on Community-Directed Therapy with Ivermectin (CDTI) at the moment. Because Ivermectin (IVM) has a limited macrofilaricidal activity, it is necessary to treat onchocerciasis with IVM for roughly 15 years, which corresponds to the adult worm's life period. However, relying on a single treatment for decades could be problematic due to the potential development of IVM resistance, as seen in livestock nematode infections and canine filarial heartworm.

Drug resistance is a genetic phenomenon that results from changes in the parasite population's genetic profile, which can be interpreted as selection for specific gene variants. The genetic profile of the population has already been transformed once the resistance phenotype has been unequivocally detected in the population. This genetic change can be found not only in genes whose products are engaged in the resistance mechanism, but also in genes that are genetically connected to other genes implicated in the resistance process.

There have been significant changes in the genetic polymorphism of the -tubulin gene between *O. volvulus* populations from IVM exposed and IVM naive people. The complete -tubulin gene was searched for Single Nucleotide Polymorphisms (SNPs), and a consistent link was discovered between four SNPs and the poor responsiveness of Ghanaian *O. volvulus* populations to IVM.

Using *O. volvulus* from IVM exposed and IVM naive individuals in the Mbonge Sub-Division, South West Region of Cameroon, this study aims to analyse the -tubulin gene for polymorphism linked with IVM resistance. In endemic communities, this will aid in early detection and monitoring of IVM resistance.

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