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CSIR-India, DRDO to join hands to develop Saras engine

The Council for Scientific and Industrial Research (CSIR) will collaborate with the Defence Research and Development Organisation (DRDO) to produce an indigenous engine for the Saras light passenger aircraft being developed by it.

“We will be taking up the project jointly. Designing and developing an aero-engine is a highly complex task,” Dr Shekhar C Mande, Director General, CSIR, said during his visit here. “Apart from the power plants, all major systems of the Saras are indigenous,” he added.

The DRDO has been developing the Kaveri engine that was initially meant for the Light Combat Aircraft since the mid-80s, but has not been successful. While some technologies and components were validated, there were problems with some. While various types of aero-engines have been produced under licence in India, an indigenous engine has not been developed. According to some experts, developing a turboprop for a transport aircraft is less complex than developing a jet engine for a fighter.



The prototype version of the Saras, being developed by the CSIR’s National Aeronautical Laboratory (NAL), is powered by two Canadian Pratt and Whitney PT6A turboprop engines, that are not only mounted on the rear of the fuselage instead of the wings, but also face rearwards.

“The 14-passenger Saras plane, which is undergoing flight trials, will also have the capability to taxi in reverse, a feature that is not very common in aircraft. In the IAF’s inventory, the American C-17 strategic freighter and the German Dornier Do-228 have this feature. Taxiing in reverse require the jet blast from the engines to be directed forwards but it has technical, environmental and safety concerns when operating in the vicinity of aerodrome terminals or structures.

The NAL would be conducting 20 test flights of the Saras before the design is frozen and production would be undertaken by state-owned Hindustan Aeronautics Limited. The IAF has committed to procure 15 aircraft.

Dr Mande, who is a member of Gaganyaan National Advisory Council, the steering body for ISRO’s manned space mission, said the NAL was also deeply involved in testing and devaluating many of the launch vehicle’s components.

<https://www.csir.res.in/slider/csir-india-drdo-join-hands-develop-saras-engine>

New Desi gel to fight frostbite

New Delhi: Soldiers posted in high-altitude sites like Siachen and Ladakh as also mountaineers and winter sports enthusiasts and those visiting or living in the snow-bound areas have a reason to cheer at an on-site treatment available for frostbite, a medical condition that damages skin and tissues due to extreme colds.

A 'nano spray gel' for immediate treatment of the frostbite injuries has been jointly developed by the Institute of Nano Science and Technology (INST), Mohali, an autonomous institution under the Department of Science and Technology, Defence Institute of High Altitude Research (DIAR), DRDO and the Punjab university.



The spray gel's details are published in the peer-reviewed journal "American Chemical Society Biomaterials Science & Engineering."

If frostbite is not treated promptly, it can lead to gangrene and amputation of the affected limbs. Frostbite occurs when the skin is exposed to a temperature of 0 degree Celsius and it used to be difficult to get treatment quickly in remote and snow-bound areas. This was also a serious medical problem for the armed forces operating in the high altitude areas but no longer, says Kalpesh Vaghasiya, the lead author of INST.

He said the new spray gel is a combination of NSAID, which is a painkiller and anti-inflammatory and clotbuster drug thrombolytic. He said the spray has been prepared using heparin, an anticoagulant that improves the blood flow by reducing clotting and aiding in blood vessel repairs.

The researchers packaged heparin into liposomes, lipid carriers, thus helping deliver the anticoagulant deep inside the skin. The heparin-loaded liposomes were embedded in a sprayable hydrogel that also contains ibuprofen and propylene glycol to prevent freezing of the spray at very low temperature.

The scientists say the gel developed by them is much better than the conventional treatment so far offered that includes immersing the body part in warm water, applying topical antibiotic creams or administering vasodilators and anti-inflammatory drugs, though these are not available in the isolated snowy areas like the mountain tops. Moreover, these medications could end up freezing themselves unlike the new gel under such circumstances.

<https://www.freepressjournal.in/india/new-desi-gel-to-fight-frostbite>

This desi gel can take a bite out of frostbite

By Archana Jyoti

New Delhi: Mountaineers, soldiers posted in extreme regions, winter sports enthusiasts, and those visiting/living in snow-bound area at high-altitudes like Siachen or Ladkha have now an on-site treatment available for frostbites — a medical condition involving damage to skin and tissues due to extreme cold.

Scientists from the Institute of Nano Science and Technology (INST) in Mohali, an autonomous institution under the Department of Science & Technology (DST), Defence Institute of High Altitude Research (DIAR), DRDO and Panjab University have developed a cold-stable spray gel “Nano-Spray Gel” that could be administered on-site for the immediate treatment of frostbite injuries. If frostbite is not treated promptly, it can lead to gangrene and amputation of the affected limbs.

The innovation of Nano-Spray Gel, which is a combination of NSAID (painkiller and anti-inflammatory) and clotbuster drugs (thrombolytic) for rapid relief and effective management of frostbite injury, has been published in the peer reviewed journal “American Chemical Society Biomaterials Science & Engineering”.

Frostbite can occur when the skin is exposed to a temperature of 0°C (32°F) or lower. It can be difficult to get treated quickly in remote, snowbound areas. This is also a serious medical problem for the armed forces operating in snow-bound areas at high altitudes like Siachen, Ladhak and so on, said lead author Kalpesh Vaghasiya from INST.

He said that the spray gel has been prepared using heparin, an anticoagulant that improves blood flow by reducing clotting and aiding in blood vessel repair. The researchers packaged heparin into liposomes — lipid carriers, thus helping deliver the anticoagulant deep inside the skin.

Then they embedded the heparin-loaded liposomes in a sprayable hydrogel that also contained ibuprofen (a painkiller and anti-inflammatory drug) and propylene glycol, which helped keep the spray from freezing at very low temperatures.

The researchers tested the spray gel on rats with frostbite, and found that the treatment completely healed the injuries within 14 days. In comparison, untreated injuries were only about 40 per cent healed, while wounds treated with an antibiotic cream were about 80 per cent healed.

The spray reduced levels of inflammatory cytokines at the wound site and in the blood circulation, which likely accelerated healing, the study ‘Heparin-Encapsulated Metered-Dose Topical “Nano-Spray Gel” Liposomal Formulation Ensures Rapid On-Site Management of Frostbite Injury by Inflammatory Cytokines Scavenging’ said.

Frostbite causes fluids in the skin and underlying tissues to freeze and crystallize, resulting in inflammation, decreased blood flow, and cell death. Extremities are the most affected areas because they are farther away from the body’s core and already have reduced blood flow, said the researchers.

Conventional treatments include immersing the body part in warm water, applying topical antibiotic creams or administering vasodilators, and anti-inflammatory drugs, but many of these are unavailable in isolated snowy areas, like mountaintops. Others, such as topical medications, could end up freezing themselves. The new gel can be of great help under such conditions, as per the researchers.

The other scientists involved in the innovation included Rahul Verma, Ankur Sharma, Eupa Ray, Suneera Adlakha from INST, Kushal Kumar and Sunil Kumar Hota from DIAR and Om Prakash Katara from University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.

<https://www.dailypioneer.com/2020/page1/this-desi-gel-can-take-a-bite-out-of-frostbite.html>