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Inside this issue 🔻

NEGLECTED TROPICAL DISEASES:

WORLD NEGLECTED TROPICAL DISEASES DAY (WNTDD)



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Genetic Strategy using CRISPR/CAS9 Reverses Insecticide Resistance 05

PAMCA Women In Vector Control (WIVC) Program 06

EDITORIAL

heers to new beginnings and once again, Happy New Year! As we continue to find our strides in 2022, the African Genetic Biocontrol Consortium is in full swing and tempo to document and create awareness of emerging biotechnologies.

On 30th January, 2022, the world marked the World Neglected Tropical Diseases Day as a reminder of the need to mobilize the attention of policymakers, healthcare providers, volunteers and the general public about the need to increase awareness and engagement in confronting inequalities that perpetuate neglected tropical diseases.

Get updated about a genetic strategy using CRISPR/Cas9, which reverses insecticide resistance of mosquito disease vectors that spread devastating diseases that impact hundreds of millions of people each year.

Also in this feature, we celebrate Women in Vector Control (WIVC) Program under PAMCA that empowers women to combat vector borne diseases by creating an enabling environment to enact a paradigm shift. Read all about it, as you catch up on all the topical issues.

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NEGLECTED TROPICAL DISEASES:

WORLD NEGLECTED TROPICAL DISEASES DAY (WNTDD)

On 30 January 2022, the annual World Neglected Tropical Diseases (NTDs) was commemorated to acknowledge the hard-earned progress against these diseases. This group of diseases are referred to as "neglected" because they are almost absent from the global health agenda, with little attention and funding. NTDs are a diverse group of diseases that are widespread in poor regions of the world where is poor sanitation and lack of access to basic healthcare. Examples of NTDs include leishmaniasis, dengue, chikungunya, schistosomiasis, rabies, and scabies. NTDs are a result of a variety of pathogens including viruses, bacteria, protozoa and parasitic worms, whereby it affects over 1 billion people globally. NTDs cost developing countries billions of dollars each year via direct health costs, loss of productivity, and reduced socio-economic activities.

The prevalence of NTDs is preventable and controllable. For instance, in the last ten years, at least 43 countries have successfully eliminated at least 1 NTD. Lack of access to drug treatment, especially in developing countries is a major challenge facing treatment initiatives towards NTDs. In addition, the COVID-19 pandemic led to de-prioritization of NTD programs, which led to massive disruptions to treatment and care. Nevertheless, adaptation and innovation is helping countries resume the NTD programs, which are complemented by integrated interventions and collaboration.

66 The prevalence of NTDs is preventable and controllable. 99



Insufficient attention and resources are given to NTDs, despite the devastating impact they bring to people in Africa and other tropical regions of the world. In PAMCA we are working towards expanding our activities to tackle NTDs transmitted by vectors as part of our vision towards an Africa free from vectorborne disease

Dr. Prosper Chaki Executive Director, PAMCA

#PAMCABeatNTDsForAll

In commemorating the World NTD Day 2022, the World Health Organization is calling on everyone, especially leaders and communities, to rally to confront the inequalities that characterize NTDs. It is imperative to reenergize the movement to combat NTDs through comprehensive and universal care for everyone affected. Innovative services are also essential in running the NTD programs, especially at a time when the pandemic has caused immeasurable



disruptions. In addition, collaboration across all sectors such as health, education, and nutrition is crucial for the purpose of beating NTDs through bold investments and actions. Further, it is important to engage and support community health workers and volunteers to give them capacity to deliver effective NTD health services. Ultimately, engaging communities and making them more informed and educated helps in prevention, control, and elimination of NTDs.



An Energising Global Movement

World NTD Day aims to mobilise political will and secure commitments to eliminate NTDs in support of the WHO's NTD Roadmap 2021-2030, including the elimination of at least 1 NTD from 100 countries by 2030.

https://worldntdday.org/

REVERSES INSECTICIDE RESISTANCE:

GENETIC STRATEGY USING CRISPR/CAS9 REVERSES INSECTICIDE RESISTANCE

Insecticides have a fundamental role in countering global impact as a result of vector-borne diseases such as Malaria. According to the World Health Organization (WHO) World Malaria Report, there were 627,000 malaria deaths worldwide in 2020. Insecticides are regarded as insect-specific chemicals that have a critical role in controlling and killing them, thus averting them from causing undesirable and destructive consequences.

In recent years, most of these

target insects develop genetic resistance to insecticides and subsequently become less sensitive to insecticide potency. The Sub-Saharan region of Africa accounts for 95% malaria cases and 96% of all deaths as per WHO data in 2020. As such, the use of insecticides in the form of insecticide-treated bed nets as well as indoor residual spraying are the major interventions against the fight against malaria. However, many mosquitoes in Sub-Saharan Africa have developed insecticide resistance, which makes these interventions less effective. Climate change has emerged as a factor that would potentially exacerbate these challenges.

Scientists at the University of California have developed a method that reverses insecticide resistance using CRISPR/Cas9 technology. The gene editing tool replaces an insecticideresistant gene in fruit flies with as susceptible form of the gene. The group of researchers including



The Sub-Saharan region of Africa accounts for 95% malaria cases and 96% of all deaths as per WHO data in 2020.

Craig Montell, Menglin Li, Bhaqyashree Kaduskar, Raja Kushwah and Professor Ethan Bier published their work in Nature Communications. The scientists used a modified type of genedrive, a technology that employs CRISPR/Cas9 to cut genomes at targeted sites, to spread specific genes throughout a population. As one parent transmits genetic elements to their offspring, the Cas9 protein cuts the chromosome from the other parent at the corresponding site and the genetic information is copied into that location so that all offspring inherit the genetic trait.

"This strategy could be used to reverse the resistance of mosquito disease vectors that spread devastating

diseases that impact hundreds of millions of people each year."

Craig Montell, professor of molecular, cellular and developmental biology, UC Santa Barbara.

In their study, the researchers employed an allelic drive to induce genetic susceptibility to insecticides, similar to insects in the wild prior to their having developed resistance. The researchers targeted an insect protein known as the voltagegated sodium channel (VGSC) which is a target for a widely used class of insecticides. Resistance to these insecticides, often called the knockdown resistance results from mutations in the VGSC gene that no longer allow the insecticide to bind to its VGSC protein target. The researchers replaced a knockdown resistance mutation with its normal natural counterpart that is susceptible to insecticides. Such allelic drive systems could be developed in other insects, including mosquitoes. Therefore, this principle provides a new approach for vector control, which can be integrated with other strategies with the goal of reducing malaria prevalence.

Source: Kaduskar, B., et al. (2022) Reversing insecticide resistance with allelic-drive in Drosophila melanogaster. Nature Communications. doi. org/10.1038/s41467-021-27654-1.

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PAMCA WOMEN IN VECTOR CONTROL:

FEATURE: PAMCA WOMEN IN VECTOR CONTROL (WIVC) PROGRAM



The Women in Vector Control (WIVC) is a program under the Pan-African Mosquito Control Association.

- Vision: An Africa free of vector borne diseases.
- Mission: Empowering women to combat vector borne diseases (VBDs) by creating an enabling environment to enact a paradigm shift.

According to UNESCO, out of the 394 medical entomologists in Africa, women make only 28% of this number. Such a statistic and representation of women is significantly low, especially at a time when global health problems require leadership that is well represented in the society. As such, the WIVC program has a mandate to increase women representation in vector control research and initiatives through mentorship, capacity building, networking, gender policy advocacy and non-professional empowerment. It is essential to bridge the gender gap at the workplace in order to realize equal representation in research on vector borne diseases. For instance, having strong supervision that challenges both genders to seek improvement at the workplace so as to have equal distribution of roles. Cooperation and working as a team would greatly help women to be actively engaged in research. In addition, having a mix of men and women in the workspace helps the team to see things from different perspectives and get a

broader and objective picture of goals and targets to be achieved. It is noteworthy that the major challenge to gender equity at the workplace is the feeling of not being valued and not being heard, which is mostly among women. For this reason, it is important to encourage women who showcase management and leadership abilities in the workplace. In doing so, such women would be role models to other women who have the desire to take up careers in vector-borne diseases research. Further, women should take up the initiative of comprehending their vulnerabilities and subsequently devise plans to mitigate or eliminate them.



Women in Vector Control research



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