

## **A preliminary study on the distribution of beta defensins copy number variable gene in different ethnics of Sarawak, Malaysian Borneo**

### **ABSTRACT**

The indigenous groups of Sarawak that are well-known for diverse ethnicity featuring different cultures, languages and lifestyles, are among the earliest resident of Malaysian Borneo. The high survivorship of these early inhabitants had triggered an interest on their ability to develop immune or defense mechanisms towards the environment. Beta defensin is one of the well-studied adaptive immune functional gene of human. Beta defensins gene family plays a major role in innate and adaptive immune systems that are located in a cluster of at least seven genes on chromosome 8p23.1 with highly variable copy number. The ability of the indigenous people populating new settlements has been linked to their resistance or susceptibility towards certain disease which is influenced by the effectiveness of beta defensins adaptability. Hence, investigation on the distribution of beta defensins copy number variable gene in ethnics of Sarawak was conducted by investigating two microsatellite regions within the gene cluster. The result from 78 respondents comprising of the Iban, Bidayuh, Selako, Bugis and Jawa on the immediate copy number typing range from 2 to 8 copies. Interestingly, the copy numbers are not unique to the ethnics. They show a broad overview of shared copy number typing between them. All the sampled ethnics showed an agreement of copy number typing with modal copy of four based on EPEV1 and EPEV3 except for the Selako population. Pearson's correlation shows excellent agreement between the samples with  $R^2=1$ . The differences in copy number typing between populations were mostly due to genetic drift within the population. Natural selection had caused small populations to develop defence mechanisms and adaptability towards the environment. Furthermore, intercultural marriage within small populations has discouraged gene flow and limits genetic drift which later becomes a mechanism of evolution for beta defensins copy number gene. This study highlights the diversity and distribution of beta defensins copy number variable gene between ethnics and localities. These may serve as the basis for our understanding of the evolution of the beta defensins gene within ethnicities and their ability in expansion of population due to resistant towards the environmental stress and natural selection.

**Keyword:** Indigenous people; Beta defensins; Immune defence; Copy number; Microsatellites assay; Environment