

monoclonal antibodies include ones that discriminate between the ScuPA and the HMW form. A combination of these molecular-specific antibodies will enable simultaneous assays of the ScuPA, HMW, and LMW forms in the same specimen of culture medium.

This work was done by Dennis R. Morrison of Johnson Space Center and M. Zouhair Atassi of Baylor College of Medicine. For further information, contact the Johnson Commercial Technology Office at (281) 483-3809.

This invention is owned by NASA, and a patent application has been filed. Inquiries

concerning nonexclusive or exclusive license for its commercial development should be addressed to the Patent Counsel, Johnson Space Center, (281) 483-0837. Refer to MSC-21947.

Understanding and Counteracting Fatigue in Flight Crews

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The materials included in the collection of documents describe the research of the NASA Ames Fatigue Countermeasures Group (FCG), which examines the extent to which fatigue, sleep loss, and circadian disruption affect flight-crew performance. The group was formed in 1980 — in response to a Congressional request to examine a possible safety problem of uncertain magnitude due to transmeridian flying and a potential problem due to fatigue in association with various factors found in air-transport operations — and was originally called the Fatigue/Jet Lag Program. The goals of the FCG are: (1) the development and evaluation of strategies for mitigating the effects of sleepiness and circadian disruption on pilot performance levels; (2) the identification and evaluation of objective approaches for

the prediction of alertness changes in flight crews; and (3) the transfer and application of research results to the operational field via classes, workshops, and safety briefings.

Some of the countermeasure approaches that have been identified to be scientifically valid and operationally relevant are brief naps (<40 min) in the cockpit seat and 7-min activity breaks, which include postural changes and ambulation. Although a video-based alertness monitor based on slow eyelid closure shows promise in other operational environments, research by the FCG has demonstrated that in its current form at the time of this reporting, it is not feasible to implement it in the cockpit. Efforts also focus on documenting the impact of untreated fatigue on various types of flight operations. For example, the FCG re-

cently completed a major investigation into the effects of ultra-long-range flights (20 continuous hours in duration) on the alertness and performance of pilots in order to establish a baseline set of parameters against which the effectiveness of new ultra-long-range fatigue remedies can be judged.

This work was done by Melissa Mallis, David Neri, Mark Rosekind, and Philippa Gander of Ames Research Center; John Caldwell of Air Force Research Laboratory; and Curtis Graeber of The Boeing Company. For further information, visit the FCG website at <http://human-factors.arc.nasa.gov/zteam>.

Inquiries concerning rights for the commercial use of this invention should be addressed to the Ames Technology Partnerships Division at (650) 604-2954. Refer to ARC-15114-1.