

SNAKE VENOMICS OF AFRICAN SNAKE SPECIES

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Snakebite envenoming represents an important public health problem in many tropical and subtropical countries, and has been aptly described as a disease of poverty. Most snakebite envenomations occur in low-income regions of Africa, Asia, and Central and South America. In sub-Saharan Africa, each year 1.000.000 bites cause 500.000 envenomations and 3.500-32.000 fatalities. However, despite the magnitude of its effects, the snakebite pathology has not received the attention it deserves, and has been categorized by the WHO as a neglected tropical disease. The severe shortage of commercial antivenoms in Africa provided an opportunity for unscrupulous marketing of inappropriate antivenoms that have proved clinically disastrous. This sad situation has prompted manufacturers in other parts of the world to provide antivenoms for Africa. Thus, in addition to laboratories traditionally producing antivenoms for Africa, such as EgyVac (Egypt), Sanofi-Pasteur (France) and South African Vaccine Producers (South Africa), in recent years other manufacturers, such as MicroPharm Ltd. (UK), Instituto Bioclon (Mexico), Instituto Butantan (Brazil), and Instituto Clodomiro Picado (Costa Rica), have developed new antivenoms against the most medically relevant African snake venoms. We have applied *in vivo* neutralization assays and antivenomics to assess the pre-clinical neutralization efficacy and the immunological cross-reactivity of EchiTAB-Plus-ICP[®] toward seven species of sub-Saharan snakes, e.g. *E. ocellatus* (Nigeria), *E. leucogaster* (Mali), *E. pyramidum leakey* (Kenya), *Bitis arietans arietans* (from Ghana and Nigeria), *B. gabonica gabonica*, *B. rhinoceros*, and *B. nasicornis* (undisclosed origin). The antivenom showed high degree of cross-reactivity against all venoms tested, although a small number of venom proteins (primarily PLA₂s, disintegrins, and Kunitz-type inhibitor) were only partially immunodepleted from the venoms. Now, we have investigated the toxin composition of venoms from African spitting cobras, and have assessed the ability of the EchiTab-Plus-ICP[®] antivenom to neutralize their toxicological activities by combination of standard laboratory tests in mice and antivenomics.