MICROWAVE BIOEFFECT CONGRUENCE WITH SCHIZOPHRENIA

John J. McMurtrey,[a]

ABSTRACT

In view of the documentation for microwave technology to induce internal voice in humans, the correlation between microwave bioeffects and schizophrenia is reviewed. These correlations are extensive and include cognitive deficit, electrophysiologic activity, startle decrease, neurotransmitter changes, hormone alterations, immune alterations, mitochondria deficits, deleterious histologic change in disease reduced brain areas, activation of hallucination involved brain areas, and ocular disease. Schizophrenia correlates with microwave bioeffests such that congruence indicates microwave involvement with this disorder. The development of methods to exclude microwave means in psychosis is imperative, and research is proposed.

INTRODUCTION

Microwave induced sound[1]and internal voice technology has long been discovered, [2] developed,[3, 4] detailed in patents, [5, 6] with weapons applications described. [7, 8, 9] That such technology can be applied remotely and coupled to target tracking technology[10] has implications for patients who, by virtue of internal voice complaint and other symptoms are diagnosed with schizophrenia.[11] A frequent patient understanding of the origin of these voices is by remote transmission, though the very concept is considered delusional,[12] and often the diagnosis is psychosis of varying severity depending on functional ability,[13] without any investigation of the described internal voice capabilities.

Microwave voice transmission substantiation suggests examination of microwave bioeffect correlation with schizophrenia, which has the most hallucination prevalence. This

[a] Address: 903 N. Calvert St., Baltimore MD 21202. Email- Johnmcmurt@aol.com Phone- 410-539-5140.

examination reveals correlations that are listed in Table I. These correlations are so numerous and extensive that a high level of congruence between microwave bioeffects and schizophrenia is apparent. The effects discussed are within the microwave hearing spectrum, (100-10,000 MHz or 0.1-10 GHz) and intensity is in terms of the existing US standards,[14] as in parenthesis. Microwave exposure duration terms are defined below.[b]

Cognitive Deficit

Schizophrenia cognitive deficit is particularly in memory.[15, 16] Schizophrenic prefrontal cortex dysfunction is considered important, with this region's 'working memory' role as central, to many schizophrenic symptoms.[17] Rat "working memory" performance in a radial arm maze is deficient on microwave exposure (60% of US pop. std.) [18, 19] Rat water maze performance is deficient in 'spatial memory' with acute pulsed microwave exposure (1.2 X US pop. std.)[20] Prolonged rat microwave continuous wave exposures exhibit shuttle box and intermittent response training deficits (30% of US pop. std. to 1.2 X US occup. std.),[21, 22, 23, 24] with more pronounced decrements on extended exposure.[25] Other studies found rat food pellet reinforcement deficits on continuous wave or pulsed microwave exposures (½ to 1.6 X US occup. std.)[26, 27, 28] Multiple human case report of memory difficulty, with other neurasthenic complaints exists on excess microwave exposure.[29] Accidental and/or occupational 1-10 GHz excess radar exposure exhibits frontal lobe neuropsychiatric symptoms.[30]

Electrophysiology

An electrophysiologic indicator of 'working memory', contingent negative variation (CNV)[31] is decreased in several mental illnesses with the greatest decreases in schizophrenia.[32, 33,

[b] Brief = 30 minutes or less; Acute = 60 minutes to 30 minutes; Prolonged or Extended = days, Chronic = month or more.

[34] Cell phone radiation also decreases human CNV.[35, 36] The test involves a warning stimulus and an imperative stimulus with the intervening evoked waveform representative of sensory and motor adjustment prior to expected action.

Electrophysiologic auditory event related P300 and antecedents are reduced in schizophrenia,[37, 38] with increased latency.[39] Magnetoencephalographic (MEG) auditory event responses during hallucination are also decreased,[40] resembling responses to interfering sound.[41] Like hallucination or outside sound, pulsed microwaves decrease auditory electrophysiologic evoked potential amplitudes with a tendency towards increased latency in rats and rabbits (less than US occup. std.)[42] Hearing effect pulsed microwaves evoke brain responses similar to auditory stimuli.[43, 44, 45] Human hearing threshold increases for auditory tones on radiofrequency exposure.[46] Schizophrenia auditory P300 reduction is related to deleterious signs and poor prognosis.[47]

Soviet and American microwave exposure of humans report EEG increases in delta or "slow" waves, abnormal to alertness in quantity. Acute human exposure to continuous waves at the low microwave hearing spectrum end and pulsed frequencies at the high spectrum end, exhibit increased electroencephalogram (EEG) delta waves (less than US pop. std.)[48] Soviet and East European microwave occupational exposure review observes increased EEG delta waves.[49] Cell phones also increase human delta waves.[50]

Rabbit and rat microwave irradiation yield delta waves as well. Daily 3 hour rabbit exposures produces delta wave increases at 1 month to pulsed microwaves and at 2 months to continuous wave exposure (1/2 US occup. std.)[51] Daily 7 hour microwaves produces delta waves after 10-15 days in rabbits at 1/3rd the US population exposure standard, but took 1 month for delta wave increase at 1/30th this standard.[52] Rat microwave irradiation induces delta waves in the left hemisphere by continuous wave, but in the right hemisphere when modulated.[53] Delta

waves are also produced by extra low frequency radiation in rabbits[54] or magnetic fields in humans.[55]

Microwave delta wave increases correspond to delta wave increases widely noted in untreated,[56, 57, 58, 59, 60, 61, 62, 63, 64] and medicated[65, 66, 67, 68, 69, 70, 71, 72] schizophrenia EEGs.[73] Delta waves particularly correspond to psychotic episodes, [74, 75] and occur immediately prior to auditory hallucination.[76]

Electromagnetic field EEG entrainment occurs especially within physiologic brain frequencies (1-40 Hz.), either with a so modulated carrier wave or at these extra low frequencies. Microwave EEG entrainment (or change to exposure frequency) is demonstrated in cats,[77] and rats.[78] Lower frequency radiation or magnetic EEG entrainment is observed in rabbits,[79] monkeys,[80] and humans.[81] In addition to the capacity of entrainment to produce delta waves, the effect forms a basis for schizophrenic thought interference complaints, and is of non-lethal weapon concern.[82]

Startle Response

Some schizophrenics are hypo- or non-responders to orienting responses[83] and normally evoked electrodermal activity.[84] Microwave occupational exposure inhibits galvanic skin response.[85] Some schizophrenics have little or no startle response.[86] Microwave exposed rats exhibit decreased startle under both continuous wave[87] and pulsed[88, 89] conditions (1.2 X US occup. std.) Pre-natal rat exposure decreases startle in females (1.2 X US occup. std.)[90] Rats also fight less on microwave exposure (23 % of US pop. std.),[91] and avoid hearing effect pulsed microwaves.[92]

Neurotransmitters

Both schizophrenia and microwave exposure involve brain dopamine alterations. Many have long attributed positive schizophrenic symptoms to dopamine increases based on differential drug effects.[93] However, negative symptom schizophrenic findings from dopamine metabolite, dopamine receptor, and drug studies indicate decreased dopamine.[94] Based on behavioral changes, drug study results, and enzyme alterations, microwave exposure also indicates decreased dopamine.[95]

Other neurotransmitter alterations correspond in both microwave bioeffect and schizophrenia. Brain postmortem tissue analysis, cerebrospinal fluid, and drug studies find decreased schizophrenic serotonin.[96] Although rat serotonin metabolite ratios indicate increased serotonin turnover rates on acute microwave exposure (3.1 X US pop. std.),[97] brain serotonin decrease occurs on prolonged exposure (near US occup. std.) (45, Hermann) Rat microwave exposure from birth to 15 days decreased serotonin in adults (near ½ US occup. std.)[98] Cortical synaptosome γ-aminobutyric acid (GABA) uptake and release is reported decreased in schizophrenics, who have decreased GABA neurons,[99] and synthetic enzymes.[100] GABA receptor binding (by ^{3}H-muscimol) decreases in rat neocortex on microwave irradiation (2.6 X US occup. std.)[101] Cholinergic system disruption impairs memory and attention; prominent schizophrenia features, however though acetylcholine alterations are indicated, evidence for either an overall increase or decrease is inconclusive.[102] Similarly indeterminate is the microwave net effect on acetylcholine. Microwaves inactivate acetylcholine esterase activity[103] (which may increase cholinergic activity, though disputed as to the enzyme's Km), (45, Hermann) and abolish scopolamine anticholinergic effects.[104] However, acute rat microwave exposure decreases sodium dependent choline uptake, the rate limiting step in acetylcholine synthesis, especially in frontal cortex followed by the striatum on either pulsed or continuous

wave, but only pulsation decreased hippocampal choline uptake (60 % of US pop. std.)[105, 106] (18, Lai, 89)

The hippocampus and striatum are limbic structures-- a brain system prominent in schizophrenia pathogenesis. This system is also involved in microwave bioeffects.[107, 108] Microwave exposure amplification of hippocampus theta rhythm is observed (30 % of US pop. std.),[109] with histologic and anatomic alteration reported.[110, 111]

Hormones

Corticotrophin is indicated to mediate microwave stress,[112, 113] and microwaves influence adrenal steroids. Satellite station operator microwave exposures produce a stress reaction of urinary increases in 11-oxycorticosteroids and stress hormone diurnal pattern shift ($1/10^{th}$ of US pop. std.)[114] Rat microwave exposure yields adrenal activation resulting in adrenal medulla epinephrine and corticosteroid depletion (1.8 X US occup. std.)[115] Female rat microwave exposure increased corticosterone and ACTH, with decreased estradiol independent of pregnancy.[116, 117, 118] Schizophrenic patients have increased cortisol with less dexamethasone cortisol suppression than controls,[119, 120] and corticosterone increase is reported.[121] Schizophrenics have such hypothalamic-pituitary-adrenal axis over activity with ACTH increase as to feature the metabolic syndrome.[122] Patient cortisol lacks sleep inhibition, and correlates with paranoia and hallucination.

Some negative syndrome schizophrenics have decreased melatonin.[123] Electro-magnetic fields diminish melatonin in animals.[124] (95, Frey, 94) Human melatonin decrease is both at lower frequencies,[125, 126, 127, 128] and on cell phone use.[129] The pineal gland synthesizes melatonin from serotonin,[130] also decreased as above. Abnormal EEG and decreased melatonin are

associated with pineal calcification,[131] which has lower incidence in undeveloped societies[132] who also show better schizophrenic prognosis.[133]

Mitochondria Changes

Mitochondria are altered in both schizophrenia and microwave exposure. Mitochondria deformation, size reduction, and decrease in number from 20-33% in schizophrenia brain are observed.[134] Cytochrome c oxidase, of the mitochondria oxidative phosphorylation system, is reduced from 30-63% in the schizophrenic brain.[135] Schizophrenic mitochondria gene expression is decreased in five pathways.[136] Acute microwave exposure evidences mitochondria matrix density decrease, and cristae degen-eration in vitro (1.2 X US occup. std.)[137] Adenosine triphosphate (ATP) and creatine phosphate (CP) levels depend on oxidative phosphorylation, which requires electron transport components of mitochondria cristae. Very brief (5 min) whole body microwave exposure significantly decreased rat brain ATP and CP levels (2.5 X occup. std.)[138, 139]

Lipid Phosphorylation

Schizophrenic brain magnetic resonance spectroscopy shows decreased phosphomonoesters, and increased phosphodiesters. [140] This represents reduced lipid membrane building blocks, and increased lipid degradation products. Microwave exposed rabbits decrease P^{32} incorporation into brain lipids (1.8 X US pop. std.)[141]

Blood Brain Barrier Permeability

Molecular and cellular evidence suggests blood-brain barrier (BBB) impairment in 18-29% of Schizophrenics.[142] Non-thermal microwave alteration of the BBB permeability is

consistently observed,[143, 144, 145, 146] and is attributed to pinocytosis.[147, 148] The alteration is proposed induced by heat shock protein phosphorylation,[149] and heat shock protein antibodies are among the evidence for schizophrenia BBB impairment. Studies not showing the effect have utilized short exposures, thermal microwave levels, and are criticized for procedure or publication behavior[150] Thermal microwave BBB studies are complicated by decreased BBB permeability at about 40^{o} brain temperature,[151] but at 2^{o} higher permeability greatly increases.[152, 153]

Immune Alterations

A schizophrenia autoimmune etiology is indicated by several immune alterations, including abnormally high autoantibodies against brain and somatic antigens,[154, 155] Higher autoimmune disease prevalence in these patients and their relatives is reported.[156, 157] Foreign abstracts indicate microwaves cause autoimmune stimulation.[158, 159, 160]

Increases of the cytokine interleukin-6 (IL-6) are a feature of autoimmune disease. (155, Ganguli) Ten reports of an increase in IL-6 in schizophrenia are versus six reporting a normal level, while four reports of an increase of IL-1$_{\beta}$ in the disease are versus six reporting a normal level.[161] Electromagnetic field exposure of human monocytes, the most important producer these cytokines, dramatically increased production of IL-6 and IL-1$_{\beta}$.[162] These fields were lower in frequency than microwave.

High tumor necrosis factor (TNF) levels are reported in schizophrenia. (154, Gaughran) Very low intensity microwave whole body exposure increases TNF production in peritoneal macrophages and spleen T cells (2 X 10^{-4} of US pop. std.)[163, 164] Microwave exposure TNF increase has several other reports.[165, 166, 167]

The balance of evidence shows B lymphocyte increase in schizophrenia (5 reports of increase versus 3 of normal levels.) (142, Rothermundt) Whole body microwave exposure increases the proportion of mouse spleen B lymphocytes.[168, 169] This increase is not caused by proliferation, but from stimulation of already existing precursor B cell maturation,[170] and is under genetic control,[171, 172] with apparent humoral mediation.[173] Microwaves also induce human lymphocyte lymphoblastoid transformation in vitro.[174]

Anatomy and Histology

Schizophrenia reduction of medial temporal lobe structures, the hippocampal-amygdala complex, is observed in 74 % of magnetic resonance imaging studies, with left lateralized findings.[175, 176] (37, Kasai) Microwaves affect both the hippocampus and the cortex. Chinese hamster 15 day microwave exposure produces pyknotic neurons in the hippocampus, hypothalamus, and unspecified cortex areas (1.8 X US occup. std.) (110, McKee) Rat pre- thru post-natal ultra-wideband microwave exposure increased hippocampus lateral length. (111, Cobb) Such enlargement may indicate edema, reflecting pathology resulting in eventual size reduction. These rat pups stress vocalized more, and later mated less.

The thalamus is volume decreased in 42 % of schizophrenia studies, (175, Shenton) with lower neuron number in the anterioventral nucleus observed. [177] Light and electron microscopy of hamster 22 day microwave exposure reveals cytoplasm vacuolization and chromatolysis with a pale frothy cytoplasm in ventral thalamic neurons, and little rough endoplasmic reticulum, with very few polyribosomes (3 X occup. std.)[178] Dendrites had vacuoles, myelin figures, and few microtubules.

Schizophrenia cerebellum changes are evident in numerous studies of neurological signs, postmortem specimens, [179] and in 31 % of neuroimaging studies. (175, Shenton) Atrophy is the

main anatomic observation, but several studies show Purkinje cell loss.[180] Rat and quail pre-natal prolonged microwave exposure produces Purkinje cell loss and histologic change respectively (1.2 X US occup. std. & 3.1 X US pop. std.)[181, 182] Rat post-natal microwave exposure also produces Purkinje cell decrease and cellular changes (1.2 X US occup. std.)[183] (?181, Albert) Pulsed microwave rat balancing ability deficit suggests cerebellum motor influence (23 % of US pop. std.) (91, Frey, 77)

Prefrontal and parietal lobe volume reduction is reported by 60 % of studies for each area. (175, Shenton) Several microwave reports are of unspecified brain area change. Prolonged microwave rat exposure produces neuronal cytoplasm vacuolation, swelling, and beading of axons, with dendrite spine decrease (less than US occup. std.)[184] Extended microwave exposure produces myelin degeneration in rat brain, (184, Lai) and in guinea pig or rabbit cortex (1.75 & 2.5 X US pop. std.)[185]

A neurodevelopment schizophrenia hypothesis is favored, since autopsied brain has no inflammation or scarring. Yet, brain atrophy by apoptosis lacks gross change. Microwaves <u>in vitro</u> produce apoptosis in the Fas pathway (3.1 X US pop. std.)[186]

Metabolic Activation

Glucose uptake and blood flow in the hallucinating brain show temporal lobe activation over baseline or control in 85 % of studies.[187] The temporal lobe superior gyrus is activated in some 40 % of studies, but middle gyrus or medial temporal regions of hippocampus or amygdala are often activated, with thalamus activation in some studies. (187, Weiss) Acute hearing effect pulsed microwave exposure increased rat brain glucose metabolism by [^{14}C] 2-deoxy-D-glucose with particular prominence in the lateral geniculate, medial geniculate, the ventral medial thalamus, and in limbic structures of the mammillary bodies, and amygdala (30% of & 1.2 X US

occup. std.) [188] Only more prominent uptake by non-auditory structures was noted, with both geniculate bodies being part of the thalamus, while the mammillary bodies have a terminal hippocampal tract, and are too small for imaging. [189] Rat blood flow increases significantly in the temporal cortex, lateral and medial geniculate bodies with acute microwave exposure pulsed for the hearing effect (1.6 X US occup. std.)[190] Therefore microwave studies particularly correspond in temporal, thalamus, and amygdala regions to those of hallucination.

Brief human cell phone[191] and rat microwave exposure also increase brain blood flow (1.2 X US occup. std.),[192] but longer exposure of pregnant rats exhibited decreased uteroplacental circulation (1.2 X US pop. std.) (117, Nakamura) (118, Yoshida) Acute psychosis studies have shown increased global brain blood flow,[193, 194] with psychosis and delusion correlation, yet the chronic patients most studied show hypoperfusion. Microwave exposures inducing thermal effects initially increases, but eventually decreases brain blood flow, though associated with cellular injury.[195] Specific cerebral blood flow regions are increased while hallucinating, but sensory stimuli and endogenous verbal imagery activates brain regions of hallucinators less than non-hallucinators.[196, 197] (187, Weiss)

Brain activation changes are widely noted in schizophrenia, particularly in the frontal lobes.[198] At rest, schizophrenics exhibit lower glucose utilization in the frontal lobes relative to either occipital or whole brain.[199] The schizophrenia prefrontal blood flow is particularly deficient while performing tasks specific to this region. (197, Taylor) Schizophrenia brain perfusion during tasks includes globally increased blood flow, or less dominant hemisphere activity and more non-dominant increases than controls. Micro-wave deficits in frontal choline uptake, maze performance, contingent negative variation, and frontal neuropsychiatric symptoms above are consistent with a prefrontal deficit.

Defects in brain area volume, mitochondria, and neurotransmitters provide basis for decreased activity in schizophrenia. Corresponding defects with microwaves and the shift of brain activity to other brain areas could have mechanism in technologic assault. Although perceptual processing is normally lateralized to the left hemisphere, pitch discrimination, non-verbal, and degenerate sounds activate the right hemisphere in health.[200] Microwave activation may be akin to non-verbal or degenerate sound.

A microwave mechanism for EEG delta wave increase has been proposed by corpus callosum tract fatigue, making unavailable this interhemispheric connection, with inherent corticospinal and spinocortical tract delta rhythm predominant.[145] Schizophrenia corpus callosum dysfunction[201] and decreased brain area activity may enlist abnormal brain area activation. One model of gamma wave distribution relates delta wave amplitude and cortical metabolic rate in normal development to transient neuronal organizational state.[202] A re-organizational state may apply in technologic assault.

Positive Symptoms

Although microwave bioeffects are consistent with negative schizophrenic symptoms,[c] internal voice transmission effects provide basis for most prominent positive schizophrenic symptoms.[d] Presently, casual discussion of this presentation is considered delusional by psychiatric prejudice, without detailing extensive references. Because internal voice is similar to thought, and may be directive, these technologies are capable of altering thought itself and ongoing behavior. Presently, positive symptoms of attention deficit and thought disorder are explained by hallucination. Exacerbating both these symptoms would be microwave impaired

[c] Alogia, affective blunting, anhedonia/asociality, avolution//apathy, and attention impairment.
[d] Hallucination, delusions, positive thought disorder (e.g. derailment, tangentially, incoherence, etc) bizarre behavior, and inappropriate affect.

working memory, and EEG entrainment capability. Microwave manipulation, then could account for the major positive schizo-phrenic symptoms of hallucination, delusion, attention deficit, and thought disorder.

Belief of technologic assault is most consistent with the paranoid schizophrenia subtype. More studies of this diagnosis show less genetic association, a later onset, [203] and an increase of this form within the past century is reported.[204, 205] Schizophrenia is apparently preponderantly sporadic,[206, 207] with EEG abnormalities reported as more frequent, in this form.[208] Although first admission studies have indicated a decline in schizophrenia, changing demographic and diagnostic patterns question true incidence change,[209] with diagnoses of borderline states,[210] and paranoid psychosis[211] matching some declines, while a recent review shows a schizophrenia incidence increase.[212]

Ocular Disease

Microwave exposures are known to produce eye disease. Subcapsular cataracts are particularly produced by microwaves.[213, 214] Anterior subcapsular cataracts were significantly more prevalent in schizophrenics than a visually impaired population, without medication association, except that phenothiazines actually had less cataract prevalence.[215] As expected for a group of little occupational exposure, schizophrenics have less cataract incidence, of all types, than the general population,[216] but schizophrenia cataracts have been associated with high doses of chlorpromazine (a phenothiazine.)[217] Microwave exposures have occupationally been associated with retinopathy,[218] (30, Hanson) and experimentally produce retinal damage.[219] Schizophrenia retinopathy is associated with thioridazine, [220] and generally with phenothiazines.[221] (217, Bond) All the schizophrenia ocular disease associated drugs are older, generically available, and may have public medical assistance or patient profile prescriptive

preferences. Phenothiazines were so broadly utilized that direct association with schizophrenia cannot be excluded.

Standards and Environmental Considerations

East European and Russian occupational microwave standards of 10 $\mu W/cm^2$ are based on a neurasthenia syndrome.[222] Reported symptoms are headache, dizziness, increased irritability, loss of appetite, sleepiness, increased fatigability, sweating, difficulties in concentration or memory, depression, emotional instability, dermatographism, thyroid enlargement, and tremor of the extended fingers. (49, Silverman) The American study of increased human EEG delta waves noted short-term memory impairment, concentration inhibition, irratibility, apprehension, frontal headache, and such sluggishness as to interfere with work the next day. (48, Bise) This syndrome is consistent with many schizophrenia symptoms.

The Russian standard has contrasted with a 1000 times greater US standard of 10 mW/cm^2, which was too weakly written to sustain lawsuit. (222, Steneck) The original US standard was set at one-tenth the level known to increase body temperature. The main microwave research sponsor, the Defense Department has vigorously defended this thermal rationale with suppression of non-thermodynamic effect investigations.[223] Standard setting for optimal equipment performance on national security grounds is suggested.[224] Present US standards (ANSI/IEEE C95.1) lowered the occupational standards within certain frequencies, and finally set population standards, though at ~100 times the Russian. (14, Ghandi) There are many reported effects at, or near these standards, which are certainly not so strict as to exclude all effects, however detrimental.

A 1975 Environmental Protection Agency survey indicated that less than 1% of the population was routinely exposed to more than 1 $\mu W/cm^2$, and that high exposure areas (building

tops with radiofrequency transmitter clusters) could run as high as 100-200 μW/cm^2. (222, Stencek) Cell phones can reach 200 mW power output.[225] Although few microwave correlates of schizophrenia are at, or below these levels, neither well studied is chronic exposure, with considerable exposurechange since 1975.

Unknown is an environmental microwave relationship to schizophrenia, except for those correlations here reviewed. Even though a manufactured system may meet the standards, sources are proliferating, and standards may be exceeded in many situations, particularly with increasing cell phone use. Potentially toxic effects are in cell phone reports, and base station proximity increases risk, with recognized over exposure by heat-sealing appliances. (222, Steneck) Dermatologic electromagnetic hypersensitivity syndromes are reported by patients, as well as a type resembling neurasthenia recognized by the Russians.[226] Though such syndromes are unconfirmed, yeast cell effects are some seven orders of magnitude below the Russian standard.[227] Microwaves are a proposed mechanism for a reported sunspot activity association with schizophrenia.[228]

A schizophrenia neurodevelopment hypothesis is now favored, but there is evidence for a neurodegenerative process in a sub-population.[229, 230] Neurodegenerative diseases such as amyotrophic lateral sclerosis (ALS), Alzheimer's, and Parkinsonism are linked to electromagnetic field exposure.[231] For ALS, data indicating increased risk is relatively strong, while for Alzheimer's the data is weaker than for ALS, and Parkinsonism is only linked with little evaluative data.

SUMMARY AND CONCLUSION

Microwave technology is capable of internal voice transmission. Microwave internal voice weapons are considered[232] (7, DIA) (3, Oskar) and a weapon has been referenced, (9, Army) with the basic technology described. (2, Justensen) (5, Burnkan) Continuous symptoms present in psychosis can be maintained by available tracking technology. Since similar means are a frequent patient complaint, it is compulsory that methods be developed to rule out involvement of these technologies in delusional disorder and psychosis. It is unethical to further ignore the evidence and disrespect these patients.

Microwave bioeffects have a high level of congruence with major lines of schizophrenia investigation. In both schizophrenia and microwave exposure, there is cognitive deficit, and a number of electrophysiologic signs including decreased contingent negative variation, decreased auditory event related response, and increased EEG delta waves. Startle response and galvanic skin response is found decreased in both conditions. In the neurotransmitter levels of both conditions, serotonin is found decreased, with dopamine and GABA indicated as decreased. The limbic system is afflicted in both situations. Hormone changes of melatonin decrease, and adrenal activation are common to both conditions. Immune function, mitochondria, and the blood-brain barrier are reported similarly altered in both situations. Microwaves induce deleterious histology in several brain structures observed reduced in schizophrenia. Microwave exposure activates brain structures corresponding to those noted on hallucination. Subcapsular cataracts have been associated with both conditions. Retinopathy is associated with both widely prescribed anti-psychotic medication, and microwave exposure. Microwave voice transmission, and EEG entrainment provide basis for positive symptoms. The almost comprehensive congruence between microwave bioeffects and schizophrenia may not apply to all patients, but is most consistent with the negative symptom group.

The congruence of microwave bioeffects with schizophrenia symptoms does not have to involve voice transmittal in a technologic etiology. Potentially toxic effects to functioning exist near, and at exposure standards. Hypersensitivity syndromes are reported at lower frequencies than microwave, although any syndrome has been unconfirmed. Neurodegenerative diseases are also associated with lower frequency exposure, particularly ALS and Alzheimer's. The potential for voice transmittal to mimic positive schizophrenia symptoms, and the congruence of other symptoms with microwave bioeffects indicates that a technologic etiology may involve more than a few patients.

The medical community has been remiss in refusing investigation of such an etiology. Psychiatrists have actively ignored longstanding patient complaints of being affected as basically herein referenced. Microwave bioeffects, including sound and voice perception have long been described. The evidence for a technologic etiology regarding microwaves practically comprehensively correlates with schizophrenic symptoms to such congruence that a mathematic congruent state cannot be excluded. This hypothesis is more defined than any other means of pathogenesis, and should mandate investigation to develop methods for ruling out such an etiology. Though direct proof is lacking as to specific cases, investigation must begin. Of course the hypothesis may not involve all cases, for multifactor etiologies are common to medicine, and reference is often made to "the schizophrenias."

Patients subject to internal voice assault would have hallucination, and likely paranoia with belief that voices are transmitted to them. It would be most probable among sporadic cases with non-adolescent onset, having some or all of the correlations here noted. Clinical investigation would include radiofrequency measurement. Attention should be given to likely cranial directional localization within the specified Brunkan patent hearing spectrum.

Establishing radiation characteristics with the Brunkan patent burst and pulse pattern or multiple frequencies as in the Stocklin patent would also be highly pertinent, but less important.

Investigation of responses within and outside of rooms shielded from electromagnetic radiation is relevant. Practical considerations are that shielded facilities already exist for MRI and magnetoencephalgraphy. Observations of hallucination, event related auditory response, contingent negative variation, or EEG delta wave index in selected patients would likely be parameters more immediately responsive to microwave cessation. Although existing facilities may be adequately shielded,[233] the shielding must be radar effective, with serious determination of adequacy.

Subcapsular cataract and retinopathy epidemiologic study in schizophrenia would also have relevance. The specific cataract type is known to be microwave induced, and is reported without medication association. Patient signs relating to other microwave bioeffects would have bearing on any coincidence of these symptoms, which was indeterminate to this review, and is pertinent to a technologic etiology.

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Patents are printable free from the U. S. Patent Office website.

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