

# Warfare of the Future, Today?

## The DIME Bomb: Yet another genotoxic weapon

by James Brooks  
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### **“Horrific” wounds in Gaza may foreshadow warfare of the future**

It's been almost five months since the first report that Israeli drone aircraft have been dropping a “mystery weapon” on Palestinians in the Gaza Strip. Since then, news media around the world have run stories depicting the strange and “horrific” wounds inflicted by the new bomb. The international press has spoken with Palestinian doctors and medics who say Israel's new device is a kind of chemical weapon that has significantly increased the fatality rate among the victims of Israeli attacks. [1-4]

In mid-October, Italian investigators reported forensic evidence that suggests the new weapon may also represent the near future of US “counterinsurgency warfare”. Combined with photographs of the victims and testimony from attending doctors, this evidence points to the use of Dense Inert Metal Explosives (DIME). [5]

DIME is an LCD (“low collateral damage”) weapon developed at the US Air Force Research Laboratory. Publicly, it is slated for initial deployment in 2008. DIME bombs produce an unusually powerful blast within a relatively small area, spraying a superheated “micro-shrapnel” of powdered Heavy Metal Tungsten Alloy (HMTA). Scientific studies have found that HMTA is chemically toxic, damages the immune system, rapidly causes cancer, and attacks DNA (genotoxic).[6-13]

It is unfortunate that the US media have virtually blacked out the story of Israel's new weapon, not least because our own military may soon be using it in Iraq and Afghanistan. The story might also have told us something about the grossly disproportionate brutality of Israel's war on the Palestinian people—reason enough for the media to suppress it. [14]

Thanks to the intrepid Italians, the story could even have introduced Americans to their government's DIME weapons program. This article will ask whether Israel is ‘testing’ US DIME bombs in the Gaza Strip, and explore the workings, dangers, and projected use of DIME weapons. DIME's roots in depleted uranium (DU) research will lead us to consider DIME in its historical context, as the latest innovation in the US military's long-running development of genotoxic weapons.

### **“They cannot return to life again”**

The first reports about ‘Israel's new weapon’ came from Dr Joma Al-Saqqa, chief of the emergency unit at Gaza's largest hospital, Al-Shifa. Dr. Al-Saqqa said that Israel was using “a new ‘chemical’ weapon” and its siege was “a live exercise on a new ammunition that, so far, has resulted in killing 50 Palestinians and injuring 200.” He observed that, “despite the damage in internal soft tissue in the bodies of injured people, the fragments were not detected by X-ray. In other words, they had disappeared or dissolved inside the body.”[15]

“There were usually entry and exit wounds,” Dr. Al-Saqqa reported. “When the wounds were explored no foreign material was found. There was tissue death, the extent of which was difficult to determine....A higher deep infection rate resulted with subsequent amputation. In spite of amputation there was a higher mortality.” The effects of the weapon seemed “radioactive”. [16][17]

According to Palestine News Network, Dr. Al-Saqqa “confirmed that there were dozens of wounded legs and arms. Many of them had been burned from the inside, and distorted to the point that they cannot return to life again.” [18]

“When the shrapnel hit[s] the body, it causes very strong burns that destroy the tissues around the bones...it burns and destroys internal organs, like the liver, kidneys, and the spleen and other organs and makes saving the wounded almost impossible. As a surgeon, I have seen thousands of wounds during the Intifada, but nothing was like this weapon.”[19]

However, Dr. Al-Saqqa could not analyze the chemistry of the bizarre wounds. On the first day of the siege, June 27, Israel had conveniently destroyed Gaza’s only criminal laboratory. [15]

Despite his pleas to the “international community” to investigate and lend assistance in treating the victims, “no one has lifted a finger”, the doctor was quoted in mid-July. “What we found were journalists who came to take pictures, but as for the medical community, nothing.” [17]

On August 3, the United Nations Relief and Works Agency (UNRWA) reported that Commissioner-General Karen AbuZayd had visited Dr. Al-Saqqa’s hospital, “where the staff is struggling to deal with wounds resulting in an unusually high number of amputations.” Commissioner AbuZayd commented that “what we saw in Al-Shifa...was rather horrific.” [20]

According to Merlin (Medical Emergency Relief International), “75 per cent of war-wounded patients admitted at one hospital needed amputations” following an Israeli attack on Gaza City. [21]

The World Health Organization was reportedly considering an investigation into the injuries. Physicians for Human Rights - Israel “agreed to take away fragments of tissue from the bodies of Palestinians killed during the recent military operations in Gaza for possible analysis in Israel but urged the medics to seek an international investigation.” [2]

### **Tungsten in Tissue Samples: A DIME Weapon?**

On October 19, Italy’s Rai24news televised an investigative report that supplied crucial new information. The Italian investigators had tissue samples from the victims in Gaza analyzed by Dr. Carmela Vaccaio at University Parma. Dr. Vaccaio reportedly found “a very high concentration of carbon and the presence of unusual materials, such as copper, aluminum and tungsten.” The doctor concluded that her “findings could be in line with the hypothesis that the weapon in question is DIME.”

Rai24news reporters also talked to Maj. Gen. Yitzhak Ben-Israel, former chief of the IDF's weapons development program. General Ben-Israel appeared to be familiar with DIME weapons. He explained that, "one of the ideas is to allow those targeted to be hit without causing damage to bystanders or other persons." [5]

The US Air Force refers to this emerging realm of weaponry as FLM (Focused Lethality Munitions). FLM is expected to provide the 'weapons of choice' for targeting "terrorists hiding among civilians", as a cheerleading Wall Street Journal article put it. [22]

With "focused lethality [and] higher energy materials...nano particles, intelligent fuzing, [and] mass focus lethality", the Air Force "will be able to strike effectively, wherever and whenever necessary, with minimal collateral damage." Ominously, the military thinks these weapons will allow it to target sites "previously off limits to the warfighter." [23][24]

Publicly slated for deployment in 2008, DIME bombs are small but unusually powerful. Their carbon fiber casings make "more of the blast energy...available as blast as opposed to being absorbed in [a] steel case". The carbon reportedly breaks into "thousands of harmless fibers", preventing unintended casualties from far-flung casing shrapnel. [22]

The 'footprint' of the DIME blast is much smaller than a conventional bomb's because gravity and air resistance quickly drag the dense, finely powdered "micro-shrapnel" to the ground. The blast radius is reportedly as small as 25 feet. [6][25]

The ideal of "Focused Lethality" is to reliably kill every human within the blast zone—one way or another. It is 'total war' on a 50- or 100-foot circle, within which deaths are not admitted as collateral, but purchased as insurance.

How does "micro-shrapnel" work? Israel's new weapon "slices" off its victims' legs, leaving "signs of heat and burns near the point of the amputation". It's "as if a saw was used to cut through the bone", according to Dr. Habas al-Wahid, head of the ER at Gaza's Shuhada al-Aqsa hospital. [5]

Viewing photographs of the living and dead Palestinian victims of this device, many of whom are children, we notice patches of darkened but unburned skin, possibly where metal powder was driven into and/or through the skin by blast force. A child's torso is peppered with holes, some of which, judging from doctors' reports, probably tunnel through to exit wounds in the back. The skin and muscle of one victim is ripped into a blood-encrusted pulp, as if blasted at close range with tiny birdshot. Some of the corpses are unrecognizable. Most of the recent photos of "strange" wounds from Gaza appear to be consistent with what is known about DIME weapons. [26]

### **HMTA, Son of DU**

The powdered Heavy Metal Tungsten Alloy "micro-shrapnel" in the DIME bomb is a "spin-off" from the US military's development of depleted uranium (DU) and uranium alloy "bunker buster" bombs. In fact, HMTA has been proposed as a replacement for DU in some weapons systems. [27]

Although the government has maintained a thick smokescreen of disinformation around

DU for decades, the truth about its dangerous toxicity has become increasingly difficult to deny. There is, for instance, the embarrassing matter of the former director of the US Army's Depleted Uranium project. This courageous whistleblower, Dr. Douglas Rokke, is warning everyone who will listen that DU is an "illegal...radioactive toxic material", the use of which "is absolutely unacceptable, and a crime against humanity." [28]

During Gulf War I, US forces deployed more than 300 tons of DU in Iraq. A few years later, more was dropped during Operation Desert Fox. Iraqi doctors reported alarming rises in the incidence of cancer, leukemia, and birth defects, in clusters closely correlated with US bombsites. Scientists found strong links between DU and Gulf War Syndrome, which is slowly killing thousands of veterans. [29-31]

Despite the science, the vets, and the human tragedies in Iraq, the US has stubbornly refused to end its use of DU. US-UK forces may have expended more than 2000 additional tons of DU in Iraq since March 2003. Nowadays, however, commanders are supposed to warn GIs to avoid contact with the results of their work. [32]

Unfortunately, DU is not the end of the story. After the 2001-2002 bombing of Afghanistan, the Uranium Medical Research Centre (UMRC) found that the urine of Afghanis living near US bombing sites contained 4 to 20 times the normal level of non-depleted uranium (NDU). These unexpected results could not "be explained by...any known geological or other features in the area."

UMRC researchers were "shocked" that, "without exception, at every bombsite investigated, people are ill...[with] symptoms consistent with internal contamination by uranium." [27]

Their field results indicated that our weapons scientists had "progressed" beyond DU to NDU, a processed form of pure uranium that is much more toxic than the depleted form. The "slightly enriched" uranium reported from recent Israeli bombsites in Lebanon may possibly be NDU from modified GBU 28 'bunker busters' supplied by the United States. [33][34]

Little wonder, then, that uranium weapons are becoming a public relations problem for the Pentagon. In a 2005 article, three scientists at the Armed Forces Radiobiology Research Institute (AFRRI) wrote that "medical and political controversies surrounding the use of DU" had spurred "a search for substitute metals in armor-penetrating munitions." [27]

"[N]ew alloys of tungsten/nickel/cobalt and tungsten/nickel/iron...rival DU in armor-penetrating performance", and are "among the leading candidates to replace DU in selected munitions". Some of this ordnance "has already been deployed, although on a relatively small scale."

The new alloys are collectively known as HMTA. In the scientific literature on tungsten, the toxicity of HMTA stands apart. This formula (roughly 9 parts tungsten and one part nickel and cobalt or iron) damages DNA even when powders of the metals are simply mixed together. [7][8][12]

Implanting four tiny bits of weapons-grade HMTA in lab mice induced terminal cancer in

100 percent of the subjects. A powdered HMTA recipe was tumor-generating and capable of “genotoxic effects”. At least one experiment found parallels in the way DU and HMTA attack DNA. The results of another suggested that HMTA may pass its genetic damage down to the next generation. [8][11][12][13]

Crucially, HMTA may be much more carcinogenic than DU when it is embedded in the body—as DIME weapons are designed to do. “Tumors developed rapidly” in rats implanted with pellets of HMTA, but researchers “did not observe tumor formation in the DU-implanted rats.”

Multiple syndromes of heavy metal poisoning have also been attributed to this alloy, including a disease that can be induced by cobalt overdose. Because HMTA contains far too little cobalt to cause the disease by itself, researchers suspected a synergistic effect among or between the metals. [11]

This research and studies of tungsten alloys in soils indicate that the area of a DIME blast should be treated with caution until it has been decontaminated (assuming this is possible). Depending on the local HMTA concentration, soil in the blast area may remain barren for an indefinite period of time, or it may grow plants internally contaminated with HMTA. [35][36]

### **The “who knew?” charade**

Although the authors of the 2005 AFRRRI article have conducted most of the publicly available research on the health effects of HMTA, their scientific competence fails them when they attempt to explain how the military’s favorite “surrogate metal” turned out to be almost as genotoxic as DU, and probably more carcinogenic:

*“In many ways the development of substitutes for DU in munitions has followed a pattern similar to that for DU deployment, in that incomplete toxicological information was available prior to their release...it was assumed that many years of industrial use of tungsten and alloys such as tungsten carbide...meant they could be used as safely in armaments.” (27)*

We infer that it was reasonable for the military to deploy DU weapons, because the toxicological information was “incomplete”. It’s a strange scientific rigor that requires us to know exactly how a known poison works before we stop giving it to people. The cold fact is that there never was a scientifically valid reason to “assume” that depleted uranium could be used “safely in armaments”. [37][38]

We currently have “incomplete toxicological information” about HMTA, but for more than fifteen years we have had clear warnings about the health risks of combining these metals. US weapons scientists should have known as early as 1992 that mixing cobalt with tungsten could greatly increase the resulting alloy’s cancer potential. [39][40]

It is hardly news that nickel is carcinogenic and genotoxic, and specialists have long noted that heavy metal alloys tend to unpredictably amplify the toxicities of their component metals. With this kind of “incomplete” information at hand, could military scientists have reasonably “assumed” that nickel would be a “safe” addition to HMTA?

Concerns have been voiced about tungsten sport ammunition for several years.

Tungsten alloy bullets, some also containing nickel and cobalt (for superior hardness), were found to pose potential environmental hazards in several studies. A probable link between industrial tungsten and leukemia has been identified. Even compared to these findings, however, the toxicity of HMTA may be of a different order. [35][36]

The “who knew?” apologia offered by the AFRRRI researchers asks us to assume that the scientists who developed DIME weapons proceeded in sheer ignorance of the existing science. They were so incompetent that they merely “assumed” that they could use any tungsten alloy.

Does this implausibility jibe with the rest of the picture? A multi-billion dollar military weapons program is stung by the “controversies” surrounding its toxic DU-uranium weapons, and is under pressure to produce an expedient alternative. Would this program’s scientists have been allowed to be so cavalier about consulting the literature? Would the replacement metal be chosen on blind faith, without bothering to conduct even simple studies of its potential health impacts?

Logically, we must conclude that the military developed HMTA in the knowledge that it could have significant carcinogenic and genotoxic effects. Did they “assume” that saying “tungsten is safer than DU” would take care of the matter?

Perhaps relatively non-toxic tungsten carbide, famed for its hardness and cutting ability, would not have sufficed for the purposes of the DIME bomb. Focused Lethality Munitions like DIME must kill all of their victims.

#### **Dual-Purpose Munitions: Is the human genome a target, or collateral damage?**

Considering the full human scope of their destructive power, DU and NDU may be said to function as Dual-Purpose Munitions, like cluster bomblets that kill both tanks and people. As their exotic metallurgy “burns” through concrete and steel, DU and NDU bombs are converted to micron-sized particles that sicken and kill and murder the next generation in the womb. [41][42]

Agent Orange, an herbicide heavily used during the war on Vietnam, also performed two functions. It obliterated the ‘jungle cover hiding the Viet Cong’ while it ‘weakened the enemy’ with burns, illness, and death, and corrupted the DNA of hundreds of thousands of Vietnamese. The third generation of its disfigured and suffering victims is now being born. [43][44]

The toxic HMTA “micro-shrapnel” spewed by DIME weapons appears to be the latest development in a long string of carcinogenic and genotoxic weapons developed and deployed by the US military. However, DIME is also represents a departure from tradition. Rather than spraying or exploding clouds of genotoxic dust, it’s a step into a future in which the toxic metal can be blasted directly into the human body, to “continue the fight” as an embedded agent.

#### **Return to Gaza**

Israel has denied using DIME weapons. Nonetheless, Israel’s military has used the occupied Palestinian territories as a weapons development zone for decades, testing bright ideas like depleted uranium and poison gases. It would not surprise us to find that

it is now testing a weapon for the US Air Force on Palestinians in Gaza. [45]

Unfortunately, the DIME hypothesis is the most plausible explanation for the grotesque effects of Israel's new weapon. We can only pray that we have not witnessed the first experiment in the effects of embedded HMTA in human subjects.

Still, DIME may not explain all of the evidence. For example, one of the metals found in victims' wounds was copper. DIME bombs are not known to contain significant copper, but another US marvel, the Sensor Fuzed Weapon (SFW), sprays slugs of molten copper at its targets. Is Israel also testing the SFW? [46][47]

If DIME weapons are designed to reduce civilian casualties, why has Israel's 'mystery weapon' increased the civilian death toll? Perhaps this question should be addressed to the advocates of Focused Lethality Munitions, and to the remote-control operators of Israel's drone aircraft and their commanders and politicians.

Although much remains unclear about Israel's new weapon, a few devastating facts are indisputable:

The weapon causes enormous and indiscriminate pain and suffering.

It operates as both a chemical weapon and an anti-personnel explosive. At the very least, it is likely to induce heavy metal poisoning in its surviving victims.

The weapon has significantly increased civilian mortality rates, in part because it inflicts virtually untreatable wounds.

Despite this public parade of horrors, Israeli forces have continued to use this weapon against Palestinians in the Gaza Strip for nearly five months.

**“Whenever and wherever necessary”**

If the DIME hypothesis is confirmed, authorities will probably explain that it is a new class of weapon not regulated by international law. The truth is that existing conventions and treaties have already prohibited some of the weapon's reported effects.

To cite one example, the bomb may be in direct violation of Protocol I of the 'Geneva Convention on Certain Conventional Weapons', which "prohibits the use of any weapon the primary effect of which is to injure by fragments which in the human body escape detection by X-rays." [48]

We will likely be told that DIME weapons provide a more “humane” way to fight “terrorism” by “reducing collateral damage” and “helping US troops win hearts and minds”. At the same time, we'll be assured that the new weapon “packs quite a punch” and will “give our troops more options” to “take the battle to the enemy”, even if he is “hiding among civilians”.

Whether Israel's new weapon is the Air Force's DIME bomb or another similarly dreadful invention, the horrors unfolding in Gaza make it clear that “Focused Lethality” is a blood-drenched lie. It promises only a deadlier form of indiscriminate warfare.

US plans to explode payloads of cancer-causing genotoxic heavy metal powder “wherever and whenever necessary” may portend an escalation of a campaign currently limited to the vicinity of “hard targets” we attack with DU and NDU. Whatever we make of the intent behind these weapons, the habitual result is chemical-genetic warfare. It cannot be allowed to continue.

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James Brooks has written several other investigative articles about Israel's use of chemical weapons ( see <http://www.vtjp.org/report/> and <http://www.vtjp.org/personal/> ), and has maintained the **Vermonters for a Just Peace in Palestine/Israel** website at <http://www.vtjp.org/> since May 2002. His background is in applied veterinary nutrition; he

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