

Presidenza del Consiglio dei Ministri



**HUMAN RIGHTS, MEDICAL ETHICS AND
ENHANCEMENT TECHNOLOGIES IN MILITARY
CONTEXTS**

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Presentation

For the first time the NBC deals with an issue relative to ethics/bioethics in a military context. The Committee began to tackle this issue during the plenary session of 15 July 2011 upon listening to what was said by Col. Gaspare Schiavone, Office Chief of Army Logistic Command, Office for Logistic Operations, and Col. Paolo Astorre, Head of Medical Oncology of the Celio Military Hospital, delegated by Lieutenant General Rocco Panunzi, who had been invited to participate but was not able to take part in the work.

To tackle the problem of the possibility of limiting the use of arms, does not mean to justify war or endorse militarism. There is nothing further from ethics than the openness to give and receive the death that war imposes. It is nonetheless the task of ethics to curb human aberrations, in the hope that limit after limit, reflection after reflection, their elimination may be achieved. This has happened in many Countries with corporal punishment and the death penalty. Can the same happen with war? We are acquainted with the role that humanitarian associations, international organisations and pacifist movements have been playing in this field for some time now. It is opportune that bioethics should also reflect on the role of the doctor, the type of arms used and the psycho-physical conditioning that the military are subject to. Keeping silent on these issues could mean a scornful repudiation of war, but also the fear to touch a sector, like the condition of the military and their duty to obey, which generally the logic of power or the easy rhetoric of the absolute duty to defend the fatherland tend to exclude from any control and external intromission.

Considering the range of the issues that arose concerning ethics and bioethics in a military context, the work group, coordinated by Prof. Salvatore Amato and Dr. Riccardo Di Segni, reached the conclusion that it is a difficult context to assess completely and exhaustively in one Opinion. Within the context of the numerous problems arising, the working group decided to focus the attention on enhancement in a military framework. Furthermore, this profile was collocated in a wider reflection on the subject of enhancement that the Committee was carrying out also with reference to other sectors, particularly that of cognitive pharmacological enhancement. Well aware of the complexity of the argument and on the basis of the study of the literature and documents available, the coordinators of the group prepared a draft which was first discussed by the group and then in the plenary session.

In a still very uncertain panorama, but characterised by a singular convergence of interests and agreements for collaboration between industry, research bodies and military institutions, the hypothesis is presented of an increasingly engineered soldier removed from the ordinary citizen. 'Enhancement' technologies have been employed on this type of soldier that can be defined as 'strategies to create human capacities going beyond the normal biological variability, by means of modifications of the human function', among which surgery, genetic modifications, neuronal stimulation, enhancing drugs.

Starting from the shared assumption of the repudiation of war, the NBC expresses a general judgment of ethical disvalue on the specific subject of enhancement technologies in a military context. Many of these technologies represent a risk both for the subjects exposed to them and for the civilian and

military adversaries, which goes beyond the limits foreseen by the international law in force relative to military operations and war.

The Committee is nonetheless aware that the technological evolution on the one hand and military needs on the other will move more and more towards the adoption of some of these technologies. Concerned about these developments, the NBC considers it necessary that for all technology in such a context, the conviction be affirmed with greater emphasis that a number of fundamental bioethical principles cannot be derogated: the principle of dignity and the physical, psychic and ethical integrity of the military, the principle of non-harmfulness, the principle of autonomy, the principle of equality. For this end the Committee recommends, at a national and international level, the setting up of multidisciplinary commissions similar to ethics committees, constituted not only of military, who might ascertain the compliance to these principles at the various levels, checking the clinical trial protocols, the modalities used to obtain informed consent, the reversibility or non-reversibility of the effects. In the framework of this is the difficult balance between the duty to obey, the secrecy to which the military is bound and the respect for his or her fundamental rights.

The document, drafted by Prof. Salvatore Amato and Dr. Riccardo Di Segni, was debated in the working group, at which the following participated: Profs. Luisella Battaglia, Lorenzo d'Avack, Marianna Gensabella, Assunta Morresi, Laura Palazzani, Monica Toraldo di Francia, Giancarlo Umani Ronchi. The Opinion was approved with a majority vote by Profs. Luisella Battaglia, Adriano Bompiani, Bruno Dallapiccola, Lorenzo d'Avack, Riccardo Di Segni, Silvio Garattini, Marianna Gensabella, Laura Guidoni, Assunta Morresi, Andrea Nicolussi, Laura Palazzani, Vittorio Possenti, Monica Toraldo di Francia, Giancarlo Umani Ronchi. Profs. Cinzia Caporale and Grazia Zuffa abstained. Profs. Salvatore Amato, Francesco D'Agostino, Maria Luisa Di Pietro, Demetrio Neri and Lucetta Scaraffia were absent at the meeting but expressed their agreement with the text. Prof. Carlo Flamini wrote a personal remark.

The President
Prof. Francesco Paolo Casavola

1. Premise

The indispensable premise to this document is that the NBC tackles this subject starting from the shared assumption of the repudiation of war 'as an instrument of aggression against the freedom of other peoples and as a means for the settlement of international disputes' decreed by the constitutional text (Art. 11); of war defined by the United Nations Charter (San Francisco 26 June 1945) as a 'scourge' from which to preserve oneself with the commitment to peace.

This solemn statement does not imply the renunciation of defence from violence by any aggression whatsoever, but instead makes it obligatory to take preventive measures to avert armed force – where possible – and to repress it, with suitable proportionate means, should it be brought into effect.

These principles – now firmly enshrined in international and national law (a hard-fought achievement after centuries-old and bloody experiences) – oblige the sovereign states to keep their armed forces active, and equipped with the suitable instruments to react to offence, to neutralise it, to induce the aggressor to give up their objectives and if necessary – with the intervention of international courts should the aggressor be an external state – to compensate the Country being attacked for the damage caused.

In this very general scheme, according to which the debated question of the so-called 'just war' was also formulated – identified back in the Middle Ages – and after the uncontrollable dimension of the 'Great Armies', constituted by the compulsory recruitment of whole demographic classes of the male population in the XIX and XX Centuries, an 'Armed Force' has in many Countries substituted all this, made up of persons who voluntarily enrol in the exercise of a military profession, which – for their whole working life or parts of it – constitutes above all the work (contractualist employment) of young people, who for different reasons apply for enrolment and are selected according to physical, cultural, moral and behavioural characteristics, etc. established by the specialised 'technicians' in military art, who make up the decision-making summit of the Armed Forces.

'Military sociology', a branch of general sociology applied to the military world, has widely examined the various models according to which the organisation of the Armed Forces is realised, pointing out which behavioural requirements of the recruits must be covered to confer ready and efficient operational skills to oppose armed conflict to those very Forces.

The present organisation process that has been used in recent decades, coming also from the experiences gained in World War II, regional conflicts and terrorism, sees the establishment of two basic parameters:

1) the development and practical application of all those innovative techniques that might increase the defence/offence quotient for what is globally understood as 'armament';

2) the increased and progressively more sophisticated care in the preparation of the 'human factor' and that is of the Officers (who have increasingly become true experts in the various disciplinary fields involved) and the soldiers who become more and more 'executive', with high levels of professionalism.

The military Health Corps, which has integrated the Armed Forces for Centuries, superintends every aspect of health protection.

The considerations of this document are based on these factors in particular.

2. The question of *enhancement* in the conferral of a high professional level

The human enhancement techniques concern various fields of scientific experience and take on a plurality of aims. In this document the NBC sets out to analyse that particular profile represented by the use of these techniques for military purposes¹. In this choice the Committee is aware that the data and information to work on are necessarily approximate, as an evident reticence exists on such a delicate subject by every state to reveal its strategies and declare its intentions. Nevertheless, in the last ten years, this problem has arisen more and more frequently not only in essays and newspaper articles², but also in various official documents of the National Research Council (NRC) of the United States which have looked at the single aspects of this composite reality: non-lethal arms³, the potential of the use of biomaterials and information technology in distance medical care⁴, the neurosciences⁵, genetics, nanotechnologies and pharmacology⁶. Referring to these documents the Royal Society of the United Kingdom wrote the report on *Neuroscience, Conflict and Security* in February 2012.

It thus seems opportune to begin a reflection that attempts to identify the minimum essential ethical margins that must be claimed, in any case, also within a context that often seems far from any possibility of control and total respect of the fundamental rights of the person. In the words of Canetti, it is difficult not to take cognizance that 'what in time of peace is banned with the hardest sanctions, here it is not only expected of the individual, but practised *en masse*'⁷. However many theories have been formulated to bring back war within ethical limits and however many international declarations may have been undersigned by the single states, it is difficult to avoid the resigned conclusion that 'death, violence, suffering remain the trio that best defines war'⁸.

According to some, even the doctor who during wartime occasionally makes the last extreme attempt to reduce suffering, but on other occasions manages to save the wounded from death, finds himself playing a role which in

¹ For other aspects of enhancement see the Opinion on *Neurosciences and pharmacological cognitive enhancement: bioethical profiles* approved by the NBC on 22 February 2013.

² For example W. Pinkus, *Study urges using neuroscience to improve U.S. Soldiers' performance*, in "Washington Post", Monday, May 18 2009.

³ NRV, *An assessment of nonlethal weapons science and technology*, The National Academies Press, Washington DC, 2003.

⁴ NRC, *Capturing the full power of biomaterials for military medical needs*, The National Academies Press, Washington DC, 2004.

⁵ NRC, *Emerging cognitive neuroscience and related technologies*, The National Academies Press, Washington DC 2008; *Opportunities in neuroscience for future army applications*, The National Academies Press, Washington DC, 2009.

⁶ NRC, *Human behavior in military contexts*, The National Academies Press, Washington DC, 2008.

⁷ E. Canetti, *Potere e sopravvivenza*, it. tr., Adelphi, Milano, 1974, p. 25.

⁸ G. Cosmacini, *Guerra e medicina. Dall'antichità a oggi*, Laterza, Roma-Bari, 2011, p.196.

some respects is ambiguous, since he must quickly heal people who are then sent to die or kill once again. The more the doctor works to avoid death the more he fuels it in that perverse game that Brecht describes with painful cynicism, in 'Me-ti, Book of Changes' and stresses how the predicament of doctors is particular evident in war. They can do nothing to stop war, but only 'patch up' the smashed limbs⁹. This judgement is not exact as it is forgotten that the doctor's specific role is to try and restore health to the wounded or to alleviate suffering.

Realism would lead us to simply establish the clear conflict between the rules of war and those of peace. Even if we would all like to live in a better world, a sort of 'furious madness' comes out in men leading them to deprive themselves, with their own hands, of all the advantages of peace as *Querela pacis* by Erasmus from Rotterdam suggests to us. Idealism does not deny the plausibility of this perspective, but drives us to make a kind of act of faith: to believe in the possibility of the respect of some fundamental principles even during conflicts would mean to offer humanity a chance to change. It is likely that the opportunity will never be taken, but it would be worse if it were never offered. Kant taught us that 'Some trust in the enemy's way on thinking must still remain even in the midst of war since otherwise no peace could be concluded, and the hostilities would turn into a war of extermination'¹⁰.

For these reasons the NBC considers that it is necessary to intervene also in a sector that is increasingly being highlighted, like the possible use of human enhancement technologies in a military context which, if used for offensive potential, would hardly appear to come into the usual canons of bioethics. On the other hand, one must bear in mind that war has always constituted a significant time for experimentation, application and increase of new knowledge in every sector of technology and in particular in those of medicine, from the antiseptics practised systematically in the Franco-Prussian war of 1870, to morphine injections by hypodermic syringe experimented during the American Civil War, from X-rays used during the First World War to the massive use of amphetamines as fatigue and fear inhibitor during World War II and so on. It is probable that the streamlining of distance monitoring and healthcare of soldiers will make it possible to extend the horizons of telemedicine with an effect on the role of the doctor, electronic instruments for the identification of the enemy will open up new prospects to biometry, the use of chemical substances or genetic manipulations to increase attention, memory and the speed of decisions are likely to have therapeutic repercussions. Even without hoping to bring back war within the limitations of ethical control, the analysis of the effects of these new technologies must not be neglected in order to be prepared to face the repercussions that there could be on normal relations of coexistence in peacetime. The *dual use*¹¹ theory highlights how difficult it is to trace a clear

⁹ Me-ti, *Libro delle svolte*, it. tr., Einaudi, Torino 1997.

¹⁰ I. Kant, *Per la pace perpetua*, Feltrinelli, Milano, 1991, p. 27. Referred to by L. Mumford, *Per una civiltà umana*, It.tr., Scheiwiller, Milano, 2002, p. 35.

¹¹ The term is thus defined, according to the fields of application: "Dual-use describes something that can be used for two purposes, such as for civilian or military purposes"; "dual-use items" shall mean items, including software and technology, which can be used for both civil and military purposes, and shall include all goods which can be used for both non-explosive uses and assisting in any way in the manufacture of nuclear weapons or other nuclear explosive devices". Cfr.: "Setting up a Community regime for the control of exports, transfer, brokering and transit of dual-use items" Council Regulation (EC) No. 428/2009, 5 May

demarcation line between normality and exception so as to avoid a contorted or negative use of scientific progress.

We know that some of the above mentioned technologies are already being experimented in some Armed Forces of other Countries. It therefore becomes ethically important to try and define the distance separating the exception from normality and above all to ascertain to what extent it is still possible to apply the traditional categories of natural/artificial, enhancement/deterioration, benefit/harm, autonomy/coercion to these technologies.

The NBC has already partly dealt with these issues in the documents on *Neuroscience and human experimentation: bioethical problems* of 17 December 2010, *The identification of the human body: bioethical aspects of biometrics* of 26 November 2010, *Nanosciences and nanotechnologies* of 9 June 2006, *Ethics, health and new information technologies* of 21 April 2006. Now it sets out to examine to what extent these technologies might, through military use, take on particular connotations that coerce the ethical limits of experimentation and affect personal integrity and human identity more and more deeply. From this point of view the *dual use* theory takes on particular importance since the experimentation and utilisation of these technologies, even though not having a strictly therapeutic nature, is presented as an instrument for the protection of the integrity of the soldier, who will feel less fatigue and stress, will control his actions better, will be treated more readily and appropriately and will distinguish friend from foe without making mistakes. While the use of 'smart bombs' constitutes, or is at least presented as such, a reduction of the destructive outcomes of war, also the biotechnological enhancement of the 'engineered soldier' could appear as a way to reduce the number of victims. The idea of an increasingly scientific and less bloody war emerges, where the pills should substitute the bullets (*pills instead of bullets*) and the non-lethal arms should take on a predominant nature. By means of nanotechnologies and neurosciences, the future arsenals will be devised to induce incapacity rather than death, bringing about panic, depression, psychosis and delirium in the enemy.

The NBC does not intend to examine how credible these scenarios are, nor does it have the means to do so. It sets out to begin a reflection on what the possible costs to be paid are to realise the instruments that are recommended to pass from 'bench to bunker'¹². How is or how will the experimentation be carried out? To what point are the effects that will be caused reversible? To what extent will the utilisation of the body as an 'arm' or a 'machine', devised, modelled and enhanced exclusively in the light of military needs have repercussions on human identity? Insofar as the declared effect consists in putting the military in the best possible condition to defend his own and his Country's safety, the further effect would consist in the rise of the efficacy of aggressive potential. This impossibility to keep the defensive element distinct from the offensive one belongs to any form of military training or armament improvement, but in this case the conditioning is particularly deep as it is not just a question of building new destructive machines but of forging

2009; "A comprehensive strategy on how to minimize research misconduct and the potential misuse of research in EU funded research" in the website

ftp://ftp.cordis.europa.eu/pub/fp7/docs/misconduct-misuse_en.pdf.

¹² J. Bardin, *From bench to bunker. How a 1960s discovery in neuroscience spawned a military project*, in "The Chronicle Review", July 9 2012.

new 'machine men' who are more and more distant from normal men, but also more controllable or rational subjects.

There is also another question that arises. As well as the problem of the reversibility of the conditioning effects in the military, it becomes crucial to think of the impact of all this on the civilian population, both during the conflict and in the difficult phase of the return to post-war normality.

In short, the general problem appears once again of war that marks the history of man increasingly radically, deeply modifying single lives: every war, with whatever means it is waged. The context of future war would essentially question the right to life but also the right to the integrity of the body and the psyche, which are increasingly manipulated for different needs by the protection of health or the search for wellbeing. For this very reason it is opportune to make an in-depth evaluation of the demand for new technologies of military equipment from science, to ask them the same questions that bioethics asks science. Their answers should be on the consented limits of experimentation on man, informed consent, the duty for transparency, etc. exercised in a military context. The British Medical Association has stated that "*working to enhance national security may not always be compatible with the fundamental tenets of medical ethics*"¹³. The NBC is aware that the military must undergo a number of restrictions of his own rights in the name of the duty to obey; nonetheless, the NBC considers that it is indispensable to support the existence of the military's inalienable right to the same guarantee procedures that regulate experimentation on man.

¹³ BMA, *Boosting your brainpower: Ethical aspects of cognitive enhancements*, London, 2007.

3. What technologies are being discussed: the need to make distinctions

The above considerations lead us to state that, if by 'human enhancement' we mean to the letter and generically any form of intervention that tends to improve the corporeity, the mind or the single individual capacities, it is undeniable that this is nothing new nowadays.

There are historical and classical means of such 'enhancement'. Some act on physical performance (training) or resistance to illnesses. During the American revolution George Washington had his troops vaccinated against smallpox (as was done empirically before Jenner) as his men were much more prone to the disease than the English. Other systems tend to improve the soldier's performance, decreasing the traumatic impact of the direct clash with the enemy and its ethical implications: from the language, that presents war operations as a work of pacification, to the physical presence (bombings at a distance with the metaphors of 'surgical' precision of 'smart bombs'), to social distance (demonisation of the enemy, group loyalty contrasted with the radical hostility of the alien)¹⁴. An important and consolidated role is that of drugs and substances like alcohol, which reduce anxiety, fear and control. In high doses caffeine was and continues to be used to resist sleep. In World War II amphetamines were widely used to resist tiredness and fatigue. During the war of the Falklands the English soldiers used Temazepam to guarantee better rest at times when they could sleep. In the American army Zolpidem is used as a sedative for the same purposes. These 'first level' interventions within the limits of a discrete use and in traditional circumstances (e.g. night patrols, nursing night shifts for the seriously wounded, etc.) are less problematic from the ethical point of view.

The new element presented by some and which instead represents a problem, consists not only in the increase of today's genetic, pharmacological and micro-electro-mechanical possibilities of enhancement which would make it possible to produce effects that were unimaginable in the past, but also in the forecast of a simultaneous and combined application of all these technologies to envisage the design of a sort of "*mech-warriors*"¹⁵; "machine men" further and further away from the normal man. A prospect is beginning to appear, for now only hypothetical but not unreal, which could have serious repercussions on the way of understanding human identity, making it very difficult to identify the threshold of 'normality' from which to formulate a stable and shared ethical horizon. It could be said that there is no need to predetermine this horizon, insofar as the decisions are entrusted exclusively to individual choices according to the principle that 'if it were not good for you, then it should not be enhanced'¹⁶. In the case of the military however, enhancement would take place also in the interest of the community of belonging and/or of that defence with arms (e.g. the squad of belonging or particular equipment with arms suitable for specific tasks) for which reason it is not possible to avoid the problem of the level of sacrifice that can be requested – at least of some – and of the conditions that might legitimise it.

¹⁴ P. Lin, *More than human? The ethics of biologically enhancing soldiers*, IEET, March 28 2012.

¹⁵ Lin, cit.

¹⁶ J. Harris, *Enhancing evolution: The ethical case for making better people*, Princeton University Press, Princeton NJ, 2007.

Some maintain moreover that in a sector in which many aspects of human identity are questioned it is impossible to entrust the problem of ethical legitimacy exclusively to the right to self-determination, since there is always an evident social repercussion in any way whatsoever of being and acting. In this case however the relationship between good and evil would not concern single actions or the use of specific armaments, but the very existence of human beings that are designed and manipulated as if they were 'arms', also by means of established modifications of their corporeity. From the point of view of human rights the problem arises of the moral and juridical statute of these particular forms of 'post-human'. Should we exclude these new subjective situations from the protection of human rights and think of new forms of responsibility and protection, 'the so-called post-human rights', or must we foresee a diversified application of human rights today recognised and in force between 'enhanced' and 'non-enhanced' subjects¹⁷? From the point of view of international law the problem arises of how to define these interventions on the human body, should they take on an exceptional and irreversible nature. Could the creation of these new 'bio-mechanical fighters' be compared to the creation of new 'biological agents' coming under the prohibitions laid down by the Convention on the use of biological weapons?

In any case, the bioethically complex point is represented by the possibility to identify plausible parameters by which to establish the difference between 'improvement and/or optimisation' and 'enhancement' and/or change¹⁸. Our proposal is to consider all those interventions as forms of 'enhancement and/or change' that push the bio-physical capacities beyond the typical level of the species and beyond the statistically normal margin of functionality for single individuals¹⁹, nonetheless bearing in mind the reserves of a number of bioethicists who question not only the possibility of making a convincing distinction between the two concepts, but also the value of this distinction for the formulation of judgements on the licitness/illicitness of the different practices. It must be highlighted that the main context in which these bioethical reserves lie is that of the neurosciences, in which the definition of normality has controversial margins, while in a context of physical efficiency the above criterion is more widely accepted even if not unanimously.

In the analysis of the new systems it is useful – even in the awareness of the problems of the definitions in this context – to distinguish between the 'optimisation' of human performance (*Human Performance Optimization*, HPO) which refers to 'strategies to sustain performance before stress factors putting it at risk, for example, selection, training, nutrition, rest, equipment, command' and 'enhancement' of the human performance (*Human Performance Enhancement*, HPE) and that is: 'strategies to create human capacities that go beyond the normal biological variability, through modifications of the human function (e.g. surgery, genetic modifications, pharmacology, neuronal stimulation)'.¹⁹

The traditional physical and psychological training programmes come more specifically into the context of optimisation systems, in order to develop

¹⁷ A. Buchanan, *Moral status and human enhancement*, in "Philosophy & Public Affairs", 2009, 37, 4.

¹⁸ M.J. Sandel, *The case against perfection*, *Atlantic Monthly*, 2004, 293, 51-62. In Italian *Contro la perfezione. L'etica nell'età dell'ingegneria genetica*, Vita & Pensiero, Milan 2008.

¹⁹ N. Daniels, *Normal functioning and the treatment enhancement distinction*, in "Cambridge Quarterly of Healthcare Ethics", 2000, 9 (3).

the mental capacities of leadership, physical, emotional and mental control of stress in situations that demand high performance levels, attention and professional excellence. That sort of 'ultraview' realised by *Warfighter Refractive Surgery* poses greater doubts of classification, to the limits of natural human potential, and carried out by the American armed forces on over one thousand air force pilots and over 230 thousand soldiers to obtain a visual capacity of fifteen tenths, making it possible for example to see a fly nine metres away, with obvious advantages of being aware of and avoiding dangers.

In the context of real enhancement the different systems can be considered according to the technologies or objectives. These situations are very different also from the point of view of the actual possibility to be realised. In many *National Research Council* studies scales of feasibility are foreseen that range from three to twenty years. We are therefore going ahead, even if starting from reliable scientific data, in the horizon of probability and at times of only possibility. The NBC does not intend to examine the single perspectives, but to look at the bioethically most important points for human identity which would derive from an overall framework.

4. An analysis of some enhancement methods

Bearing in mind these premises and underlining the fact that for the moment it is more a question of hypotheses and studies being carried out rather than real possibilities of application, it is opportune to distinguish among these technologies:

Drugs:

In this field there is a constant transfer of notions coming from practice and clinical trials to the particular military situations.

The Ampakines, the subject of research in memory and attention deficits, are studied for their possible effects in the control of sleep and other situations of neurological stress. Again with regard to sleep, which seems to be the field being studied most nowadays, the possible uses of Modafinil used in narcolepsy are being investigated, and of Hypocretin by nasal spray, the effects of which are known in sleep disorders in trypanosomiasis. In the US army Modafinil is already being used for pilots during long missions and Setraline hydrochloride is prescribed for troops undergoing lengthy combat exposure to reduce stress and risk of depression²⁰.

From the use in patients suffering from dementia to its use in memory enhancement (Methylphenidate). This is a developing sector that concerns 'cerebral plasticity': drugs that act on the synaptic connections and which would be more promising than those already used like Modafinil and Donezepil. They are expected to have an effect in the improvement of the memory, attention and cognitive performance. They could also have the effect of weakening or cancelling previous memories, and in such a way be used to eliminate distressing or embarrassing memories, or to reduce the enemy's defence capacities.

²⁰ *Opportunities* cit., p. 55.

Beta-blockers and serotonin inhibitors act on and can be used on mood, anxiety and self-perception; oxytocin on empathy, trust and moral decisions and the suppression of testosterone²¹.

In another perspective outside the neurological field are the anabolic steroids used in the treatment of sarcopenia and osteoporosis in the production of great muscle mass, a problem that greatly involved sport before hitting the military context. The masculinisation of the woman by androgens to enhance aggressiveness must also be considered.

The treatment of anaemia with recombinant erythropoietin could open the way to the creation of organisms with increased oxygenation capacities in prohibitive conditions.

The use of nanoparticles for elective medication would increase their potential use in specific fields.

Genetics:

The knowledge of genetic mechanisms that are at the basis of certain pathological situations suggest possible uses that could be realised with genetic manipulations (by means of viral vectors or implants of genetically modified cells) or with specific drugs for the temporary inhibition of certain functions. For example congenital analgesia, due to a genetic mutation of the SCN9A gene makes patients insensitive to pain; it is a rare and dangerous childhood disease. But its mechanism could be replicated to create subjects that are insensitive to pain and therefore extremely useful in military conditions with a high exposure to painful factors. The myostatin gene could be manipulated to increase muscle mass²².

In other words, genetic knowledge might be used to identify capacity, predispositions, susceptibility to catch certain diseases and to be resistant in exceptional conditions²³.

Neural stimulation:

Electrical brain interfaces made up of microelectrodes already exist. Inserted into the cerebral cortex they can be used to give visual information in blind people or to give motor stimuli in paralysed patients. Implanted into the subthalamic nucleus or the globus pallidus they are useful in the treatment of Parkinson's disease or other neurological diseases, depression, epilepsy, instead of or with better effects than drugs. Alternatively to electrodes transcranial or magnetic vagal nerve stimulation is however also considered. Seriously wounded soldiers can derive benefit from these new treatments, but we should also consider the potential of their development on healthy subjects. Distance controlled stimulation should be effective in resistance to stress, pain and tiredness, in speeding up reactions, increasing memory capacity, creativity, etc.; in giving sensations of pleasure/pain, gratification or refusal, that directly affect decisions and behaviour²⁴. In other words, control technologies are being studied that are placed inside specialised helmets able to give information at a

²¹ *Emerging Cognitive* cit., p.32.

²² K.E. Friedl, *Overview of the HFM-181 Symposium Programme Medical Technology Repurposed to Enhance Human Performance*, NATO OTAN RTO-MP-HFM-181, pp. 1-20.

²³ *Opportunities* cit., p. 20.

²⁴ Friedl, cit., E. Williams et al. *Human performance*, Jason.The MITRE Corporation McLean, Virginia 2008.

distance on the state of health and the reactions of the fighters with the possibility of suppressing undesired reactions or to enhance the desired ones²⁵.

Stem cells:

From the sectors of the clinical use of marrow, corneal, bone and spine repair, their use can be foreseen in the treatment of serious invalidating injuries, but also a theoretical cerebral use to increase capacities and speed in mnemonic functions and learning.

Special surgery:

From the field of ablative neurosurgery interventions, selective surgery for the control of sleep and attention span can be prefigured.

Corneal surgery, also by laser, increases visual capacity.

Prosthesis and information technology support:

Prosthetic limbs are envisaged to give superhuman strength, performance and stamina; eye prostheses for sensitivity to radiations that are not normally perceptible; hearing systems for auditory capacities beyond the normal human thresholds.

From the point of view of **objectives**, the enhancement offered by all these systems is expressed in an overcoming of the normal human capacities in the fields of sight, movement, tolerance to extreme temperatures, in hypoxygenated arid climates; in the increase of memory, the possibilities and speed of learning, resilience to stress, loss of sleep, pain and tiredness. The application of a *personal status monitor* to the body should make it possible, by means of the use of *neuro-imaging* technologies, to visualise the regions of the brain so as to guide the cognitive and decision-making processes or to enhance, with the interface connection with electronic devices, visual capacities and to keep a centralised control of the operations zone. The application of this electronic distance monitoring increases the role of “telemedicine” (*digital medicine*) to keep the physical-pathological conditions of the soldier under control (heartbeat, body temperature, blood pressure, electrocardiograph map) and to even carry out surgery at a distance (*remote telepresence surgery*).

5. The bioethical problems

The NBC considers that the starting point of the bioethical reflection on this issue must be the adherence to the general criteria and principles of bioethics and biolaw internationally recognised as being aimed at the protection of the dignity and fundamental rights of man. A reflection must nonetheless be made on the application of such assumptions to that particular ‘ethos’ characterising on the one hand the professional soldier during his enlistment, on the other hand characterising the just as specific ‘ethos’ of the medical profession in whatever context it is practised.

It is therefore a question of reflecting on the argument according to that ethics of the professions, which makes up not only the traditional deontology of conduct among professionals of the same discipline but constitutes a norm of conduct due towards others.

²⁵ *Opportunities*, cit., pp. 76 and 84.

As said above, the first and basic distinction concerns the difference between the optimisation procedures of performance and those claimed as a real enhancement, between the improvement of the subjective conditions and the change of the models typical of the species. The use of the recently acquired scientific knowledge in the medical field, with particular reference to the neurosciences, opens up new and more powerful means by which to control the state of individual health, the reactive capacities and modalities in conditions of stress. More sophisticated selection mechanisms and training programmes derive from this. These optimisation procedures alone, which are part of the training programme aimed at shaping more resistant and motivated people, could pose bioethical problems, owing to the tough operations foreseen in some of the training. There may only be a fine line separating this from the enhancement procedures and the difference blurred. But the examples of the huge case record mentioned above show that one can speak of enhancement when the objective consists in creating subjects who go beyond the normal biological variability, by means of modifications of the human form and function, above all if they remain after the period of military life. Until now the use of artificial means had been used in the treatment of pathologies, to bring back the pathological to the physiological; instead this is a question of bringing the physiological to the ultra or super.

It is in this more specific context that there must be a more careful bioethical control, in the awareness of the a vast range of possible risks.

One aspect of the problems is not new. The sports environment where use is made of anabolic steroids, or that of schools and universities where drugs are taken to improve the brain's performance present situations with a certain similarity.

In its opinion on Ethics, Sport and Doping (25/3/2010 Conclusions and recommendations), this Committee stated with regard to the use of doping in sport:

1) The judgement on the ethical disvalue of the recourse to doping, which this document sets out to reaffirm, is based on a number of reasons, which range from the need to safeguard the athletes' physical health and their real autonomy of choice to the moral values intrinsic in sport and to the preservation of the meaning of sport in the collective imagination. Although there are different assessments of whether these reasons are able to overcome a certain rational scrutiny, it does not appear however that the reasons given by those against the prohibition of doping are completely convincing or devoid of limitations.

2) The sporting spirit, as such, is the spirit of a competition in which athletes face each other who, streamlining their physical capabilities, through training, effort, sporting intelligence and willpower, are able to express an essential aspect of our common human identity, that of "merit", which does not only depend on the natural gifts each of us receives from birth, but especially on how each person strives to use them in building their identity (particularly, the athlete's identity).

Nevertheless, this analysis must highlight the differences and specificities of the military case as well as the analogies. To create Olympic champions is not the same as creating efficient soldiers with better possibilities of quickness, sharpness, identification of danger, for the protection of themselves and their division too. The importance must also be stressed of an education aimed at

fostering reciprocal solidarity and support in emergency conditions, among those belonging to the same base unit²⁶. In war a spirit of noble competition and an importance of 'merit' can undoubtedly exist, but these values are repressed by a different concept of contemporary military art and by more urgent needs to save one's own side to the detriment of the other. In war, which is essentially different from any sporting competition, there is a tendency to neutralise the adversary, even at the expense of his life. Those who fight however jeopardise their lives. The horizon is different also for other reasons. In sport the resorting to doping derives from choices and answers to personal and/or team interests, whereas in a military context it mainly answers to a general interest, which is that of preparing the best conditions of responsiveness above all of defence (see Art. 52 of the Constitution), but if necessary of counterattack. In the context of sports moreover as in other bioethical contexts, a possible argument in favour of the liberalisation of some forms of enhancement could be represented by the need to bring to the light and to regulate conduct which would otherwise remain clandestine. In the case of doping however, the NBC's orientation has been that of not considering this argument as being sufficient. In the military case the context is evidently different and informed consent could not always be requested when dealing with substances covered by military secrecy. Furthermore, in the military case, as already pointed out, the greatest efficiency entails as much the increase of defence instruments as the offensive ones. A subject who is more insensitive to pain is less vulnerable, but can also be less sensitive or more indifferent to the suffering of others. If doping already tends to clearly separate those using it from all the others, biopsychic enhancement could create even more radical divergences in the way of living and experiencing human relationships, as is envisaged by some for the return to civilian life. In any case it seems little opportune to follow the way, as previously mentioned, of formulating the confirmed rights of the post-human; moreover, every time that an incompatibility were to be manifested between the traditional way of defining the rights of the person and the models of behaviour induced by enhancement we should affirm that a moral violation exists. While it is acceptable to increase the spheres of responsibility of 'enhanced' subjects (the Italian legal system for example sanctions the recourse to violence of a boxer more seriously or by whoever does martial arts), a diversification in the exercise of rights would unacceptable as much in favour (privileges, exemptions from responsibility, special courts) as to the disadvantage (limitations of relationships, exclusion from certain positions) in the military condition.

From the biojuridical and bioethical point of view it is indispensable to also tackle the problem of the limits of admissibility of these techniques: to what extent and on what basis can they be imposed. These are interventions which, in a strict sense, have no therapeutic nature, but in a broad sense this does not apply in the case of preventive vaccinations, under the aspect of the improvement of health 'defences' and the possibility of survival in conditions of foreseeable exposure on duty to microbial agents or known viral pathogens²⁷. This way seems legitimate in the measure in which the parameter adopted, pre-

²⁶ Friedl, cit., § 1.5.3.

²⁷ Moreover the very vaccinations of the military are the subject of debate, and also of media controversy, owing to the risks that they would involve for health when administered in a great number, close together and with unsafe excipients.

eminent with respect to any other need, both the interest in the protection of the soldier's life and health, as long as informed consent is obtained, as we shall see below, and effects are not foreseen that are so radical and irreversible as to jeopardise his return to a normal social life. In this case as well the usual rules of preventive medicine for everyone are valid.

Particular problematic profiles are instead represented by:

a) the experimental aspect of some of these interventions, exacerbated since they are carried out on healthy subjects, without the 'publicity' of specific protocols and suitable external controls, to achieve results that often have no definite established threshold (as in the case of the return to normality after an illness), but feel the effects of the ideological conditions of political aspirations of the single Countries. This is a field in which the experimental dimension could reach extreme levels that are hard to reconcile with the respect for human dignity.

b) the physical and/or psychological effects to be obtained. The extraordinary capacities acquired by some types of performance can be at the expense of other types of performance and capacities²⁸. They can create a figure of a soldier who is not only professional, but an automatic fighting machine, detached from civil society. The awareness that a person treated in this way acquires their own capacities or incapacities can disturb the psychic balance, with mechanisms that go from the exaltation of their own image to refusal and even suicide.

c) the problem of the persistence or reversibility of the effects. The effects can be short term, in the immediacy of conflict or the training process, but can persist over time and sometimes be irreversible, in body and mind. One must ask: what kind of problems can the induced modifications, if permanent, pose when returning to civilian life? If these are advantages, how can competitiveness with the normal members of civilian society be managed? If there has been a modification of the psyche, what permanent consequences can be envisaged towards third parties?

In a normal context of clinical trials the general rules based first of all on informed consent are enforced. The NBC expressed its standpoint on this in its opinion on Neurosciences (conclusions § 4): 'The studies and research in the neurological sector must still comply with the requirements of ethics inherent in any testing on human subjects, found in risk-benefit assessment, in informed consent and the authorization of the use of results, balancing the protection of 'privacy' with the requirements of advances in knowledge and societal needs. A particularly important role is played by ethics committees that will have to acquire specific expertise in neuroscience. It is hoped that the scientific community will formulate codes of conduct, in order to ensure the growth of awareness and shared ethical behaviour'. The question is whether in a military context these interventions, already aggravated by the uncertainty and high variability of the results, especially long term ones, can justify partial or total departures from the principle of consent. The NBC's opinion is that one cannot depart from this; moreover it could be illusory to think that in a context like the military one, based on the hierarchical chain and discipline, it is possible to exercise a normal right of consent or dissent. Even though these are rather particular situations, one must start from the assumption that they should in any case come into the context of voluntariness, which furthermore exists and is

²⁸ Friedl, cit., § 1.5.4.

permitted in a military context. Moreover, so as to limit the possibility of the decision falling on the last and weakest link, it is necessary to activate supervision from above and control commissions in which the presence of experts can be very important in the protection of the individual involved in the experimentation. In any case these must be procedures that, in the opinion of the organs of control, come into the context of the optimisation of the personal bio-psychological performance and not into that of enhancement as outlined above.

The so far accepted codes can be questioned. If the enhanced individuals are in some way a new form of arm, great part of today's international conventions should be revised. People able to stand situations that go beyond the threshold of normality resist pain more than others. And this, in the obvious and shared abhorrence for any form of torture, points to the tragic spiral towards which we could find ourselves going before increasingly refined forms of torture to elude increasingly refined technologies that raise the pain resistance threshold. The protection effect of the soldier would end up by increasing the risks that he runs. The fight against pain (extremely useful in the treatment of pathologies) would in such case end up fuelling new and unforeseen forms of suffering.

In particular there is the problem of the applicability of the international conventions on the use of biological weapons (*The Biological and Toxin Weapons Convention* of 1972) and chemical weapons (*The Chemical Weapons Convention* of 1993). Article 1 of the Biological and Toxin Weapons Convention bans the production and the possession of 'Microbial or other biological agents, or toxins whatever their origin or method of production, of types and in quantities that have no justification for prophylactic, protective or other peaceful purposes'. By analogy could the systematic use come into this ban of pharmacological 'agents' to build 'enhanced' soldiers, increasing their memory, self-control, resistance to sleep, tiredness, pain and generally speaking their emotions? In this very case it appears evident how difficult it is to distinguish between the defensive aspect, tending to increase security and reduce the suffering of the soldier, and the offensive aspect of the efficiency in giving death. Enhanced soldiers become enhanced weapons, posing international law new and disquieting questions.

It is difficult to exclude that bio-chemical interventions aimed at systematically lowering the normal sensitivity thresholds can bring on indifference to the pain of others and that interventions at a distance of gratification or punishment can reduce the soldiers' moral integrity or their ability to make moral choices, exposing them more and more to the possibility of carrying out actions against humanitarian law and ethics. The conditions can be created for new atrocities against humanity. Also in this perspective the question is whether the exceptionality of the war condition, in which human lives and the survival of a community are at stake, can justify the recourse to extraordinary means.

The specific medical responsibility in all these processes must be stressed; the people who study and develop most of these technologies and who should then apply them to single individuals, selecting the most suitable candidates are doctors. The medical deontology, accepted in a military context, should not however allow departures from the fundamental bioethical principles applied to the medical profession and relative to the experimentation on man, even those in uniform.

6. Recommendations

Starting from the shared assumption of the repudiation of war, the NBC expresses an opinion of ethical disvalue on the subject of enhancement technologies in a military context. Many of these technologies represent a risk both for the subjects who have to undergo them and for the adversaries, civilian and military, that goes beyond the limits foreseen by the international law in force relative to military activities and war.

Technological evolution and military needs will increasingly press for the adoption of a number of these technologies. In some cases it will be difficult to distinguish between optimisation and enhancement. Conscious of and concerned about these developments, the NBC considers it necessary that for all technology that is not already classifiable as enhancement the conviction be affirmed that some fundamental bioethical principles cannot be derogated:

a) the principle of dignity and integrity by which all those technologies must be banned that could modify the psycho-physical and ethical integrity of the military for an extended period or permanently;

b) the principle of non maleficence by which any intervention, even if it did not have immediate effects on health and were not realised in the exclusive interest of those subject to it, must exclude both present and future harm, even in the perspective of returning to civilian life;

c) the principle of autonomy by which it is always necessary to inform the military of the nature and the risks of the treatment they could be subject to and to respect the autonomy of their judgement. By virtue of the very delicate nature of these situations, the procedures for the format of the informed consent, written and always revocable, should follow the international guidelines for subjects exposed to risks and as specified below in point 2).

d) the principle of equality according to which it would be illegitimate to carry out discriminations in the exercise of rights and in career advancements between those undergoing interventions and those refusing them, and this applies in both conscription and voluntary enrolment.

In support of these bioethical principles the NBC recommends that the Italian Government be promoter of the adoption of the following measures at national, European and international levels:

1. to consider enhancement for military goals in its various possible forms (genetic, pharmacological etc.) as an activity detrimental to dignity insofar as able to modify the psycho-physical and ethical integrity of the subject for extended periods of time or permanently;

2. to set up multi-disciplinary commissions similar to ethics committees, made up not only of military, which might ascertain the compliance with these principles at the various levels, controlling the trial protocols, excluding enhancement interventions and verifying that the other optimisation interventions guarantee the respect of the fundamental bioethical principles, particularly the transparency of the procedures by which to obtain informed consent.

Personal remarks

Personal remark signed by Prof. Carlo Flamigni

In an informal meeting with an authoritative member of the Presidency Committee I was asked, very politely but rather peremptorily, to write codicils of dissent shorter than I usually do, also so as not to burden the Committee with excessive English translation costs. This codicil will therefore be very short indeed: I can in no way approve a document that endorses the principle according to which war is an inevitable event (for which it is necessary to prepare in the best way possible, even if respecting a number of ethical rules) and the existence of an army is a necessary evil. I would just like to recall that in Article 11 of the Italian Constitution it is stated that Italy repudiates war, that Article 52 has been outdated by facts (compulsory conscription no longer exists) and that the defence of the fatherland to which the same article refers to can be entrusted to non-violent means.