

MILITARY PHYSIOLOGY IN INDIA

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Research in military physiology in India was initiated in 1952 with the formation of Physiology Division within the realm of Defence Science Laboratory (DSL) which was then located within the premises of NPL at Pusa, New Delhi. Subsequently, with the identification of thrust area of research in environmental physiology and ergonomics of man-machine interface, nutritional requirements and biochemical changes in stressful environments concerning the soldiers, the Defence Institute of Physiology & Allied Sciences was established on 20th September 1962 in the premises of DSL which was then located at Metcalfe House, Delhi. During a short period between December 1962 and 1968, DIPAS was located in the Physiology Department of Madras Medical College, Madras. In 1968, DIPAS was shifted to the Army Base Hospital Campus, Delhi Cantonment. In the year 1993, the Institute was shifted to its present permanent premises at Lucknow Road, Timarpur, Delhi.

Since its inception, DIPAS has come a long way to emerge as a premier Institute with expertise in executing research in the field of Physiology and related disciplines. It has translated itself in research areas adopting the concept of 'Man to Molecule'. Commensurate with the mandate of keeping the man fit behind the weapon, the core competence of the Institute is focussed on physiological adaptation of service personnel, while operating under the influence of extreme cold & hypoxia at high altitude, hot desert, noise, vibration, electromagnetic/microwave/UV radiations, deep sea water and various toxicants.

DIPAS has its characteristic strength in its ability to conduct multidisciplinary studies in actual field conditions as well as in laboratory on invasive organ systems as well as cell biology to understand the mechanism at cellular level. These research pursuits are initiated as S&T projects and on users' requirements in the emerging areas.

During the early years, DIPAS has contributed extensively in all major areas of immediate application to defence operations viz., ration scale and nutrition of soldiers, sizing of clothing, load carriage and distribution in infantry soldiers, thermal comfort zone identification, nature of heat casualty, salt & water requirement in summer, habitability survey of naval ships and physical training & conditioning schedules. While continuing with these issues related to immediate operational needs, research studies also emanated in tune with the emerging technologies. Extensive research work was carried out on yoga and adaptogen as performance enhancers in extreme environment, body water distribution on heat induced hypohydration and its correction, neurophysiological mechanism against noise induced hearing loss and thermal evaluation of protective clothing. In the products development front, DIPAS contributions are noteworthy. Carbogen Breathing system developed as a treatment modality for noise induced hearing loss has been approved by

DGAFMS. The same has already been accepted for induction by the Indian Navy. Another TOT for the product Aloe vera cream 'ALOCAL' developed for prevention/treatment of cold injuries has been granted to M/s Fem Care Pharma, Nasik. This cream has proved to be efficacious in reducing frostbite morbidity in Glacier Region and its consolidated demand is being met by DIPAS to 14 Corps HQ on need basis. Electrically heated Gloves and Socks developed by DIPAS in collaboration with MECON, Ranchi, have successfully been evaluated for its efficacy to provide thermal comfort at an ambient temperature of -15°C. These are in process of field trials and subsequently will be made available to soldiers operating in snow bound areas. The Nitric Oxide therapy (Inhalation of 15 ppm NO + 50% O₂) for the treatment of High Altitude Pulmonary Edema (HAPE) developed at DIPAS is in use at 153 GH. It is being supported by supply of necessary gases and accessories by DIPAS. In addition, DIPAS is in continuous interaction with Army authorities for 'Introduction of Yoga in Army' at high Altitude'. DIPAS has also ventured into the fields of Biotechnology and evaluation of herbs in Himalayan region. This has resulted into important Hsp based vaccine as a candidate against *S typhi*, *S pneumoniae* and Typhoid as well as nutraceutical and functional food products. Establishment of Genomic and Proteomic Lab in the Institute is in progress, which will be of immense use for other DRDO Life Sciences Laboratories also. Another notable facility matured is in the area of Biomechanics. A state-of-art lab has come up to conduct Ergonomic evaluation. In addition to its immediate application on ergonomic evaluation of human factors with respect to different workstations, the facility will be of major use in the forthcoming DRDO programme 'Soldier as a System' in terms of modulation of human performance and evaluating biomechanics of human motion.