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RTO MEETING PROCEEDINGS 42

The Effect of Prolonged Military Activities in Man. Physiological and Biochemical Changes. Possible Means of Rapid Recuperation

(les Effets d'activités militaires prolongées sur l'homme.
Changements physiologiques et biochimiques. Moyens
possibles de récupération rapide.)

*Papers presented at a workshop organised by the former DRG of NATO in Oslo, Norway,
3-5 April 1995.*



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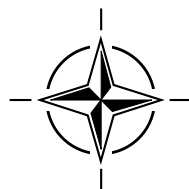
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RTO reports both to the Military Committee of NATO and to the Conference of National Armament Directors. It comprises a Research and Technology Board (RTB) as the highest level of national representation and the Research and Technology Agency (RTA), a dedicated staff with its headquarters in Neuilly, near Paris, France. In order to facilitate contacts with the military users and other NATO activities, a small part of the RTA staff is located in NATO Headquarters in Brussels. The Brussels staff also coordinates RTO's cooperation with nations in Middle and Eastern Europe, to which RTO attaches particular importance especially as working together in the field of research is one of the more promising areas of initial cooperation.

The total spectrum of R&T activities is covered by the following 7 bodies:

- AVT Applied Vehicle Technology Panel
- HFM Human Factors and Medicine Panel
- IST Information Systems Technology Panel
- NMSG NATO Modelling and Simulation Group
- SAS Studies, Analysis and Simulation Panel
- SCI Systems Concepts and Integration Panel
- SET Sensors and Electronics Technology Panel

These bodies are made up of national representatives as well as generally recognised 'world class' scientists. They also provide a communication link to military users and other NATO bodies. RTO's scientific and technological work is carried out by Technical Teams, created for specific activities and with a specific duration. Such Technical Teams can organise workshops, symposia, field trials, lecture series and training courses. An important function of these Technical Teams is to ensure the continuity of the expert networks.

RTO builds upon earlier cooperation in defence research and technology as set-up under the Advisory Group for Aerospace Research and Development (AGARD) and the Defence Research Group (DRG). AGARD and the DRG share common roots in that they were both established at the initiative of Dr Theodore von Kármán, a leading aerospace scientist, who early on recognised the importance of scientific support for the Allied Armed Forces. RTO is capitalising on these common roots in order to provide the Alliance and the NATO nations with a strong scientific and technological basis that will guarantee a solid base for the future.

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The Effect of Prolonged Military Activities in Man. Physiological and Biochemical Changes. Possible Means of Rapid Recuperation

(RTO MP-042)

Executive Summary

Panel 8 of the Defence Research Group (DRG) held a Workshop on the medical consequences of prolonged continuous military operations at Soria Moria, Oslo, 3-5 April 1995.

The participants agreed that the key questions raised by this workshop were:

- How to select and train personnel for continuous operations
- How to intervene to enhance physical and mental performance during continuous operations

The participants concluded that although the studies presented were of considerable interest, too scarce data exist to answer these key questions. Most data available are from studies of one stress factor at a time, and more effort should be done on studies of combined stress under field conditions. The workshop also agreed that further studies of physiological and psychological parameters during continuous operations during field conditions are highly needed. Whether special recommendations should be given for the treatment of wounded personnel participating in continuous military operations, and possible consequences for the long-term health of personnel participating in continuous military operations were also discussed by the workshop. This question is of great importance and can only be answered through further research.

The other key question about how to intervene during continuous operations in order to maintain the physical and mental performance, by such means as work-rest schedules, nutrition and drugs, has mainly been carried out in laboratory experiments and only scarcely addressed in a systematic manner during continuous field conditions. The workshop participants agreed that the question of possible interventions was the most significant issue to be addressed in further studies. The methodological problems with field models and how to measure the effect of interventions during field conditions were discussed. One suggestion was that a multifactorial intervention study could be performed e.g. during a NATO exercise. Effect of the interventions should be measured in a standard manner on mental and physical performance by the performance measures used e.g. during a “Best ranger competition” in US in addition to studies of physiological, biochemical and immunological functions, as well as sleep quality and effects of nocturnal sleep recovery. Canada, Germany, France, Norway, US and UK are likely to participate in these collaborative studies, and the workshop participants suggest that the Human Factors and Medicine Panel should establish a Task Group to address this important question.

les Effets d'activités militaires prolongées sur l'homme. Changements physiologiques et biochimiques. Moyens possibles de récupération rapide.

(RTO MP-042)

Synthèse

Le Panel 8 du Groupe sur la recherche pour la défense (GRD) a organisé un atelier sur les conséquences médicales d'opérations militaires continues prolongées à Santa Moria, Oslo, du 3 au 5 avril 1995.

Les participants ont reconnu la nature clé des questions suivantes soulevées par l'atelier :

- la sélection et l'entraînement des personnels en vue de la réalisation d'opérations continues
- les possibilités d'intervention en vue d'améliorer les performances physiques et mentales lors d'opérations continues

Les participants ont conclu que bien que les études présentées fussent d'un grand intérêt, trop peu de données existaient pour pouvoir formuler des réponses à ces questions clés. La plupart des données disponibles sont issues d'études de facteurs de stress isolés, et il y a lieu d'entreprendre des études du stress complexe dans des conditions opérationnelles. Les participants se sont également accordés à penser que la nécessité se faisait sentir d'études complémentaires des paramètres physiologiques et psychologiques présents lors d'opérations continues en conditions opérationnelles. Les participants à l'atelier ont aussi discuté de l'opportunité de l'élaboration de recommandations spéciales concernant les soins à dispenser aux personnels blessés lors d'opérations militaires continues, et des conséquences possibles pour la santé à long terme des personnels engagés dans ces mêmes opérations. La question est d'une grande importance et ne trouvera de réponse que par le biais de recherches complémentaires.

L'autre question clé, qui concerne les possibilités d'intervention pendant les opérations continues afin d'assurer le maintien des performances physiques et mentales, par le biais de cycles de travail-repos, de la nutrition et des médicaments, a été principalement abordée sous la forme d'expériences de laboratoire, et rarement de façon systématique en conditions opérationnelles. Les participants à l'atelier se sont accordés à dire que le sujet des interventions possibles était la question la plus intéressante à étudier à l'avenir. Les problèmes méthodologiques associés aux modèles des conditions opérationnelles et au calcul des effets des interventions en conditions opérationnelles ont été discutés. Il a été proposé d'entreprendre une étude d'intervention multifactorielle, par exemple lors d'un exercice de l'OTAN. Les effets des interventions sur les performances physiques et mentales devraient être calculés de façon normalisée en faisant appel par exemple, aux méthodes employées lors de la "Best ranger competition" aux USA, en plus des études réalisées sur les fonctions physiologiques, biochimiques et immunologiques, sur la qualité du sommeil et sur les effets de la récupération du sommeil nocturne. Il est vraisemblable que le Canada, l'Allemagne, la France, la Norvège, les Etats-Unis et le Royaume-Uni participent à ces études menées en coopération et les participants à l'atelier ont proposé à la commission sur les facteurs humains et la médecine de créer un groupe de travail pour examiner cette question importante.

Contents

	Page
Executive Summary	iii
Synthèse	iv
Human Factors and Medicine Panel	vi
	Reference
Endocrine and Metabolic Changes during Exhaustive Multifactorial Military Stress. Results from Studies during the Ranger Training Course of the Norwegian Military Academy by P.K. Opstad	1
The Phagocyte Function during Multifactorial Military Stress, and Neuroendocrine Interactions with Phagocytes by P. Wiik, P.K. Opstad and A. Bøyum	2
The Effect of Strenuous Exercise, Calorie Deficiency and Sleep Deprivation on White Blood Cells, Plasma Immunoglobulins and Cytokines by A. Bøyum, P. Wiik, E. Gustavsson, O.P. Veiby, J. Reseland, A.H. Haugen and P.K. Opstad	3
Fluid Regulation and Time Course of Erythropoietin during Multifactorial Strain of Austrian Special Forces Survival Training by P. Wittels, H.-Chr. Gunga, B. Kanduth and K. Kirsch	4
Sleep Recovery from Physical Exercise: A New Understanding of Brain Responses to Stress by A. Buguet	5
Acute Recovery of Physiological and Cognitive Function in U.S. Army Ranger Students in a Multistressor Field Environment by K.E. Friedl, M.Z. Mays, T.R. Kramer and R.L. Shippee	6
Managing Fatigue in Long Duration Airlift Operations 1994 by J. French	7
The Biochemical and Physiological Effects of 95 Days Endurance Exercise in Negative Energy Balance by M.A. Stroud	8
The Effects of Exhaustive Military Activities in Man. The Performance of Small Isolated Military Units in Extreme Environmental Conditions by L. Vanggaard	9
Special Rations for Long Range Reconnaissance Troops by W. von Restorff, K. Diebold and T. Brezina	10

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14. Abstract																											
<p>New technology and operational concepts have provided new challenges to military personnel's health, safety and performance. These proceedings include ten papers, dealing with different aspects of the biomedical consequences of continuous military operations. They were presented at a workshop organised by the former DRG of NATO in Soria Moria, Oslo, Norway, 3-5 April 1995, and this publication has been sponsored by the Human Factors and Medicine Panel (HFM) of RTO.</p> <p>The papers show large alterations in hormones, metabolites, red and white blood cells, as well as mental performance. There was an adrenergic desensitization, decrease in thyroid function due to energy deficiency, and decrease in androgens due to physical exercise. Unspecific immune function (granulocytes and monocytes) were stimulated, while specific immune function (lymphocytes) were inhibited. Acute sleep deprivation mainly affects mental functions and have limited influence on endocrine, metabolic and immune functions.</p> <p>The key questions addressed by the workshop were how to select and train personnel for continuous operations, and how to intervene to enhance physical and mental performance by such means as nutrition, sleep, work-rest schedules and drugs. The optimal treatment for soldiers' recovery and reentry to the battlefield following high intensity direct action missions was also discussed.</p> <p>The participants agreed that there is a need for more realistic field studies with systematic interventions with different stress factors to reveal their relative significance and to find counter measures.</p>																											

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