

ОРГАНИЗАЦИОННО-МЕТОДИЧЕСКИЕ ОСНОВЫ ВОССТАНОВИТЕЛЬНОЙ МЕДИЦИНЫ И МЕДИЦИНСКОЙ РЕАБИЛИТАЦИИ

Organizational and Methodological Foundations of Rehabilitation Medicine and Medical Rehabilitation

PANTALEONI G. | ORIGINAL ARTICLE

DOI: <https://doi.org/10.38025/2078-1962-2020-99-5-4-10>

УДК: 615.03



Year 2020. World toxic risk for environmental and human tissue pollution: Prevention, Therapy and importance of Clinical Pharmacology and Toxicology collaboration inside Thermal and Rehabilitation Centers

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Abstract

This work is finalized at preventing toxic damage from associated pharmacological and non-pharmacological therapies. As a "finalization" of this paper, we have pointed, today Year 2020, in full Toxic Risk, and also at the Risk of Pandemic from COVID 19, the duty to introduce in every hospital and also in some particular Rehabilitation Centers and/or in some special Thermal Place of the Planet, together with the presence of the Doctors Specialists in Medicine and/or in Rehabilitation and Balneology, also the Doctors Specialists in Clinical Pharmacology. These Medical Doctors, Clinical Pharmacologist, by definition, are expert in the global study of "Pharmacological and Toxicological drug and non drug Interactions". We must today, also to consider that there is a "Universal Law of Collaboration DNA dependent", highlighted by us through our Studies of Behavioral Teratogenesis. For this last problem we have pointed out the very important scientific discoveries of our prof. Vittorio Erspamer of the Institute of Pharmacology of the University of Rome "La Sapienza". Vittorio Erspamer has given, a big contribution to the knowledge of "intercellular communications", and therefore to the confirmation of the "Law of cellular and organismic collaboration", with the discovery of Serotonin (Enteramine) and then of numerous other neuro mediators and peptide neuro modulators (The peptide triangle). Today we are in danger of Global Toxic Damage. Environmental damage to nature and the population can be prevented and fought with a Periodic Family Detoxification (P.F.D.) to be implemented, in different ways and with International Collaboration. The Thermal Centers are therefore, a physiological, and harmonic phylogenetic privileged places. We must point also, the Italian School of Hydroclimatology and Thermalism of Rome University, for the first work on International Classification of the Mineral Waters of the world of Prof. Mariano Messini and Giulio Claudio di Lollo.

Keywords: environmental pollution, the point of view of the Clinical Pharmacologist, thermal educational methods, neuromediators and modulators peptides, thermal and post marketing surveillance, thermal drug interactions, periodical family detoxification (P.F.D.)

For citation: Pantaleoni G. Year 2020. World Toxic Risk for Environmental and Human Tissue Pollution: Prevention, Therapy and Importance of Clinical Pharmacology and Toxicology Collaboration Inside Thermal and Rehabilitation Centers. Bulletin of Rehabilitation Medicine. 2020; 5 (99): 4-10. <https://doi.org/10.38025/2078-1962-2020-99-5-4-10>

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Received: Sept 14, 2020

Accepted: Sept 28, 2020

Published online: Oct 30, 2020

Introduction

The point of view of the Clinical Pharmacologist, especially if a Doctor-Specialist also in Medical Hydroclimatology,

Thalassology and Physical Therapy, and Occupational Medicine, must always focus on the problem of Optimizing each Therapy (Pharmacological and Non-Pharmacological). This

can also happen in the case of Therapeutic, Physiotherapeutic and/or Aesthetic Therapies and Methodologies, which are implemented in the Spa field, on patients who have used or can use drugs, even “over the counter” (OTC), considering at the same time, the work environments from which they come (more or less “polluted and/or polluting”).

This is especially required in this period of Serious Environmental Pollution. The research for the reduction of drug damage due to “technical” defaults in the handling of drugs becomes fundamental: laboratory and clinical controls are neglected, in consideration of the “basic pharmacokinetic and pharmacodynamic changes” in relation to lifestyles, work environments, nutrition, alcohol consumption, drug interactions, age, sex, ethnicity, etc. It is also required by Pharmacovigilance and Toxic-vigilance for the “Prevention of Damage from Drugs and Toxicants, including environmental agents”: See also some particular observation and scientific medical works [1–3, 4–12].

Medical-Toxicological Scientific Report and Clinical Pharmacological Considerations.

Certainly these problems are accentuating in the third millennium due to globalization and environmental pollution in an exponential increase, as reported in many scientific papers and now by all the mass media. Pharmacology as a basic science for each therapy thus sees its borders and fields of study, competence and ethical and professional responsibility widen, through the indispensable interaction with all medical specialties.

It is therefore our duty to seek suitable solutions to remedy them immediately especially to sensitize the world medical and health organization of the moment, to take serious and urgent measures. Some of our pharmaco-toxicological discoveries quite important, produced by widespread environmental pollutants, which accumulate in tissues rich in lipids, such as the brain and gonads [13], and also in our historical study for the mineral waters [14] show that, many hospitals, and some particular medical places and centers, as the Thermal Environments, they should be highly protected, monitored and perfectly used, to obtain the maximum benefit, the lowest cost and the minimum risk for each therapy that can be implemented. To be all motivated and aware we must understand the biological bases and the scientific discoveries, which have allowed us in recent years, to implement an increasingly effective therapy.

We can summarize the medical-scientific discoveries of recent years in four fundamental points:

1. Those that have shown us the characteristics and the cellular and intracellular composition of our organism.
2. Those that have shown us the infinite capacity of biochemical communication between cells, cellular districts, brain, systems and organs.
3. Those that have shown us the possibility of altering physiological cellular responses, through an infinity of substances (drugs and pollutants), physical and environmental means, which can both be used in therapy, but which can also act unexpectedly, producing irreversible lesions, often also genetic and therefore transmissible to the species. See also our historical studies on “Environmental toxicity and behavior” and “Behavioral teratogenesis from pollutants” [13, 15–16].
4. Those concerning the possibility of using the Thermal Places at the level of environmental monitoring and family pathologies and above all, as places for

the best detoxification and recovery of the state of psychophysical well-being (Periodical Family Detoxification: P.F.D.), eventually, also with scientifically Integrated, others Methods: Art-medicine, and other similar methods that stimulate PNEIM [17].

I): Characteristics and Cellular and Intracellular Composition of Our Organism.

Considering the first point, we can summarize the “Medical Biological Scientific” Discoveries affecting the Global Therapeutic Sector, as follows:

1) We all “Human Beings”, we are an “Eukaryotic Cell Assembly” like Plants and Animals. This concept to keep in mind, for the study of the conformation and adaptation of our Cell Receptors, to Drugs and Toxics. The receptors were formed and evolved in contact with natural substances. Substances widespread in the primitive environment. So the Receptors of every living organism have undergone successive receptor adaptations, up to now, to adapt to every Environment of the Planet.

2) The Eukaryotic Cells were formed by a “Collaboration between primitive Prokaryotes”, having Eukaryotic Cells, incorporated (millions of years ago) hundreds of small Prokaryotes, which we have today called “Mitochondria”. These “Friends Mitochondria” allow the Eukaryotic Cells (of Plants-Animals-Human Beings) to live in a little interstitial fluid and therefore allow to form Tissues, Organs, Apparatus, all “Collaborating with each other”. But be careful! In this small interstitial space, together with the “food” interstitial liquids, also the anabolites and cellular catabolites, neuromodulators and neurotransmitters (which communicate cellular well-being or discomfort), as well as hormones, autacoids, environmental pollutants, food additives, etc.

3) These Interstitial Liquids must therefore be in perfect pure nutritional balance, for the Cells, in the different districts, and always be perfectly functional, in order to allow optimal circulation and cellular “waste disposal”, to favor the perfect functioning of cells, systems and organs. Precisely for this reason, as, in a previous communication [14], I pointed out the Micro-dialytic Method for the study of Interstitial Liquids, developed by Prof. Urban Ungerstedt of the Karolinska Institutet in Stockholm, where I learned his Method, also useful, for a modern and updated “Micro-dialytic classification of the Mineral Waters of the World”, and obviously, also always useful, for their “continuous, experimental and clinical medical-pharmaco-toxicological control”.

4) In the DNA of each Prokaryotic and Eukaryotic Cell, there is a “Universal Law of Cellular Collaboration” which we discovered as modifiable by Behavioral Teratogenesis [13, 15], (and therefore, to be verified if modifiable also by Biotechnologies and by all modifications of cellular DNA), which regulates Life and Evolution, and which seems to start from the “primitive molecular and peptide formations”, transmitting itself, in a seemingly “fractal” way, to cellular, organ, organism, and Population of individuals communications.

II): Cellular Communications Between Districts, Systems, Organs:

Prof. Vittorio Erspamer was the most prolific international pharmacologist in discovering and studying neuromediators and neuromodulators, after the discovery of the Serotonin he called Enteramina, when he was in Rome at the Institute of Pharmacology, directed by our common Master Prof. Pietro Di Mattei. See The Peptide Triangle (Fig. 1)

The unexpected coincidence of the presence of the same neuro modulators and neuro mediators seen by Vittorio Erspamer in the skin, in the brain and in the intestine, confirms the “Universal Law of Collaboration” verified by us in the Ve-

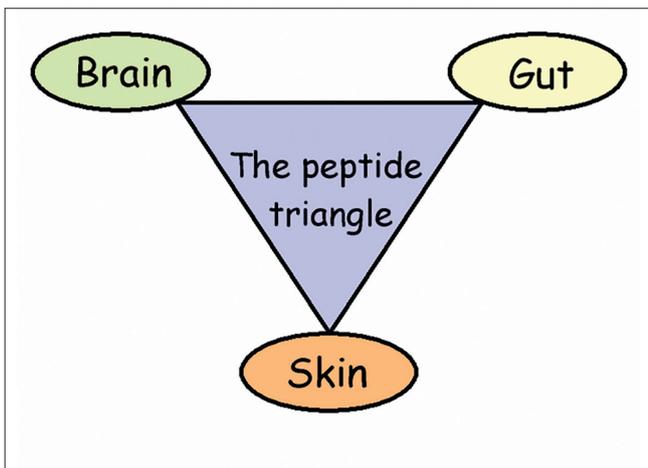


Fig. 1 Vittorio Erspamer's Peptide Triangle [18]

getal and animal kingdoms, including human beings, but gives us a glimpse of the same Law for the so-called non-living or mineral – physical Kingdom. It also confirms the scientific saying that “Ontogenesis summarizes Phylogenesis”. The presence of this now evident “Universal Law of Collaboration” forces us to take it into account also at the level of Therapeutic Methods and Behaviors to be observed and followed at the level of individuals, families and therefore of the population. We report in figure 4 a summary of these concepts as perceived internationally.

These concepts sum up the thinking of scientists and biologists. I have condensed and partially commented them for everyone's understanding, but left intact in the original international English language.

III) Possibility of altering the physiological cellular responses,

through an infinite number of substances, physical and environmental, means that can both be used in therapy and can unexpectedly produce irreversible lesions, often also genetic and therefore transmissible to the species: see also our discovery of “Behavioral Teratogenesis from Environmental Pollutants” which is accumulate in lipid-rich tissues, such as the brain and gonads [13, 15]

Figure 5 collects one of the impressive data from World Literature [10–12], about the damage we are causing “inadvertently” to the world population, not taking into account the so-called “Universal Law of Dependent DNA Collaboration”, between Experts from the various Medical-Biological Sectors Scientific, and with the World Health Organizers, all sensitized and dutifully updated, to defend, with Constructive and Correctly Informed Reasoning, their Population.

These data, published on the internet [10–12], are to be considered underestimated nowadays also in relation to many other factors, including pesticides and the invasion of aquifers also by drugs used in animals and humans eliminated with urine and feces. For recognition due to my Collaborators and Co-Authors, I must mention in the bibliography our pioneering work on Behavioral Teratogenesis by pollutants [13], and also our historical scientific works on cardiotoxicity and diffusion of Fluorinated Propellers [19–24, 15–16] like an “environmental pollution damage” that is dangerous at many levels. We started in the Institute of Pharmacology of the University of Rome “La Sapienza” [19–22] and continued then in the Chair of Pharmacology of the University of L'Aquila [13, 16, 19–22].

The Behavioral Teratogenesis we studied for Environmental Pollutants [13, 15–16] and some of the behavioral

Brain	Gut	Skin
Mammalian	Mammalian	Amphibian
Peptides		
Substance P	Substance P	Tachykinins
CCK	CCK	Caeruleins
Bradykinins	Bradykinins	Bradykinins
Gastrin	Gastrin (7)	
Neurotensin	Neurotensin	Xenopsin
Enkephalins and endorphins Dermorphin-like peptides	Enkephalins and endorphins	Dermorphins
TRH	TRH	TRH
Somatostatin	Somatostatin	?
Bombesin-like peptides	Bombesin-like peptides	Bombesin
VIP	VIP	VIP
Angiotensin I and II?	Angiotensin I and II	Crinia angiotensin II
Corticotropin-releasing factor Sauvagine-like peptides Urotensin-like peptides	Corticotropin-releasing factor Sauvagine-like peptides Urotensin-like peptides	Sauvagines
?	?	Tryptophyllins

Fig. 2. Peptides found by Prof. Vittorio Erspamer and his school, in the brain and intestine of mammals and skin of amphibians. (Ontogenesis, Phylogenesis and common eukaryotic neurotransmitters and neuromodulators). (Basic Bibliography by Vittorio Erspamer and Collaborators) [18]

BRAIN	GUT	SKIN
Mammalian	Mammalian	Amphibian
Biogenic Amines		
Indolealkylamines	Indolealkylamines	Indolealkylamines
Imidazolealkylamines	Imidazolealkylamines	Imidazolealkylamines
Catecolamines	Catecolamines	Catecolamines

Note.
 "Structure of sauvagine, a vasoactive peptide from the skin of a frog" by Montecucchi, P.C., Henschen, A. and Erspamer, V. (1981) in: "Structure and Activity of Natural Peptides" (Voelter, W. and Weitzel, G. eds.) De Gruyter, Berlin, pp 225 - 236
 "The brain-gut-skin triangle: new peptides" by Erspamer V, Melchiorri P, Broccardo M, Erspamer GF, Falaschi P, Improta G, Negri L, Renda T. (1981) in: Peptides 2, Suppl. 2, 7 - 16
 "The Tachykinin Peptide Family" by Cinzia Severini, Giovanna Improta, Giuliana Falconieri-Erspamer, Severo Salvadori, and Vittorio Erspamer in Pharmacol Rev 54:285-322, 2002, Review - This paper is available online at <http://pharmrev.aspetjournals.org>
 "Making Magic" by Peter Gorman at: <http://diseyes.lycaeum.org/fresh/nunu.htm>
 "AmphibiaWeb" at: <http://elib.cs.berkeley.edu/aw/>

Fig. 3. Biogenic Peptides and Amines in the Brain, Gut and Skin. (Basic Bibliography by Vittorio Erspamer and Collaborators) [18]

Collaboration between experts and the population:

- 1) Health is the absence of disease. We call this "health care" but in fact it is "disease care."
- 2) Health is the order and balance among the tissues and systems of the body. (= vedi il Triangolo peptidico di Erspamer ...)
- 3) Health has its roots (= radici) in an innate *bodily wisdom* (= saggezza corporea = genetica) which works according to natural laws. (= Vis Medicatrix Naturae....)
- 4) **We can choose to live in accordance with this wisdom and these laws, or not.**

Fig.4. Collaboration between experts and the population

changes induced by environmental pollutants [13, 17, 24] leave fundamental questions open about the future of Humanity.

Behavioral Teratogenesis is a technique developed by Perrie M. Adams of the University of Galveston in Texas, to reveal genetic damage at the behavioral level that can interfere with the survival of multiple animal species and therefore also humans.

IV) Importance of Thermal Centers for Periodic Family Detoxification (P.F.D.), for the Treatment of Chronic and Debilitating Diseases and for the Reduction of Consumption and Damage from Drugs:

The above data and the studies carried out by us reveal the urgent need to raise awareness among the medical profession of the problem of organismic accumulation of environmental pollutants, of the containment in the chronic

use of drugs and of the elimination of voluptuous toxicants (alcohol, smoking, drugs). This modern environmental toxicological event decisively relaunches the Thermal Places for preventive and detoxifying purposes for the whole family. In fact, an increased metabolic (enzymatic induction) and emunctory commitment of the whole organism has been demonstrated, which is subjected to the elimination not only of foreign substances acquired with food (food additives, pollutants) or for pathological reasons (drugs), but also to substances diffused in the environment and in the workplace.

Each individual of this third millennium must therefore be educated on the need to prevent damage from drugs, from toxic voluptuous, from environmental pollutants, for damage in domestic use, and in many works and also it is necessary to,

1. Periodically monitor one's state of health with par-

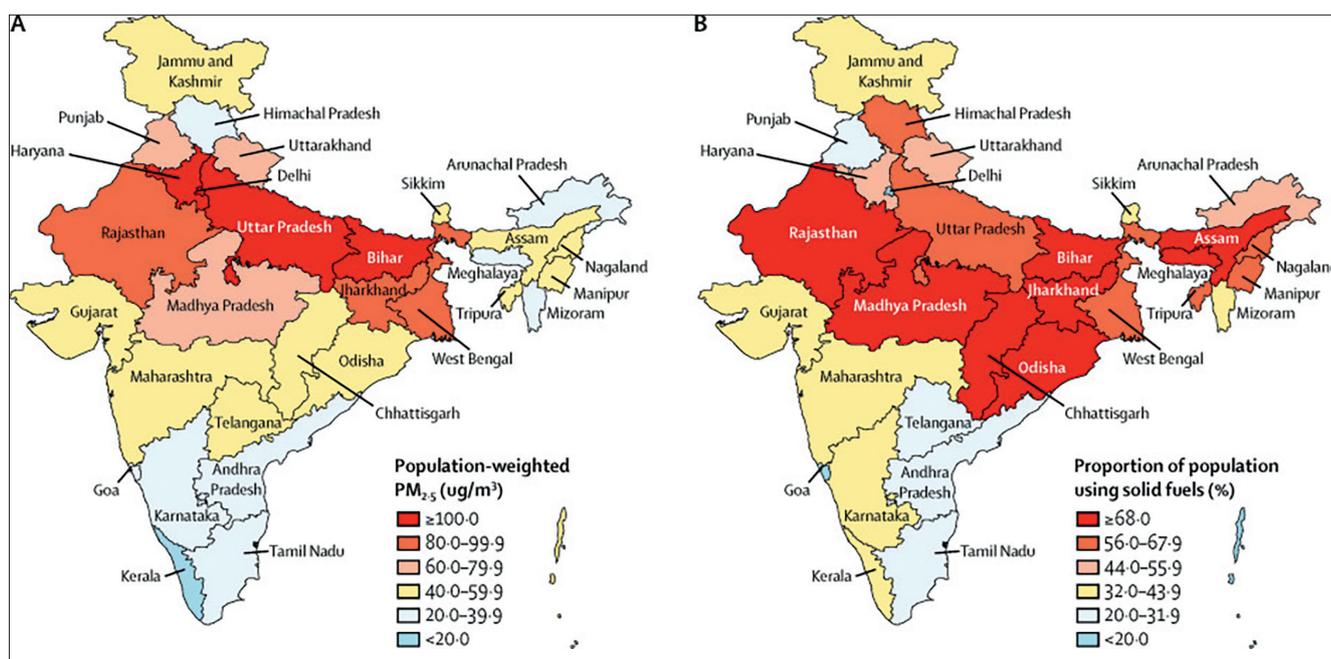


Fig 5. Damage caused by environmental pollutants

Note: 1°) $PM_{2.5}$ -concentration and use of solid fuels in the states of India, 2017

(A) Population-weighted mean ambient air $PM_{2.5}$. (B) Proportion of population using solid fuels. [10]. See also:

2°) Elisa Puzzolo and Daniel Pope. Clean Fuels for Cooking in Developing Countries. Encyclopedia of Sustainable Technologies, (2017) [11].

3°) Jane A Plant, Anna Korre, Shaina Reeder, Barry Smith, Nikolaos Voulvoulis. Chemicals in the environment: Implications for global sustainability. Applied Earth Science (2005) [12].

particular regard to the organs and systems responsible for the accumulation, metabolism and elimination of drugs and toxic substances.

2. Implement, under the constant guidance of the Family Doctor, appropriate methods and personalized cycles of purification and detoxification in places with constant monitoring of environmental and food pollution.

The Thermal Centers are therefore privileged places.

Also Italy, for the ancient experiences of application and scientific study of Thermal Therapies [25], together with all the other International Countries, among which the great experience of Rehabilitation and Balneology of the Russian Health Federation emerges, a great wealth of Thermal Places suitable for Periodic Detoxification (FPD) and the Restoration of Wellbeing.

This aspect is fundamental, both for young people in the

reproductive phase, as demonstrated by the works we initiated on Behavioral teratogenesis [13, 15–16, 24], and for each individual in every phase of their life (infantile breastfeeding, adolescence, youth, adulthood and old age) in relation to the multiple drug-toxicological interactions between environmental pollutants and drugs for clinical use.

Without going into specific citations of Thermal Places already known for this and particularly suitable for detoxification and the recovery of psycho-physical well-being, we can say generically that, all Thermal Places are to be considered important and must be appropriately protected for liver detoxifying treatments, kidney, tissue, because they stimulate the Drainage of the System and Organ.

The Thermal Cures are consequently to be considered also “regenerating and eutrophic”, as they are able to reactivate the metabolism through the optimal restoration of the Drainage of Interstitial Liquids, in which we know our cells are im-

1 °) Clinical Medical Pharmacologists are certainly the Medical Specialists who study these "Functional Modifications" and who can therefore contribute and interact correctly and in a Positive way, to reduce the Toxic Pharmacotoxicological Damage, with the various Medical Specialists and Paramedics who today in the world, they deal with Health and Wellness.

2 °) Mineral waters, thermal muds, Thermal Environment, physiotherapeutic methods and equipment, since they produce "Functional Variations", by definition they must be considered real "Drugs", therefore able to interact with the Preparations pharmaco-chemical and pharmaco-physical, used concurrently, by visitors to the SPA

Fig. 6. The Principles to Reduce the Pharmaco-Toxicological Damage

mersed, with their respective mitochondria. Cells and mitochondria sensitive to metabolic overexertion of toxic origin, are thus purified, recovered and protected, after appropriate treatment cycles in the privileged thermal places, to resume their physiological, cyclical trophic and metabolic activity.

Conclusions:

For the scientific and well organized development of the all Thermal Centers we can conclude as follows.

Today year 2020, the Thermal Centers must also, be used for an important and fundamental work of Prevention, Rehabilitation and Cure with the monitoring of the Users of the Thermal baths, as well as also, for the Control and Prevention of Environmental Pollution and many diseases. We The Clinical Pharmacologists can are essential for the control of the pharmacological and toxicological interactions. See Fig 6 here below:

The Figure 6 show the Principles of more considerable interest to reduce the Pharmaco-Toxicological Damage. The figure and the cited bibliography reassume the evidence of the action and competence of Clinical Pharmacologist also indispensable for Thermal Treatment Centers [2–3].

With these principles, it is possible to hypothesize a particular “Thermal Pharmacological Prescriptive Behavior”, in which the figure of the Clinical Pharmacologist in Thermal Organizzate Environment is appropriately inserted.

The positive impact of Thermal Treatment on the human body, would thus be appropriately assessed for each type of water used and for each type of application, particularly in cases of multiple pathologies and concomitant pharmaco-

logical therapies.

The Spas could also be useful for the dissemination of news about Environmental Pollution, by organizing Educational Courses at these facilities for public awareness of these problems.

In fact, today we need to learn how to protect ourselves, the family and the offspring, with correct Lifestyles (also pay attention to the right Biological Rhythms), use of Preventive and Protective Substances of Toxic Damage, as well as Damage from aging and Stress (Food supplements and Nutraceuticals) and also learn appropriate positive and ethical Behavioral Methods, for the best Collaboration.

We must all learn the opportunity to preserve the offspring, educating the population from the school level, about environmental, toxic damage and wrong behavior.

For this we must also mention the School of Chronobiology created by Franz Halberg of Minnesota (<http://www.msi.umn.edu/~halberg/>) and the “Positive Action” method of Prof. Carol Allred of Idhao (<http://www.positiveaction.net/>), also with whom, for some time, we have undertaken international collaborations.

We mention in the “**Bibliography, historical publications and current reports on the internet**”: the following international scientific works as “updates on the topics covered here”. **1°**) For Chronobiology [26–30]. **2°**) For “Natural mineral waters: chemical characteristics and health effects” [31]. **3°**) For “Clinical Pharmacologist Collaboration” [2–6]. **4°**) For “Damage from Environmental Pollution” [7–12, 13, 15–16, 19–20, 24, 32–33, 34].

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