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Gulf War Syndrome: US Veterans Suffering from Multiple Debilitating Symptoms

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After their service in the Gulf War conflict from 1990-1991, hundreds of thousands of our country's veterans began suffering from multiple and diverse debilitating symptoms including neurological and respiratory disorders, chronic fatigue syndrome, psychological problems, skin conditions and gastrointestinal issues.

This cluster of symptoms came to be known as Gulf War syndrome. Independent investigations, including those conducted by many of the Gulf War veterans themselves, showed multiple causes behind Gulf War syndrome, including experimental vaccines and medications; exposure to depleted uranium (DU); toxicity from biological and chemical weapons, oil fires, and other environmental contaminants.

Yet for nearly two decades, the official word from the Veterans Administration (VA), the Department of Defense (DoD), and the White House was that Gulf War syndrome did not exist. The result? Countless returning military personnel struggled for years to have their physical illnesses recognized as something other than psychological.

The latest official statistics compiled by the VA show that 25%-30%, or as many as 250,000 Gulf War veterans have suffered from this life-threatening spectrum of illnesses. (1) The number of deaths attributable to Gulf War syndrome remains elusive, however, the US government has failed to address this critical matter. A VA report released in 2014 weighs in on the disturbing oversight:

> No comprehensive information has been published on the mortality experience of U.S. Gulf War era veterans after the year 2000. The 14 years for which no mortality figures are available represent more than half of the 23 years since Desert Storm. Mortality information from the last decade is particularly crucial for understanding the health consequences of the Gulf War, given the Epidemiological Research latency periods associated with many chronic diseases of interest. Despite specific recommendations over many years from both the current Committee and Institute of Medicine panels, federal research efforts to monitor the mortality experience of 1990-1991 Gulf War veterans remain seriously inadequate. (2)

How has the federal government managed to avoid taking responsibility on an issue that profoundly impacts the lives of hundreds of thousands of our veterans? Such is the power of the military-industrial complex and the political machine in Washington DC. It seems that as long as the government can deny its role in exposing our soldiers to unproven and toxic vaccines, medications, biological and chemical weapons and depleted uranium, it wouldn't have to provide medical care to the victims of Gulf War illness. This is, quite simply, one of

the largest medical scandals and coverups in American history. For nearly two decades, the American media supported the official position that Gulf War Syndrome was only in the heads of our veterans, while legions of vets and their families were hung out to dry and die. The administrations of George H. W. Bush, Bill Clinton, George W. Bush and Barack Obama, have been complicit in the plot, and therefore stand accused of massive human rights violations. Yet American media denies it completely.

In this special two part investigation it will become clear that these claims are not wild conspiracy theories or anti-government rants, but based on firsthand testimony from veterans and years of solid scientific research. All these facts paint a sobering picture of the insidious corruption, lies and negligence on the part of our government, which has, quite literally, killed our own.

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I started reporting on the alarming emergence of Gulf War syndrome in the mid nineties. In a 1994 cover story in a national publication and based on my original 2 year investigation, I discussed the disturbing link between exposure to experimental drugs and other chemical toxins and the host of serious health problems among servicemen and women who participated in the Gulf War, also known as Operation Desert Storm. In the article, I interviewed vets who spoke not only about suffering deeply from various symptoms, but also how their attempts to bring their circumstances to light and receive healthcare were effectively stonewalled by US government.

One such serviceman was Paul Sullivan, who spoke to me about the hardships he faced, stating:

> I first became ill right there in the gulf, with rashes and what we just considered runny noses. It never went away. I ended up with chronic sinusitis, chronic bronchitis, learned I had a tuberculosis infection. The rashes still haven't gone away. The VA completely blew me off for two years until I went public·and talked on your radio station…. Before then, the VA was in the process of purging people's records, denying them service…. This denial of the problem-that it even exists-by the Department of Defense and the Department of Veterans' Affairs is absolutely shocking, immoral, and unconscionable-absolutely outrageous. (3)

My investigative article also covered the findings of two federally appointed researchers who presented an incendiary report at a May 1994 Congressional hearing on the topic "Is Military Research Hazardous to Veterans' Health?". The report, written by Dr. Diana Zuckerman and Dr. Patricia Olsen, points to an effort by the DoD to fast-track Food and Drug Administration (FDA) approval of certain experimental drugs designed to protect soldiers against wartime chemical exposure. According to the report, the DoD told the FDA that botulinum toxoid (botulism) vaccine and the anti-nerve gas drug pyridostigmine bromide were safe and effective for long-term use, despite the fact that no such evidence existed. Further, the researchers showed that DoD studies on the drugs employed shoddy scientific methodology and turned up ample evidence of serious adverse side effects. Another disturbing fact was the lack of soldiers' informed consent. I explained in the article that:

> According to Zuckerman and Olson, initially the Department of Defense assured the F.D.A. that investigational drugs would be administered to soldiers

> on a voluntary basis. Information on the products would be provided, and soldiers would be monitored for ill effects. As it turned out, though, none of these conditions were met. The Defense Department got the F.D.A. to grant them waivers from informed-consent regulations for the use of pyridostigmine and botulinum-toxoid vaccine. As a result, many gulf veterans were not told what vaccine they were being given or what the risks were. (4)

Despite years of mounting evidence, it was not until 2008 that Gulf War syndrome was officially recognized as a distinct illness after a US Congress-appointed committee released an analysis of over 100 studies related to Gulf War illnesses. The committee concluded that there was a clear link to specific chemical exposures. The chemicals identified included pesticides, pyridostigmine bromide, and the nerve gas sarin that troops may have been exposed to during the demolition of a weapons depot. The committee's chief scientist, Dr. Beatrice Golomb, singled out the acetylcholinesterase (AChE) inhibitor drugs such as pyridostigmine bromide as having a particularly strong connection to the development of veterans' ill health. She also revealed that some people appear to be particularly at risk from such chemicals due to genetic variations that impair enzyme function. When exposed, these people run a much higher risk for developing symptoms and disease (5).

The committee concluded that Gulf War illnesses are certainly physical in nature and that the psychological stressors experienced by Gulf War vets, while substantial, were inadequate to account for the extent of their illnesses. The committee findings reported that more than a quarter of the 700,000 US veterans of the 1991 conflict have suffered from the illness.(6)

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Before we dig deeper into the politics and deceit that has, and in some ways continues to suppress the Gulf War syndrome issue, let's first take a closer look at the 25 years of scientific inquiry establishing a link between the multiple toxins to which our soldiers were exposed and the long list of Gulf War-related illnesses .

Deconstructing the Symptoms and Science of Gulf War Syndrome

The term *Gulf War syndrome* is not an easily defined condition, but rather encompasses a wide variety of ailments. Former congressman Steven Buyer (R-IN), whose Army reserve unit was stationed at a prisoner of war camp in the region, calls Gulf War syndrome a misnomer, explaining that he and other afflicted servicemen have been plagued with a broad spectrum of chronic disorders. Having experienced some of the symptoms firsthand, Buyer attributes the heightened frequency of illnesses among veterans to the wide variety of hazardous substances they encountered in the Gulf, including poison gases, diesel fumes, petroleum-related pollution, parasites, experimental medications, and biological warfare agents.(7) According to the Association of Birth Defect Children, Gulf War exposures include, but are not limited to: DEET, permethrin, pyridostigmine, pentachlorophenol, benzocaine sulfur, aluminum phosphide, baygon, boric acid, Sevin, amidinohydrazone, diazinon, Dursban, dichlorvos, Ficam, carbaryl, lindane, malathion, oil well fires, leaded fuels, depleted uranium, solvents, DeContam agent, malaria pills, campfires, leishmaniasis, chemical warfare agents, CARC, experimental vaccinations (including those with squalene), D-phenothrin, allethrin, paint toxins, and many others. (8)

Dr. Boaz Milner, who practiced at the VA hospital in Allen Park, Michigan, treated hundreds

of patients claiming to have become ill as a result of their Gulf War experience. Milner agrees with Buyer that the collection of symptoms that have manifested can be attributed to a variety of factors, which he has categorized into five syndromes. Milner's first category of Gulf War syndrome sufferers consists of soldiers who were exposed to excessive quantities of radiation, likely a result of the depleted uranium used in munitions. The second form was induced by the widespread use of experimental vaccines that were designed to protect the troops from the harmful elements they would encounter, while another category encompasses veterans exposed to various environmental pollutants, including the more than 700 burning oil wells that contaminated the region's air and water. Milner believes that other soldiers may have contracted illnesses due to the presence of toxic chemical compounds, such as pesticides. The fifth form of the syndrome was brought on by the release of biological warfare agents.(9) With so many exposures, it is logical to anticipate a broad spectrum of symptoms for sufferers of Gulf War syndrome.

Chronic fatigue immune dysfunction syndrome affects over half of Gulf War victims, according to Dr. Garth Nicolson, President and Founder of the Institute for Molecular Medicine, who, with his wife, molecular biophysicist Dr. Nancy Nicolson, spent years studying veteran health conditions. Other symptoms pointed out by Nicolson include lymphoma, cardiac ailments, memory loss, leukoencephalopathy, and neurological diseases such as multiple sclerosis. Also common to sufferers are dizziness, nausea, stomach pains, light sensitivity, intense anxiety, breathing difficulty, muscle spasms, diarrhea, blurred vision, inexplicable skin rashes, hives, bleeding gums, eye redness, night sweats, and acute migraine-like headaches. (10)

Vaccines

The effects from the mélange of chemicals Gulf War vets were exposed to is impossible to unravel fully after examining the brutal fact that the experimental vaccines mixed with unmonitored medicine had never been proven safe. In fact, the widespread use of experimental vaccines during Desert Storm has been cited by many as a possible cause of Gulf War syndrome. Dr. Garth Nicolson elaborates, "I'm not a big fan of experimental vaccines. There have been too many mistakes. Usually you find these things out years later. Often agents that we think innocuous turn out to be harmful."(11) Even worse, during the Gulf War, the established procedures of vaccination were neglected and ignored. Normally, only one inoculation should be given at a time, but the military insisted on giving multiple shots at once, which, according to Nicolson, is the worst thing you can do because it suppresses the immune system. (12)

The troops immunized for the Gulf became government guinea pigs. They received experimental vaccines, such anthrax and botulinum, which were not approved for use by the FDA and have since been shown to cause potentially dangerous side effects. Soldiers who were given these experimental vaccines, without informed consent, have reported suffering from a variety of neurological problems and aberrant bleeding from various parts of the body.

Neil Tetzlaff, a lieutenant colonel in the US Air Force during the Gulf War, testified at a senate hearing of his symptoms:

On the plane ride to Saudi and during my first day in-country, I was nauseated and vomited. I attributed the sickness to the plane ride and tenseness of the situation. On my second day there, I vomited again and felt different. I attributed the sickness to something I'd eaten. On

the third day, I was extremely nauseated and vomited multiple times. I sought out the doctor and discussed my illness with him. We dismissed it as something I had eaten at the Saudi canteen. On my fourth day there, I vomited violently, the worst ever of my life, and was acting a bit off center and muddled. … On the morning of the seventh day, I vomited about a quart of blood. Since deployed for Desert Shield, I have been suffering moderate to severe and intolerable pain, and fatigue, and lately have developed one heck of a palsy. I've lost [much of] my ability to speak because I can't recall words, have extreme problems with my short-term memory, and I had a dramatic change in my olfactory system. The last three and a half years have been extremely difficult on me and my family.(13)

Not only did the experimental vaccines pose a threat to the troops' immune systems, the anthrax vaccination contained squalene, an unapproved adjuvant linked to devastating autoimmune diseases. The DOD made every attempt to deny that squalene was indeed an added contaminant in the anthrax vaccine administered to Gulf War military personnel. (14) Despite these efforts, unusually high antibody levels for squalene have been measured in blood samples of Gulf War vets. A clear link was established between the contaminated product and all the syndrome sufferers who were injected with squalene.

This was confirmed in an investigation conducted by *Insight* magazine, which also reported that VA spokespeople have no explanation for these findings.(15) The mystery is compounded by the disappearance of up to 70,000 service-related immunization records. One of the scientists hired by *Insight* to investigate the presence of squalene in veterans' blood elaborates on the study's findings: "We found soldiers who are not sick that do not have the antibodies. … We found soldiers who never left the U.S. but who got shots who are sick, and they have squalene in their systems. We found people who served overseas in various parts of the desert that are sick who have squalene. And we found people who served in the desert but were civilians who never got these shots … who are not sick and do not have squalene." (16)

According to one government official familiar with the blood test results, veterans' illnesses were correlated with increased levels of antibodies for squalene. Another official explained, "I'm not telling you that squalene is making these people sick, but I am telling you that the sick ones have it in them." (17)

Research immunologist Pam Asa has worked with about 150 sick Gulf War individuals. Asa reported that the autoimmune manifestations of squalene vary from person to person, depending on the patient's genetic makeup. "In other words, patient A will have a certain spectrum of symptoms, and patient B will have another. But it's still the same disease." (18)

Mark Zeller is a serviceman suffering from Gulf War Syndrome. He revealed the following to me in a radio interview:

> I sent my blood and got a notice back that I'm positive for this stuff called squalene, which is an adjuvant, which goes into a vaccine. This adjuvant is still not for human use. I'm here to tell you, I've got squalene in my body. And I said, it's not supposed to be in humans. To this date, it's still not used in humans except for research. I never sought to be a guinea pig out in the desert. I signed on to protect my country. At least that's what I thought. (19)

Zeller isn't alone. A study conducted at Tulane Medical School and published in

Experimental Molecular Pathology included these stunning statistics:

> … The substantial majority (95%) of overtly ill deployed GWS patients had antibodies to squalene. All (100%) GWS patients immunized for service in Desert Shield/Desert Storm who did not deploy, but had the same signs and symptoms as those who did deploy, had antibodies to squalene.
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> In contrast, none (0%) of the deployed Persian Gulf veterans not showing signs and symptoms of GWS have antibodies to squalene. Neither patients with idiopathic autoimmune disease nor healthy controls had detectable serum antibodies to squalene. The majority of symptomatic GWS patients had serum antibodies to squalene. (20)

According to Dr. Viera Scheibner, a former principal research scientist for the government of Australia:

> … This adjuvant [squalene] contributed to the cascade of reactions called "Gulf War Syndrome," documented in the soldiers involved in the Gulf War. The symptoms they developed included arthritis, fibromyalgia, lymphadenopathy, rashes, photosensitive rashes, malar rashes, chronic fatigue, chronic headaches, abnormal body hair loss, non-healing skin lesions, aphthous ulcers, dizziness, weakness, memory loss, seizures, mood changes, neuropsychiatric problems, anti-thyroid effects, anemia, elevated ESR (erythrocyte sedimentation rate), systemic lupus erythematosus, multiple sclerosis, ALS (amyotrophic lateral sclerosis), Raynaud's phenomenon, Sjogren's syndrome, chronic diarrhea, night sweats and low-grade fevers. (21)

Although the US government has been reluctant to associate squalene, and vaccines in general, with Gulf War syndrome, a 2014 VA report concedes that vaccine exposure cannot be discounted:

Taken together, the scientific literature published since 2008 supports and reinforces the conclusion in the 2008 RACGWVI report that exposures to pesticides and pyridostigmine bromide are causally associated with Gulf War illness and that exposures to low-level nerve agents, oil well fires, receipt of multiple vaccines, and combinations of Gulf War exposures cannot be ruled out as contributing factors to this condition. (22)

Biological and Chemical Weapons

Disclosures by high-ranking Iraqi officials have confirmed that Iraq possessed an extensive chemical and biological arsenal during the Gulf War. After his defection in August 1995, Saddam Hussein's top biological weapons adviser, Lieutenant General Hussein Kamel Majid, unveiled an abundance of classified information to United Nations investigators documenting the development of Iraq's biological and chemical warfare arsenals. Prior to the Gulf War, the Iraqis engaged in a top-secret program to develop biological, chemical, and nuclear weapons that could be used against their enemies, including the US, Israel, and Saudi Arabia. Prior to the disclosures, Iraq claimed it had only 10 people employed in its biological programs. Since then it has admitted that 150 scientists and an extensive support staff were involved in the mass development of biological warfare agents throughout the 1980s. According to UN officials, Iraq possessed at least 50 bombs loaded with anthrax, 100 bombs containing botulinum, and 25 missile warheads carrying other germ agents.

The Iraqi government's goal was to create a diversified arsenal that went far beyond conventional weapons. For instance, one viral agent manufactured by the Iraqis was capable of generating hemorrhagic conjunctivitis, which commonly results in temporary blindness or bleeding eyes. Another agent could be used to induce chronic diarrhea, a condition quite effective in immobilizing troops. The secret Iraqi programs were also responsible for the production of at least 78 gallons of gangrene-inducing chemicals that were capable of penetrating the body and infecting wounds. Other agents included "yellow rain," a lethal fungus responsible for bleeding lungs, and ricin, a deadly toxin derived from castor oil plants.

Was Iraq ready to use its poisons on the battlefield? Jonathan Tucker documents in the *Nonproliferation Review* that Iraq used them on 76 separate occasions.(23) Tucker notes that during the conflict London's *Sunday Times* reported on intercepted Iraqi military communications indicating that Saddam Hussein had authorized front-line commanders to use chemical weapons as soon as coalition forces began their ground offensive.(24) The American *Newsweek* also reported this fact. (25)

We have military documentation to support assertions of biological and chemical weapons presence. Battlefield reports of the 513th Military Intelligence Brigade confirmed the release of anthrax on Feb. 24, 1991, at King Khalid Military City, while documentation from the following day reveals the presence of lewisite, a nerve gas that may have been released either by an Iraqi assault or from secondary explosions.

Depleted Uranium

In addition to the chemical and biological warfare, there is another disturbing legacy left by the American invasion of Iraq: depleted uranium. DU is a byproduct of the uranium enrichment process. Its name implies it is a harmless material, but in actuality it is still a highly poisonous, radioactive, heavy metal. The term *depleted* comes from the process of extracting and removing the highly radioactive isotope U-235 from natural uranium and thereby leaving the relatively stable and less radioactive isotope, U-238. After U-235 is extracted from U-238 for use in nuclear weapons and breeder reactors, only U-238 remains. Although it is considerd depleted because it no longer contains U-235, U-238 still emits one-third of its original level of radioactivity.

The DoD claims that DU is used only on bullet tips and tank shells in order to enhance penetration of steel as easily as butter. The truth is that the entire bullet or shell, not just the tips or coating, contain U-238, making them especially hazardous. Furthermore upon explosion the uranium can be present at a nano-scale. Dr. Doug Rokke, a retired major who served as the director of the US Army Depleted Uranium Project in the mid-90s is a specialist in uranium cleanup efforts. He was an advisor for DU science and health for the Centers for Disease Control, US Institute of Medicine, Congress, and the DOD. Rokke has been at the forefront in efforts to alert health and military officials about DU's enormous health risks:

> It is important to realize that DU penetrators are solid uranium 238. They are not tipped or coated! DU oxides are shed during flight spreading minute contamination all along the flight path. The Cannon bore is also contaminated as is the inside of each tank or bradley fighting vehicle or LAV. During an impact at least 40 % of the penetrator forms uranium oxides or fragments which are left on the terrain, within or on impacted equipment, or within

impacted structures.

The remainder of the penetrator retains its initial shape. Thus we are left with a solid piece of uranium lying someplace which can be picked up by children. DU also ignites in the air during flight and upon impact spreading contamination everyplace. The resulting shower of burning DU and DU fragments causes secondary explosions, fires, injury, and death. (26)

US and British forces used Operation Desert Storm as a testing ground for the widespread employment of DU during Gulf War I. It is estimated that over 940,000 30 mm uranium-tipped bullets and 14,000 large-caliber depleted rounds were released. Even before the second Gulf War, between 350 and 800 tons of DU residue, with a half-life of 4.4 billion years, permeated the ground and water of Iraq, Kuwait, and Saudi Arabia.

Such immense radioactive pollution has exposed countless people. Inhalation and ingestion of DU were unavoidable for troops in proximity to exploding shells. In addition, soldiers spent long hours sitting in tanks, handling uranium-laced shells and casings. Weapons were also taken home as souvenirs. Families of veterans came in contact with the substance after handling clothing laced with it.

The insidious adverse effects of DU in the body was illustrated by scientists at the DOD's Armed Forces Radiobiology Research Institute in Maryland, in research presented to the American Association for Cancer Research and the Society of Toxicology. They tested the effects of embedded DU by inserting shrapnel-like pellets into the legs of rats. The researchers were surprised at how quickly oncogenes–genes believed to be precursors to cancer–formed. Another discovery was that DU kills suppressor, or health-maintaining, genes. The experiments also demonstrated that DU spreads throughout the body, depositing itself in the brain and spleen, among other organs, and that it can be passed by a pregnant rat to a developing fetus.(27)

Many of the symptoms experienced by Gulf War veterans and their families are indicative of radiation poisoning. These include nausea, vomiting, memory loss, and increased cancer rates. In addition, veterans' children are manifesting an alarming rate of birth defects, lowered immunity, and childhood cancers. Radiation-affected sperm may be contributing these defects.

Dr. Jay Gould, author of *The Enemy Within: The High Cost of Living Near Nuclear Reactors*, has been an outspoken critic of low-level radiation. Gould says that exposure to DU released into the atmosphere poses the same grave dangers any other exposure to uranium. "There is nothing new about it," Gould says, stressing that a biochemical impact of low-level radiation can immediately attack the immune response.(28) Since immune response is a key factor in maintaining good health, a weakened immune system makes people vulnerable to any kind of infection or allergic response. Consequently, everything from cancer to allergies and multiple chemical sensitivities can be activated by the uranium dust.

Gould adds that one reason why people generally ignore the dangers of low-level radiation is because it is often confused with background radiation:

> Background radiation is something that humans have lived with for hundreds of thousands of years. Over that long period, our immune response has developed a capacity to resist natural forms of radiation from cosmic rays and radiation in the soil. But ever since the nuclear age began, we have introduced

> new fission products, like radioactive iodine and radioactive strontium that are released in the operation of a nuclear reactor or an explosion of a bomb. These have the ability to impact the immune response. This is what we mean by low-level radiation. It's an internal radiation. In other words, if you ingest a fission product or a piece of uranium dust, it is like having a tiny x-ray go off for a tiny fraction of a second for the rest of your life. The effects of low-level radiation are quite awful, depending on which organ is affected. (29)

A University of Aberdeen peer-reviewed study of Gulf War vets equivocated on the reality of Gulf War illness. It admitted a higher, but not statistically significant, increase in death rates among soldiers who came into contact with DU and pesticides. A recent examination of the effects of DU in lung cell lines indicates that uranium changes regulatory biomolecular pathways within the lung tissues.(30) In rat tissue cells, a dramatic decrease in certain liver enzymes occurred. Other results indicate an increase in mRNA response (precursors to the cellular enzymes) to make up for the previous decrease in enzyme production.

Another paper by the Laboratoire de Radiotoxicologie Experimentale in Marseilles, France, suggests that in animal studies, DU inhalation can damage lung cells by changing DNA base pairs.(31) Introduction of DU into rat tracheae caused increased enzyme activity in rat testes three months later. In mouse cell lines, DU caused DNA mutations, and the authors point out that these were not only caused by radiation, but the actual presence of the chemical was toxic as well. (32) White blood cells of people exposed to the effects of DU in Bosnia and Herzegovina had measured changes in their genetic material.(33) In addition, an Israeli study showed that concentrations in hair, nails, and urine were directly correlated to the amounts of DU ingested in the water.(34) A further rat study shows that neurological exposure to DU may influence motor behavior and memory loss.(35) Despite the lack of extensive human cohort studies, these data suggest that DU present in bodily systems affects the various tissues throughout the body.

The University of Maryland School of Medicine studied vets who were exposed to friendly fire during the first Gulf War. During the course of a decade, vets continued to show elevated DU levels in their urine. The presence of increased DU research in the literature indicates a growing consensus that exposure to DU is a cause for concern.(36)One soldier who was struggling with terminal colon cancer described the environment where he was stationed as a toxic dump of "oil refineries, a cement factory, a chlorine factory and a sulfuric acid factory" all polluting the air. (37)

Gulf War Illness and Birth defects

Unfortunately, the suffering has not been limited to veterans. As early as 1994, the *LA Times* reported on birth defects appearing in the children of soldiers exposed to various chemical agents. (38) Reed West, daughter of Gulf veteran Dennis West from Waynesboro, Mississippi, was born prematurely with collapsed lungs and a faulty immune system. Joshua Miller, the son of veteran Aimee Miller, chronically suffers from unusual colds, pneumonia, and high fevers. In Waynesboro, Mississippi, the site of the National Guard Quartermaster Corps, 13 out of 15 children born to Gulf veterans suffered from serious disorders. Infant mortality rates have dramatically escalated in four counties in Kentucky and Tennessee, where the Army's 101st Airborne Division is based; in three counties in Georgia, where the Army's 197th Infantry Division is located; and at Ft. Hood, in Texas.(39) According to Dr. Ellen Silbergeld, a molecular toxicologist at the Johns Hopkins Bloomberg School of Public Health, men pass toxic chemicals on to their unborn children through their semen. (40)

According to Birth Defect Research for Children, a Florida-based association studying birth defects in Gulf veterans' families, there is an increase in birth defects in children born to Gulf War vets. Its registry keeps track of babies born with missing limbs, chronic infections, delayed development, cancer, heart problems, and immunity defects. The center has identified a disproportionate occurrence of Goldenhar syndrome in Gulf veterans' offspring.(41) Goldenhar syndrome (medically called oculo-auriculo-vertebral [OVA] spectrum) is a "rare disease," yet it is popping up in the infants of Gulf War vets far too frequently. The syndrome has a wide range of symptoms, and frequently looks very different from one child to the next. Despite its dissimilarities, Goldenhar syndrome frequently produces facial deformities such as asymetrical distortions, abnormally small eyes, missing upper eyelids, ear malformations, incomplete or fused vertebral development, and numerous internal problems with the heart, lungs, kidneys, and intestines.

Persian Gulf vet Steve Miller knows this condition all too well: his son, conceived soon after his return from the Gulf, was born with Goldenhar. According to Miller, "He had hydrocephalus, spinal scoliosis, spina bifida, was missing his left eye and left ear, [and] his heart was on the right side of his body." Miller continued to explain that "according to the National Institute of Health, [Goldenhar syndrome] is either hereditary or caused by teratogenic exposure. In our case we both tested negative in genetic testing." (42)

So how did Miller's child end up with such a rare disease when the genetic factors that supposedly cause Goldenhar syndrome were absent from both parents' DNA? The answer: a multiplicity of poisons.

Mitochondria, Neurodegeneration and the Latest Scientific Evidence.

Compelling new research presented at a 2015 Conference held by the American Physiological Society (APS) has now linked Gulf War Syndrome pathology with impaired mitochondria function. Comparing the mitochondria in blood cells from from veterans who served in Gulf operations with healthy veterans who did not deploy, the research found that deployed vets had increased mitochondrial DNA and more damaged mitochondrial DNA than their healthy counterparts. The findings suggest that the toxic compounds affecting individuals with Gulf War syndrome may have directly damaged this critical component of the cellular health. (43)

These findings corroborate a study published in 2014 noting that "Mitochondrial problems account for which exposures relate to Gulf War illness, which symptoms predominate, how Gulf War illness symptoms manifest themselves, what objective tests have been altered, and why routine blood tests have not been useful." (44)

January 2016 saw the publication of a comprehensive analysis of new research on Gulf War syndrome conducted at Boston University and several other institutions. Published in the journal *Cortex*, the analysis implicated exposure to pesticides, oil well fire emissions, sarin nerve gas and the ingestion of pyridostigmine bromide pills as profoundly on the neurological health of Gulf vets.(45) The analysis discussed the high incidence of "structural and electrical abnormalities" in the central nervous system, brain cancer, and reduced white and gray brain matter in among the veterans. The researchers also stressed the importance of deepening the scientific inquiry in this area so that we may finally develop effective treatments:

> Further research into the mechanisms and etiology of the health problems of

> [Gulf War] veterans is critical to developing biomarkers of exposure and illness, and preventing similar problems for military personnel in future deployments. This information is also critical for developing new treatments for GWI and related neurological dysfunction (46)

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Twenty-five years after the conclusion of the Gulf War conflict, there is no debating the fact that our troops suffered tremendously not only from chemical hazards on the battlefield but also from exposure to dangerous experimental drugs administered by the US military. Part 2 of this Gulf War syndrome investigation, will take a closer look at the disturbing decades-long legacy of ignorance and outright denial about this serious illness on the part of the US government.

Notes

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