



1

ACTINOMYCETES: THE PROBLEM IS YOU?!?

Shoemaker R, et al. *Medical Research Archives* vol 9 issue 11. Medical Research Archives

RESEARCH ARTICLE

Exposure to Actinobacteria resident in water-damaged buildings and resultant immune injury in Chronic Inflammatory Response Syndrome

Authors
Shoemaker R¹, Meinhardt J², Heyman A³, Lark D⁴

Affiliations
¹Center for Research on Bioterror Associated Illnesses
²School of Nursing, Georgetown University, Washington DC
³School of Medicine and Health Sciences, George Washington University
⁴NSJ EnviroSciences Pty Ltd, Newcastle, NSW, Australia

Correspondence:
Shoemaker R
E-mail: rjshoemaker@msn.com

ACRONYMS

AI	Actinobacteria Index
ANCA	Anti-neutrophilic cytoplasmic autoantibody
CIRS	Chronic Inflammatory Response Syndrome
Ct	Corynebacterium tuberculoearium
DI	Dominance Index
EMT	Epithelial to mesenchymal transformation
GENIE	Commercial transcriptional assay: Gene expression, inflammation explained
HH	Human habitat, skin, <i>Actinobacteria</i>
MAPK	Mitogen associated protein kinase
MARCoNS	Multiple antibiotic-resistant coagulase-negative Staphylococci
MIM	Molecular hypomethylation
MSH	Melanocyte stimulating hormone
NGS	Next Generation Sequencing
PI	Prevalence Index
SH	Soil habitat, <i>Actinobacteria</i>
Smad	"Small Mothers Against Decapentaplegic," signal transducers for TGFBR
TGF beta-1	Transforming growth factor beta-1
TGFBR	Transforming growth factor-beta receptor
TLR2	Toll receptor two
WDB	Water damaged building

- WHAT ARE ACTINOBACTERIA?
 - Gram Positive, spore-forming, filamentous bacteria
 - "Hybrid" of Bacterial and fungal characteristics
 - Like Staph, Actino can be pathogenic (eg Diphtheria) or commensal; Actino are a Published and Recognized marker for Moisture concerns in WDB
 - Potential Inducers of immunoreactivity

Copyright 2021 KEI Journals. All Rights Reserved

2

ACTINOMYCETES: THE PROBLEM IS YOU?!?

- What Tools are/were Necessary to Study Actino as a driver of CIRTS?
 - Commercially available dust sampling for Actino
 - Validated Dominance Index (MAPK) and Prevalence Index (TGFBR)
 - NGS –Next Generation Sequencing: After decades of Refining Detection and Differentiation methods NGS a rapid, cost effective method for speciation (illumina.com)
 - HPLC (High-Performance Liquid Chromatography) reduces time and can analyze MYCOLIC ACIDS
 - “Unsaponifiable Wax” was isolated after prolonged saponification; the alcohol-insoluble saponified wax fraction was termed “MYCOLIC ACID”
 - GENIE – Refinement of transcriptomics for specific patterning (trigger) of gene expression immunoreactivity
 - Skin ACTINO – envirobiomics.com > #21
 - Serum Actino identification techniques (purple top tube)

Shoemaker R, et al. *Medical Research Archives* vol 10 issue 1. Medical Research Archives

REVIEW ARTICLE

Screening for Biomarkers of Actinobacteria Associated with Water-Damaged Buildings – Part 1

Authors:
Shoemaker R & Lark D¹

Affiliations:
¹ Center for Research on Biotin Associated Illness, Pooomoke, Maryland, USA
² NSJ EnviroSciences Pty Ltd, Newcastle, NSW, Australia

Corresponding Author:
Shoemaker R
Email: rich@shoemaker.com

Acronyms:
CIRS: Chronic Inflammatory Response Syndrome
GENIE: Gene expression, inflammation explained
NGS: Next Generation Sequencing
WDB: Water-damaged building
HI: Dominance Index - Actinobacteria
PI: Prevalence Index - Actinobacteria
MTB: Mycobacterium tuberculosis

Abstract

Recent publications^{1,2} have presented the view that a wider variety of microbial contaminants are responsible for adverse human health effects in susceptible individuals exposed to the microbial “soup” that results in water-damaged buildings (WDB) than previously assumed. These articles presented an in-depth understanding of the expanded use of Next Generation Sequencing (NGS) to detect the bacterial taxa present in these affected environments. When combined with data from transcriptomic assays, these studies defined specific causation of acute immune activation by a growing list of microbial colonizers. Specifically, it was reported that a correlation existed between certain Actinobacteria as shown by NGS, with differential gene activation from a transcriptomic assay (GENIE) detecting a defined clinical response. This review seeks to assess the published literature to find and determine the potential for candidates that could be relied upon to act as a biomarker for Actinobacteria in dust and other samples in order to indicate the likelihood of Actinobacteria dominance or prevalence, sufficient to warrant progression to confirmation by NGS, much like endotoxin are broadly accepted as a biomarker for colonization by broad spectra of Gram-negative bacilli in WDB.

Copyright 2021 KEJ Journals. All Rights Reserved



3

ACTINOMYCETES: THE PROBLEM IS YOU?!?

- Pathogenic Actinomycetes elucidated as a CAUSE of CIRTS:
 - “Massive and unique increase in triple positive results compared to all other groups sorted by 3 variables of exposure, MAPK and TGFBR”
- Actino is understood as Driver of MHM:
 - “Given the inhibition of translocases in MHM, there will also be a reduction in transport of ions, solutes, ADP, and pyruvate across the outer mitochondrial membrane (OMM) into the mitochondrial matrix through the VDAC.
 - VDAC closure results from (i) Polycyclic Ethers produced by Actinobacteria, (ii) Beta tubulins; (iii) AZOLE ANTIFUNGALS, particularly iitraconazole”

Shoemaker R, et al. *Medical Research Archives* vol 9 issue 3. Medical Research Archives

RESEARCH ARTICLE

Newer Molecular Methods Bring New Insights into Human- And Building-Health Risk Assessments from Water-Damaged Buildings: Defining Exposure and Reactivity, the Two Sides of Causation of CIRTS-WDB Illness

Authors:
Shoemaker R¹, Neil V², Heyman A³, van der Westhuizen M⁴, McMahon S⁵, Lark D⁶

Affiliations:
¹Center for Research on Biotin Associated Illness, Pooomoke, MD

²Myotone, Australia

³School of Medicine and Health Sciences, George Washington University

⁴Lynne Marlin, MD, Calgary, AB, Canada

⁵Whole World Health Care, Roswell, New Mexico

⁶EnviroBiomics, Inc. San Antonio Tx. & NSJ EnviroSciences Pty Ltd, Newcastle, Au

Corresponding author:
R Shoemaker: rich@shoemaker.com

ABSTRACT:

Scientific disciplines dependent on accurate analytics invariably evolve due to advances in technical aspects of measurement. In disciplines in which adequate measurement is not available for application to public health policy, the impact of new paradigms in measurement can extend far beyond scientific thought. Both of these concepts apply to the effect of exposure to water-damaged buildings (WDB) on human health. What causes the putative illness and what government should do to make buildings safe for use, have been impacted by development of molecular methods, particularly Next Generation Sequencing (NGS) and transcriptomics.

The impact of human exposure to Actinobacteria, for example, and identification of immune reactivity specific to these bacteria are now revolutionizing: (i) both detection and quantitation of newly recognized pathogenic organisms; and (ii) the approach to the genomic basis of diagnosis and treatment of disease as manifested by differential gene activation. NGS permits quantitation of exposure and confirmation of risk associated with the threshold of exposure, using defined human health biomarkers that in turn has led to advances in the metabolic and inflammatory issues in WDB illness, called CIRTS, both from molecular hypometabolism and activation of TGF-beta-1 signaling that defines immunoreactivity to Actinobacteria.

Current recommendations for exposure/reactivity to fungi and methods of remediation based on fungi alone do not support continued use, now that endotoxins and Actinobacteria are found to be the major causes of human illness from exposure to WDB.

Keywords: transcriptomics, molecular hypometabolism, Next-Generation Sequencing, Actinobacteria, endotoxins, Gram-negative rods

4

ACTINOMYCETES: THE PROBLEM IS YOU?!?

- When Should You Consider to put CIRS-AHH (Chronic Inflammatory Response Syndrome secondary to Actinomyces Human Habitat) as your DDx?
 - When the patients told you they've already been diagnosed:
- By their Chiropractor with Adrenal Fatigue
- By their Naturopath with Mitochondrial Dysfunction
- By their Medical Doctor with Chronic Fatigue Syndrome

7

ACTINOMYCETES: THE PROBLEM IS YOU?!?

- Diagnosing CIRS secondary to Actinomyces
 - Contrary to misinformation / miseducation there is a strict diagnostic Criteria for CIRS:
 - Screening: History of WDB, and other biotoxin exposure in NP paperwork, interview and cross examination, VCS, Clustered Symptoms
 - Confirmation with 4 or more confirmatory labs = CIRS: failed VCS (survivingmold.com), HLA, MMP-9, TGFB-1, C4a (non-futhon NJ), alpha- MSH (Labcorp), ACTH/ am cortisol, ADH/ Osmo, anti-gliadin antibodies, low VEGF
 - Envirobiomics.com #6, 7, 8, 9, 13, 14 (different combos for FAB)
 - GENIE – Ideal, but potentially less necessary if only FAB exposure is Actinos, more necessary if multiple FAB; GENIE is helpful regardless if financially viable, saves money if patient is not progressing due to missing ongoing exposure.
 - NQ – FDA approved imaging w/ published brain volume patterns specific to CIRS – WDB, CIRS – PLS, preliminary data on Cortical Atrophy correlating with Endotoxin exposure, 90% of multi-nuclear atrophy is secondary to CIRS is Actinomyces or Endotoxin (Shoemaker 2019, Roswell)
 - Actino-Skin #21 envirobiomics.com (it "HERTSMI" too?)
 - Actino – Serum – in proof of concept

8

ACTINOMYCETES: THE PROBLEM IS YOU?!?

- Questions / Considerations for Dermal Actinomycetes:
 - Puberty?
 - Heat post shower?
 - Work out?
 - Normal fluctuations?
 - Topical oil products /moisturizers?
 - Effects of Prescriptions / Medications, Hx of Antibiotics?
 - Immunosuppression / Overwhelmed Immune System / Low MSH?

11

ACTINOMYCETES: THE PROBLEM IS YOU?!?



- Actino Serum:
 - Lavendar top tube, send bubble wrapped
 - Mark "Attn Gianni" and make sure Provider, clinic and patient identification is clear
 - Sample must arrive cool - room temp (remember you sending to Texas!)
 - If during hot weather, you can ice pack outside of bubble wrap; must arrive room temp or cool, not frozen!

12

ACTINOMYCETES: THE PROBLEM IS YOU?!?

- 36 confirmed cases of CIRS per strict diagnostic criteria
- 7 of the 36 had new generation Genie reports; all 7 were in Stage II (on Welchol/CSM, but still in exposure), 6 showed typical patten of Actinomycetes activity, but only one had "borderline" TGFB β R positive.
- At least one Actinomycetes Swiffer collected in their primary residence
- Follow –up Actino skin (envirobiomics.com>shop ># 21) swabs collected
- 5 of the 36 patients drawn for Actino plasma vesicles to verify possibility of detection via NGS technology
- Natural Body wash applied with daily showers (60 seconds of lather and wait) and post Actino skin swab conducted on two patients

13

Report Name	House Testing Y/N	Date	Level/Location	Actino DMR	C. T.	C. K.	C. S.	C. A.	P. A.
Patient 1, 2, 3, 4	Y	11/02/21	Garden Level	1.2/2.5	773	887	28	71	397
	-	11/02/21	Upstairs	1.6/8.1	44,028	10,426	4,928	9,275	38,841
Patient 5	Y	12/02/21	Top Floor	1.02/1	4,012	811	248	2,010	35,569
	-	-	Main Floor	0.6/4.2	1,512	1,809	ND	1,381	3,725
	-	-	Basement	0.6/1.1	1,190	1,809	989	221	1,138
Patient 6	-	3/14/21	Main Floor	0.8/4.3	17,227	ND	ND	21,883	45,871
	Y	12/08/20	Whole House	1.2/1.0	4,720	ND	ND	525	11,783
Patient 7	-	8/16/21	Whole House	0.9/14.8	13,077	11,801	2,452	ND	117,889
	-	4/14/22	Whole House	0.5/7.3	6,661	ND	ND	ND	8,807
	-	-	Whole House	1.2/19.2	17,495	2,320	967	39,429	102,750
Patient 8	Y	10/14/21	Old House	1.2/19.2	17,495	2,320	967	39,429	102,750
	-	6/6/22	New House	2.8/179.2	20,278	387	820	23,056	24,151
Patient 9	Y	6/11/21	Whole House	0.5/2.9	839	ND	ND	1,027	4,229
	-	5/29/22	Whole House	1.1/16.4	9,502	576	ND	1,056	34,841
	Y	7/5/21	Whole House	2.0/0.0	9,950	4,279	ND	10,127	45,432
Patient 11, 12, 13, 14	Y	6/19/22	Main Floor	0.7/4.6	17,887	1,643	2,255	46,666	36,714
	-	-	Basement	0.6/8.4	7,781	ND	ND	36,891	12,671
Patient 15	Y	7/1/22	Whole House	2.2/173.0	33,887	1,614	ND	ND	94,933
	Y	4/14/22	1st and 2nd Floors	0.8/4.4	532	ND	ND	1,174	1,772
Patient 16	-	-	Basement	0.4/6.4	1,244	ND	ND	ND	ND
	Y	8/16/21	Whole House	1.3/10.3	811	1,022	393	ND	4,390
Patient 18, 19, 20	Y	1/26/21	Whole House	2.4/9.0	4,921	ND	81	1,751	8,056
	Y	6/7/22	Whole House	1.9/11.8	8,209	1,123	ND	31,926	912
Patient 22, 23	Y	7/22/22	RV	3.0/89.0	23,448	12,206	ND	43,789	59,515
	Y	12/7/21	Whole House	1.4/0.0	8,992	38,734	ND	3,934	19,103
Patient 25	Y	4/25/22	Upstairs	0.5/3.3	2,370	7,196	ND	ND	2,330
	-	4/25/22	Main Floor	0.3/1.1	3,422	3,190	ND	447	791
	-	4/25/22	Basement	0.3/3.9	1,015	20,127	ND	ND	ND
Patient 26, 27	Y	9/16/22	Whole House	1.5/23.9	56,095	ND	2,103	1,722	105,200
	Y	8/19/22	Whole House	2.2/26.7	143,314	8,301	3,502	5,171	54,421
Patient 32	Y	4/9/22	Cabin	1.8/55.5	49,322	1,258	52,485	79,206	146,739
	-	5/21/22	Cabin	3.8/45.4	43,744	22,828	52,300	109,429	204,425
	Y	2/27/22	Whole House	1.8/31.0	118,729	ND	26,220	ND	78,088
Patient 34	Y	12/1/21	Condo	1.4/67	1,115	ND	ND	ND	46,273
	Y	3/28/22	Whole House	0.9/14.1	5,830	219	274	381	11,275
Patient 35, 36	-	8/2/21	Whole House	1.6/21.1	35,891	ND	3,726	1,029	91,418

14

15

ACTINOMYCETES: Plasma Vesicles

Patient Name	Date	Test Method	C. T.	C. X.	C. S.	C. A.	P. A.
Patient 1	7/28/22	3A	3	ND	ND	ND	535
Patient 5	8/4/22	3A	1469	ND	132	552	1107
Patient 7	8/16/22	3A	1244	ND	122	329	1252
Patient 8	8/16/22	3A	1178	ND	ND	279	831
Patient 33	8/1/22	3A	841	ND	ND	283	1717

16

Patient Name	Date	Test Method	C. T.	C. X.	C. S.	C. A.	P. A.
Patient 1	7/28/22	3A Plasma	3	ND	ND	ND	535
	6/12/22	Actino Skin	228	ND	272	ND	103,340
Garden Level	11/2021	1.2/2.5	773	667	28	71	397
Upstairs	11/2021	1.6/8.3	44,928	10,435	4,928	9,275	38,841

17

Patient 5	8/4/22	3A Plasma	1469	ND	132	552	1107
	6/4/22	Actino Skin	ND	ND	ND	ND	65,197
	8/20/22	Actino Skin	9	ND	ND	ND	77,881
	9/9/22	Actino Skin	ND	ND	ND	ND	93,020
	9/17/22	Actino Skin	7	ND	ND	ND	26,846
	10/8/22	Actino Skin	1	ND	ND	ND	17,969
Top Floor	12/3/21	1.0/37.1	4,013	631	248	3,010	38,569
Main Floor	-	0.6/4.2	1,512	1,309	ND	1,381	3,725
Basement	-	0.6/1.1	1,190	3,909	969	221	1,138
Main Floor	3/14/21	0.8/40.3	17,237	ND	ND	21,883	455,871

18

Patient 7	8/16/22	3A	1244	ND	122	329	1252
	7/12/22	Actino Skin	1,337	ND	33	ND	1,173,166
Old House	10/15/21	1.2/19.7	17,495	2,320	967	19,429	102,750
New House	6/6/22	2.8/179.2	20,278	387	820	23,696	24,151
Patient 8	8/16/22	3A	1178	ND	ND	279	831
	7/12/22	Actino Skin	1,287	1,287	23	ND	120,194
Old House	10/15/21	1.2/19.7	17,495	2,320	967	19,429	102,750
New House	6/6/22	2.8/179.2	20,278	387	820	23,696	24,151

19

Patient 33	8/1/22	3A	841	ND	ND	283	1717
	9/27/22	Actino Skin	41	ND	3	ND	29,095
Whole House	3/27/22	1.8/31.0	118,729	ND	26,229	ND	78,688

20

ACTINOMYCETES: THE PROBLEM IS YOU?!?


- Antimicrobial Agents being studied for Actino eradication:
 - Coal Tar Shampoo


 - Hopkington Pharmacy
 - Proprietary Compound
 - Defense Soap Body Lotion



21

ACTINOMYCETES: THE PROBLEM IS YOU?!?


Clinical Microbiology Reviews

[Clin Microbiol Rev.](#) 2006 Jan; 19(1): 50-62. PMCID: PMC1360273
[doi: 10.1128/CMR.19.1.50-62.2006](#) PMID: 16418522

Melaleuca alternifolia (Tea Tree) Oil: a Review of Antimicrobial and Other Medicinal Properties

C. F. Carson,¹ K. A. Hammer,¹ and T. V. Riley^{1,2,*}

[Author information](#) • [Copyright and License information](#) • [Disclaimer](#)

ABSTRACT [Go to:](#) ▶

Complementary and alternative medicines such as tea tree (melaleuca) oil have become increasingly popular in recent decades. This essential oil has been used for almost 100 years in Australia but is now available worldwide both as neat oil and as an active component in an array of products. The primary uses of tea tree oil have historically capitalized on the antiseptic and anti-inflammatory actions of the oil. This review summarizes recent developments in our understanding of the antimicrobial and anti-inflammatory activities of the oil and its components, as well as clinical efficacy. Specific mechanisms of antimicrobial and anti-inflammatory action are reviewed, and the toxicity of the oil is briefly discussed.

INTRODUCTION [Go to:](#) ▶

Many complementary and alternative medicines have enjoyed increased popularity in recent decades. Efforts to validate their use have seen their putative therapeutic properties come under increasing scrutiny in vitro and, in some cases, in vivo. One such product is tea tree oil (TTO), the volatile essential oil derived mainly from the Australian native plant *Melaleuca alternifolia*. Employed largely for its antimicrobial properties, TTO is incorporated as the active ingredient in many topical formulations used to treat

TABLE 3.

Susceptibility data for bacteria tested against *M. alternifolia* oil

<i>Bacillus cereus</i>	0.3	61
<i>Bacteroides</i> spp.	0.06-0.5	0.06-0.12 75
<i>Corynebacterium</i> sp.	0.2-2	2 42, 61, 79
<i>Enterococcus faecalis</i>	0.5->8	>8 13, 61
<i>E. faecium</i> (vancomycin resistant)	0.5-1	0.5-1 115
<i>Escherichia coli</i>	0.08-2	0.25-4 13, 32, 67, 104
<i>Fusobacterium nucleatum</i>	0.6->0.6	0.25 134, 144
<i>Klebsiella pneumoniae</i>	0.25-0.3	0.25 61, 79
<i>Lactobacillus</i> spp.	1-2	2 75, 80
<i>Micrococcus luteus</i>	0.06-0.5	0.25-6 79
<i>Peptostreptococcus anaerobius</i>	0.2-0.25	0.03->0.6 75, 134
<i>Porphyromonas endodontalis</i>	0.025-0.1	0.025-0.1 80
<i>P. gingivalis</i>	0.11-0.25	0.13->0.6 134, 144
<i>Prevotella</i> spp.	0.03-0.25	0.03 75
<i>Prevotella intermedia</i>	0.003-0.1	0.003-0.1 80
<i>Propionibacterium acnes</i>	0.05-0.63	0.5 37, 61, 126
<i>Proteus vulgaris</i>	0.08-2	4 13, 42, 61, 104
<i>Pseudomonas aeruginosa</i>	1-8	2->8 13, 61, 79
<i>Staphylococcus aureus</i>	0.5-1.25	1-2 13, 32, 126
<i>S. aureus</i> (methicillin resistant)	0.04-0.35	0.5 31, 47, 104, 115

22

Patient 5	6/4/22	ND	ND	ND	ND	65,197
Patient 5	8/20/22	9	ND	ND	ND	77,881
Patient 5	9/9/22	ND	ND	ND	ND	93,020
Patient 5	9/17/22	7	ND	ND	ND	26,846
Patient 5	10/8/22	1	ND	ND	ND	17,969

Patient 32	6/23/22	871	ND	20	ND	69,344
Patient 32	8/15/22	26	ND	2	ND	43,587

23

ACTINOMYCETES: THE PROBLEM IS YOU?!?

- Actinomycetes require both oil and water to amplify
- The literature suggests pathogenic Actinos get their start in WDB
- Can Humans vector Actinos into a clean, new non-WDB home?
- Do we need to address Dermal Actinomycetes to address pathogenic Actinomycetes reservoirs in building that trigger activation/reactivation of CIRS?
- Do we need to address Dermal Actinomycetes as a "seeding" source so our patients maintain their sanity and their weekends (otherwise spent cleaning)?
- Do we need to evaluate for topical skin products ("feeding" the Actino)?
- Is there a role for a short term no-fat, low fat diet?
- Can we change dermal biome into non-pathogenic biome that lasts?

24

ACTINOMYCETES: THE ANSWER IS THANK YOU!!

- **THANK YOU DR. SHOEMAKER!!!**

- Thanks to Gianni Rossi and Envirobiomics.com
- Thank you to Alicia Orr – research assistant with Deb potential
- Gabby Lamb - Medical Assistant
- Thank you to my staff and provider team (Genevieve and Dana)
- Thank you to the patients for never giving up and following through, your lives are profoundly meaningful and worth fighting for!