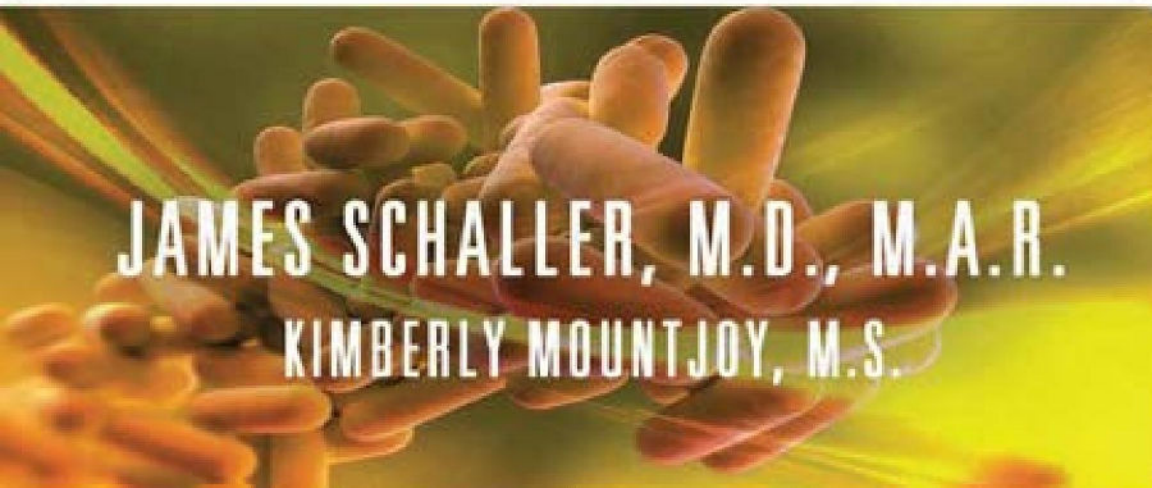
# FUA'IGA BIOFILM

## AISEA O LOU ANTIBIOTICS ANO ANTI FUNGALS f AIL

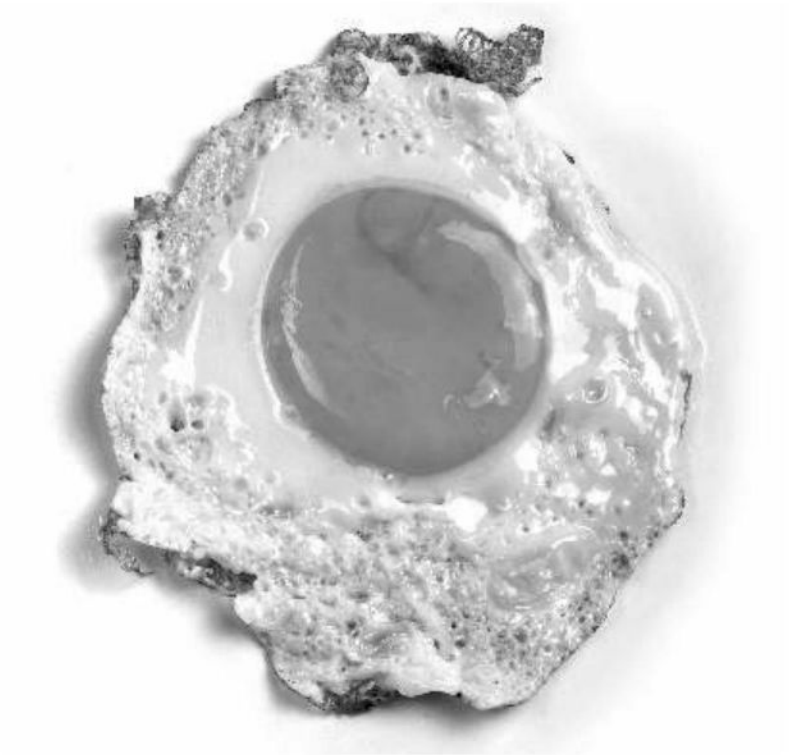
Fofo mo fa'ama'i Lyme, Sinusitis Fa'ato'a,
Pneumonia, Fa'afefete Faafefete, Manu'a, taliga
Fa'ama'i, Fa'ama'i Umu, Fa'ama'i Intestinal,
Manava Leaga, Cystic Fibrosis ma Totoga

O SE vaega tele na misi i le paso fa'ama'i



# O le a le Biofilm?

Le fa'amatalaga faigofie, fa'asaienisi biofilm: so'o se vaega o microorganisms e pipi'i ai sela o le tasi i le isi i luga o le fogaeleele. E masani lava ona i ai i totonu o se laulau latou te faia e ta‘ ua o le "slime."



Faatusatusa se biofilm i se fuamoa falai. O le lanu samasama i le ogatotonu o le fuamoa falai o le siama po‘ o le siama.

O le vaega pa'epa'e lapo'a o lo'o si'osi'omia ai le lanu e mafai ona ta'ua o le “bio-film”. E puipuia ai le fa'ama'i i totonu, po'o le yolk, mai vaila'au fa'ama'i ma le puipuiga o le tagata.

O le pito pito i fafo o le fuamoa o lo‘ o fa‘ aalia ai ni nai falai laiti. E faigofie ona misi ona o le tele o le fuamoa. O le a tatou faafoliga o ni vaila‘ au fa‘ ama‘ i, po‘ o vaila‘ au fa‘ ama‘ i pipisi. E le aoga ona o le mea moni e le mafai ona latou pasia le pito papa‘ e pito i fafo o le fuamoa. O le fuamoa pa‘ epa‘ e e pei o se puipui ia i latou.

## O ai e iai Fa'ama'i Biofilm?

A e a'oa'o e uiga i le tele o le eseesega o nofoaga ma tulaga e masani ai biofilms ma manatu e masani lava o le tulaga masani ia o siama ma meaola fa'ama'i, ua amata ona e iloa o so'o se tasi e ono maua i le biofilm po'o fa'ama'i pipisi.

## O le a le mea o loʻ o tatou suʻ eina i lenei tusi?

O mea o lo'o mulimuli mai o le a fa'aalia ai le tele o auala e sosolo ai le "fuamoa pa'epa'e," po'o le biofilm. O le taimi lava e tupu ai lena mea, e masani lava ona sili atu le faigofie ona faʻ aumatia le faʻ amaʻ i o loʻ o faʻ atusalia e le fuamoa fuamoa poʻ o le samasama ogatotonu.

## Biofilms Ose Mafuaaga Ta'imua o Puapuaga ma le Oti

### Biofilm Tino Tulaga ma Tulaga

- Ose fa'ama'i e silia ma le 2 vaiaso
- O le mafuaaga autu o le oti o tamaiti i lalo ole 6 tausaga le matutua
- Pe'a nifo—o le gutu o le tagata e iai le tusa ma le 25,000 ituaiga o siama, e tusa ma le 1,000 o ia mea o lo'o mau i totonu o le pa'u nifo.
- Fa'ama'i fa'afefete
- Fa'ama'i pipisi pe a uma le taotoga
- Kanesa
- Le manava leaga
- Fa'ama'i ga'o po'o le pa'o'ona*
- Pala o nifo •

Fa'ama'i mama

- Fa'ama'i pipisi ile urinary system
- O siama o le gutu—e mafai ona afaina ai alatoto o le fatu ma mafua ai le oti ma faateleina ai le kanesa o le inumaga
- Fa'ama'i fa'ama'i taliga
- Fa'ama'i Sinus**
- Tonsilitis tumau
- Manu'a
- Ulu o pulumu nifo — e aofia ai sitaili ulu e gaoioi sonic

- Fa'agata e fa'ataga ai le aveese o le mimi
- tulivae, sulugatiti, ma isi mea e sui ai
- Fa'ama'i alatoto o le fatu
- Manu'a po'o papala
- Fa'ama'i Lyme
- IV catheters o so'o se ituaiga
- Fa'amama toto
- tioata fa'afeso'ota'i
- Mea fa'apipi'i—so'o se masini fa'apipi'i pe fa'aofiina e mafai ona lafo atu siama i le fai'ai, ate po'o fatuga'o.
- Fa'ama'i pipisi ole prostate
- Fa'ama'i Legionnaire ma le tele o isi siama biotoxin e pa i so'o se vai i totonu
- Ma'i limu—e mafai ona alia'e mai le limu i so'o se vai o lo'o tu i totonu, e pei o lologa, taualuga, pito i lalo po'o le fa'amalama, fa'asusu, Waterpik™ e le'i fa'aaogaina po'o isi masini fa'amama nifo, fa'a'ele'ele i alavai AC, ma isi. fibrosis—o le tele o le gaosiga o le

susu i luga o le ea e mafai ai e siama e pei o le Pseudomonas aeruginosa ona taia siama e fasiotia i tua o se ofu talaloa.

- Ua leiloa vaega o le tino
- Fa'ama'i pipisi o le pa'u, lauulu po'o fao
- Gagana
- Endocarditis
- Fa'ama'i ponaivi
- Mata'i

## E tele isi mea e mafai ona fa'aopoopo i le lisi, e aofia ai fa'afitauli ogaoga o le fa'aleagaina o le biofilm i le vai ma le tele o isi faiga fa'alesoifua maloloina ma le gaosiga.

*Na faanoanoa le foma‘ i o David Kennedy, o se foma‘ i nifo litaea, ona o le to‘ atele o tagata matutua o Amerika e maua i le ma‘ i ga‘ o—o se isi ma‘ i siama o le biofilm e aafia ai le ma‘ i faaumiumi. O le a le tele o le salalau o lenei fa‘ ama‘ i fa‘ asoifua maloloina?

** I le Ondine Biopharma, o se faatalanoaga [ma Richard Longland] na faaalia ai e 38,000,000 tagata i lenei atunuu ua i ai (pe i ai) se faafitauli faaumiumi o le sinus.

***Ricardo Murga; Terri S. Forster. Matafaioi o biofilms i le ola o Legionella pneumophila i se fa‘ ata‘ ita‘ iga fa‘ aogaina-vai fa‘ aogaina. Microbiology (2001), 147, 3121–3126.

# FUA'IGA BIOFILM

## Aisea ua le manuia ai au Antibiotic ma Antifungals

Fofo mo fa'ama'i Lyme, Sinusitis Fa'ato'a,
Pneumonia, Fa'afefete Faafefete, Manu'a, taliga
Fa'ama'i, Fa'ama'i Umu, Fa'ama'i Intestinal,
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Ose vaega tele o lo'o misi i le paso fa'ama'i tumau

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ma
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# Faia o Tali Fa'asaoina Ola i le taimi nei Biofilm

## Malamalama ma Papa Malosi

I le taimi nei e mafai ona e faitau i le lua tausaga le aoga o filifiliga biofilm-fa'ato'ilalo i pepa, blogs ma tusi. E 1,000-1,500 itula e alu ai. Ma o le ai ai ni au filifiliga e tu'uina atu. O nisi nei o fa' ata' ita' iga o filifiliga e te mauaina i na pepa, blogs ma tusi:

| | | |
|---|---|---|
| Aloese mai le magnesium | EDTA | Royal Jelly |
| Aloese mai suka ma fatu | DMSO | laumei |
| NAC | Vancomycin | Lemoni-mutia |
| Norspermidine | Gentamicin | Serrapeptidase |
| Cis 2- Decenoic Acid | Banderol | 2-Aminobenzimidazole |
| Lumbrokinase | Aloese mai ga'o | Echinocandins |

## E Fa'afefea ona E Su'eina Fa'atauga Fa'atauva'a ma le Fa'atuatuaina i totonu o le Biofilm Agent e fai ma Fofo?

Tom ma Lisa blog o le oloa "x" ma le talavai "d" o ni togafitiga fa' apitoa e fa' aleagaina ai fa' ama' i pipisi o le biofilm i Chronic Fatigue (CFS) ma Fibromyalgia (FM).
E fiafia tagata ona e leai se fofo tele ma e leai se fiafia i fa' ama' i biofilm.

O le fa'alavelave o le "x" po'o le "d" atonu e iai sona aoga e fa'aleagaina ai se biofilm po'o le fesoasoani e foia se ma'i. Ae ia faaeteete e fai sooga vave. Togafitiga "a" atonu e na'o le biofilm o fa'ama'i e sefulu, ma e na'o a matou fa'amaoniga e aoga i fa'ama'i e tolu.

O la matou sini o le fa' aali atu ia te oe o mea lelei su' esu' ega e fa' aalia ina ia mafai ai e oe ma lau foma' i ona amata i mea moni ma o le a mafai ona malamalama i le mafua' aga o so' o se su' esu' ega biofilm.

Mo se fa' ata' ita' iga, o lou fa' ama' i atonu e pei o Lyme i lona fa' aaogaina o le u' amea. Ua lipotia mai e Saito ma le tele o isi e le pei o isi meaola uma ua iloa, Borrelia, le mafua' aga o le ma' i Lyme, e mafai ona ola e aunoa ma le u' amea, o se u' amea e mana' omia e isi ola uma. Nai lo lena, e fa' aaogaina e Borrelia le manganese.

Ae fa'afefea pe a maua lou ma'i biofilm i le lumana'i e tutusa le malosi e ola lelei ai e aunoa ma se u'amea? Atonu o lona uiga e ono aoga le biofilm a le ma'i Lyme mo oe. Biofilms fa'ama'i fa'ama'i ma fa'ama'i fa'ama'i e matele lava ina fa'asoa fa'apena fa'aletonu i se fa'alavelave fa'alavelave. O le iloa pe fa'afefea ona galue lou fa'ama'i e mafai ona fesoasoani e iloa ai po'o le a le vaila'au biofilm e aoga.

http://phys.org/news/2013-03-scientists-reveal-quirky-feature-lyme.html#jCp. Mauaina Mati 26, 2014.

# Mataupu

# Se Fouvalega Faafomai

O le talitonuga o le biofilm infection o se suiga tele i le su‘ esu‘ eina o fa‘ ama‘ i pipisi e mafai ona tiga, fa‘ aletonu ma o le mea moni, o se fasioti tagata pito i luga e fuafua i le matua o le tagata.

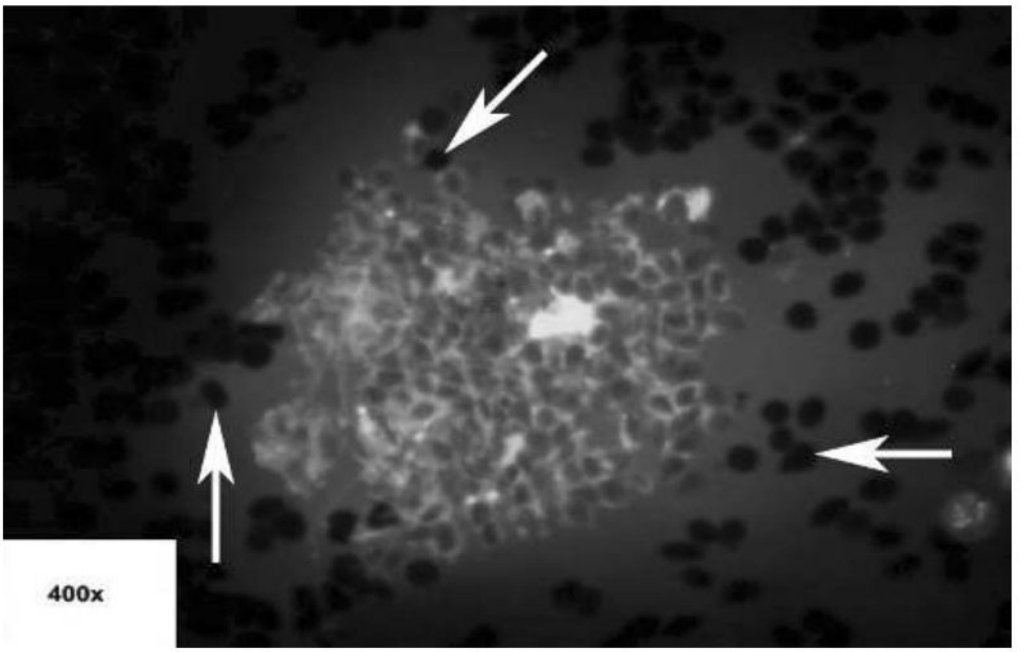
O fa‘ ama‘ i pipisi ua amata ona toe fa‘ afo‘ i mai i tatou i aso na maliliu ai tagata i fa‘ ama‘ i faigofie. Ole lalolagi fou ole biofilm e mafai ona fasiotia ai le tele o tagata nai lo le WWI ma le WWII tu‘ ufa‘ atasia pe a le vave suia mea i atunu‘ u atia‘ e ma atunu‘ u e le‘ i atia‘ e. Ona o le faagesegese o le malamalama i le taua o biofilms ma o le mea lea, o le fa‘ agesegese o le vaetamaina e foma‘ i o vaifofo fou, e o‘ o lava i foma‘ i mata‘ utia atonu e na‘ o le fa‘ atauaina o bio-films pe a fa‘ amaonia le to‘ atele o tagata ua le atoatoa ma feoti ona o latou. . I le taimi nei, ua misia e le tele o biofilms o le mafuaaga o mafatiaga ma le oti. O lea la, o biofilms e aunoa ma ni vaifofo e matua ogaoga e pei o le polio i le seneturi lona 19 e aunoa ma se tui, ma i le tulaga o le numera o tagata afaina, e sili atu le leaga nai lo le HIV / AIDS.

O le tele o siama e ola i totonu o nu'u e masani ona iai ni biofilms e puipuia ai. 1% o siama e a'afia ai tagata po'o a'afia ai le ola o tagata o lo'o opeopea na'o ia ma a maua i le toto, e le maua fa'atasi ma so'o se biofilm slime.

Ua fa'atatau e le National Institutes of Health e sili atu i le 80% o fa'ama'i fa'ama'i i totonu o le tino o le tagata e mafua mai i le biofilm, o le tele o ia mea e fa'atupuina ai fa'afitauli masani ma toe tupu. Po'o, e sa'o ea Glowacki ae 99% o siama e ola i se biofilm? Pe e te fa‘ aaogaina le NIH's 80% po‘ o Glowacki's 99% e fai ma fa‘ atusatusaga, o biofilms o se iloiloga ogaoga i fa‘ ama‘ i.

Gł owacki R, Strek P, Zagórska-Swiezy K, Skł adzieńJ, Oleś K, Hydzik-Sobocińska K, Miodoński A. [Biofilm mai tagata gasegase e maua i le rhinosinusitis masani. Suesuega SEM Morphological].[Mataupu i le gagana Polani]. Otolaryngol Pol. 2008;62(3):305-10.

# Folasaga Biofilm Ata



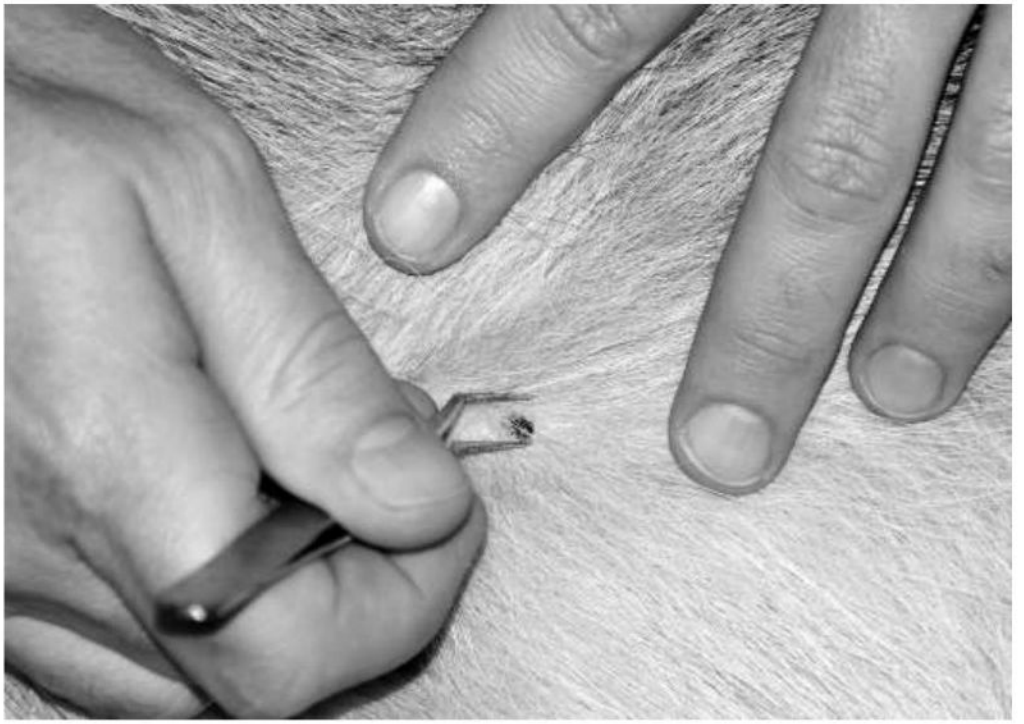

Ose fa'amea fou fa'apitoa fa'a-fa'ameamea-fa'atupu fa'ama'i sela tasi e ta'ua o le FL1953 po'o le Protomyxzoa rheumatica. (O lenei smear faapitoa o le auala sili lea e iloa ai nei sela tasi-selau parasites i tino o le tagata, talu ai o le DNA po‘ o le PCR su‘ ega e le o taimi uma e lelei).

O le selau ovalo pogisa i fafo o lenei ata o lo‘ o fa‘ aalia i luga e 8 micron le lapopoa o sela mumu toto (RBCs). O le vaega tutotonu o se polo biofilm ma le tele o sela mumu i totonu o le tele o le biofilm.

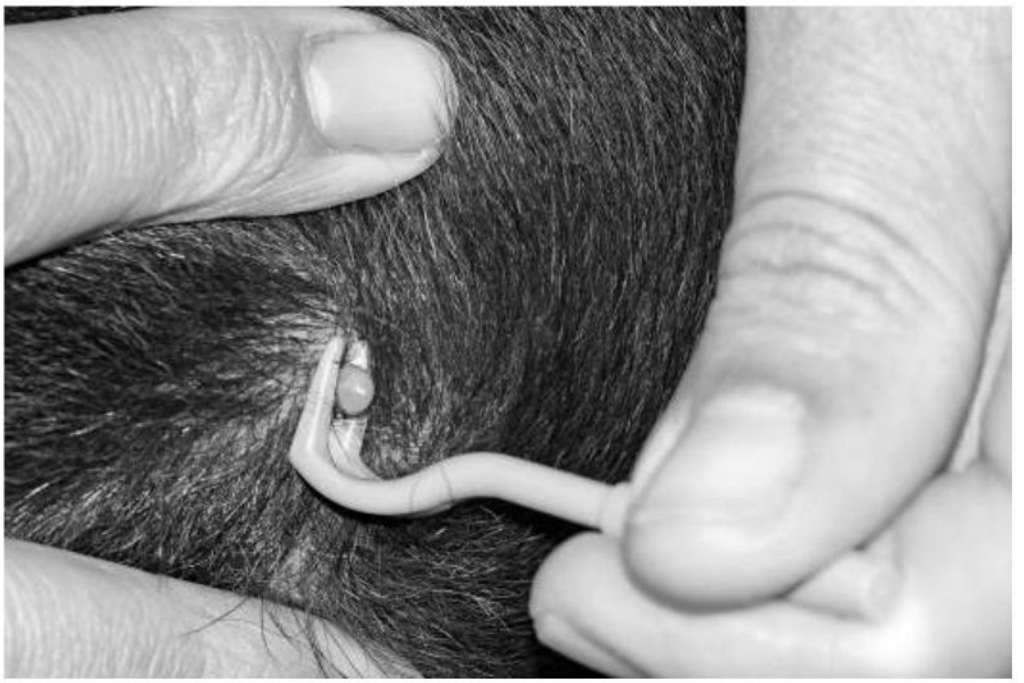
O lenei biofilm o lo‘ o fa‘ aalia i luga e masani ona maua i latou e maua i fa‘ ama‘ i pipisi e pei o le Bartonella masani, le Lyme disease Bor-relia bacterium, ma le Babesia mata‘ utia. E ui ina sili atu le leaga o nisi fa'ama'i e maua mai i le tiki nai lo isi pe sili atu ona taatele nai lo isi, e ono mafai uma lava ona oti se'i vagana ua fa'aumatia. O lenei parasite o lo‘ o fa‘ aalia i luga o se fa‘ ama‘ i sela tasi e feso‘ ota‘ i ma Babesia ma le malaria, ma a aveese lona biofilm, e foliga mai e pei o le malaria e le o matua. E tusa ai ma le Centers for Disease Control, o se protozoan tulaga ese. E le o Babesia po o le malaria. Ole fa'ama'i lea e ta'ua ole FL1953 po'o le Protomyxzoa rheumat-ica. E maua ai le tele o biofilm ma o le tele o le ogatotonu o lenei ata e aofia ai le faitau selau o sela mumu.

A'o tatou va'ava'ai i totoga eseese ma mafua'aga o biofilms, e le tatau ona tatou tu'ua se fa'ama'i fa'ama'i pipisi o lo'o feavea'i e le silia ma le 200 mea ola i le itiiti ifo ma le tolu konetineta—le Ixodes tick. O lo'o tauaveina e le itiiti ifo ma le lua tagata fai ata tifaga mata'utia: FL1953 ma le siama Lyme sili ona lavelave fa'ale-fa'atupuina. O lo' o matou a' oa' oina pea e uiga i fa' ama' i pipisi uma o lo' o ia tauaveina.

Faamolemole ia matau le lauulu e pei o le mutia lapopoa, o lea la o le siaki lenei o se vaega o lenei lapopoa. A e tu'ufa'atasia le le vaaia ma se u o lo'o i ai se fa'ama'i tiga, se anti-histamine, se anti-coagulant ma se anti-inflammatory agent, o lo'o i ai sau fa'ama'i pipisi. O se tasi o vaila'au faua fa'ama'i, Sialostatin L, ose enzyme lelei e taofia ai le puipuiga e mafai ona taofia ai le foma (Horka 2012).



O maile e mafai ona avea ma uo mamae a tagata, ae le mafai pe afai e te pa‘ i i o latou faua ae le o pe afai latou te aumaia siaki po‘ o futu i totonu o lou fale po‘ o le taavale. Fa'apea o ta'ifau ma pusi uma e nonofo i fafo atu o le 'a'ai masalo sa i ai se fa'ama'i po'o se fulu.



# Fa'amanino "Biofilms".

O le biofilm e pei o se sene i le ogatotonu o le vaitaele o le suauu olive, ma i le pito i fafo o le suauu o lo‘ o i ai le pepa e fa‘ atusalia ai siama e fasiotia ai sela. E le mafai ona latou agai i totonu e faaumatia le sene. Biofilm bacteria community o le tulaga masani lea o le tele o fa‘ ama‘ i pipisi o tagata. Ua a'oa'oina i matou o fa'ama'i pipisi o siama tu'ufua o lo'o opeopea solo ma ose mea sese matuia lea.

O lo‘ o fa‘ aalia ai le mamao e tatau ona tatou o‘ o i le saienisi pe afai o le ituaiga autu o siama—biofilm bacteria community—o se manatu fou, ae tāua. Ina ua ou faia se lisi i le 2004 o le luasefululima filifiliga e tape ai biofilms, sa leai se fiafia tele.

I aso nei, o le le mafai ona fa‘ aumatia biofilms ma filifiliga eseese e moni lava o se fa‘ alavelave fa‘ alesoifua maloloina.

O le sini i le tusiaina ma le lolomiina o lenei tusi o le faia lea o se seti taugofie toe su‘ esu‘ eina o filifiliga fa‘ atasi ai ma isi filifiliga talafeagai, e tu‘ uina atu se tusi mama o fofo e ofoina atu ai fofo sili ona lata mai ma fa‘ aonaponei mo le faitau selau o fa‘ ama‘ i e feso‘ ota‘ i. ma biofilms. O le pa puipui o se ata tifaga e mafai ona matua le mafai ona aveese pe peni-trate i filifiliga masani o lo‘ o fa‘ aogaina e foma‘ i, foma‘ i fa‘ ama‘ i, naturopaths, isi a‘ oga vaila‘ au, foma‘ i suau‘ u taua, acupuncturists, foma‘ i tausi ma‘ i po‘ o herbalists.

Faatasi ai ma lenei tusi matou te fa‘ amoemoe e tautua oe ma lau foma‘ i / foma‘ i e ala i le su‘ esu‘ eina o filifiliga o lo‘ o avanoa nei. Na matou su‘ esu‘ eina le lima tausaga talu ai o fa‘ asalalauga i PubMed-le fa‘ amaumauga tele mo fa‘ asaienisi faafoma‘ i-mo “togafitiga o le biofilm.” O le tele o filifiliga e manaia ma e le o taimi uma e te fa‘ amoemoeina. O lenei tusi ua fa'amoemoe e tu'uina atu ia te oe filifiliga lautele e puipuia ai ou mafatiaga, le atoatoa ma e o'o lava i le oti.

I le mavae ai o tausaga o su‘ esu‘ ega ma su‘ esu‘ ega, na ou iloa ai o le fa‘ ama‘ i fa‘ ama‘ i "tagata atamamai" i le biofilm atonu ua leva ona leiloa i le taua, ma o le mea moni, e to‘ atele atonu e le‘ i iloa uma taua. Pa-

## Fa'ata'ita'iga Puupuu o Tagata ma Biofilms

I le 2004, na toe malosi ai Richard Longland mai se fa‘ ama‘ i lilo i le mae‘ a ai o taotoga. I masina na sosoo ai, sa mafatia o ia i le tele o faafitauli—tiga o le ulu, tiga o sooga, ma mulimuli ane faafitauli o le fatu ma le fai‘ ai, le vaivai tele ma le faaletonu o le mafaufau.

O le foma‘ i na tete‘ e ia te ia, ae mulimuli ane, i le 2007, na togafitia o ia mo le mycoplasma lea na sau mai se taotoga e mafai, so‘ o se nofoaga i le falema‘ i po‘ o se nofoaga faitele po‘ o se siaki.

O le tele o a‘ u gasegase ua va‘ aia le 3 i le 200 foma‘ i a‘ o le‘ i o mai ia te a‘ u. Ou te malamalama i lona aafiaga. Sa tatau ona vaai Mr. Longland i le silia ma le luasefulu foma‘ i mo se su‘ esu‘ ega. I lenei vaitaimi faigata, na ia faia ai se ata e sili ona lelei e ta‘ ua o le “Aisea ua Ou Ma‘ i Ai?” O ia o se tagata ma'i-siamupini o le fa'aogaina o vaila'au ma vaila'au naturopathic e fa'ate'a ai lona tino mai biofilms siama fa'aletino.

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E 78 tausaga o Eteuati ma e toatolu ona afafine ma le toavalu o fanau a fanau. Sa taofia o ia i le falema‘ i ona o le tau manava. E maua i le pneumonia leaga po'o se fa'ama'i i lona māmā Ua faasolo ina leaga o ia. Ua toe malosi tagata ta'ito'atasi i le fa'aaogaina o vaila'au e fa'ato'ilaloina ai le tele o niumonia puipuia mai le biofilm.

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Ua tele tausaga ua vaivai Linda ma ua faaletonu i le aoga. Na ou maua talu ai nei e tele ana siama fa'ama'i na mafua ai le sili atu ma le sefululima fa'ai'uga a le su'esu'ega e le masani ai. O ananafi na ia telefoni mai ai, ma ona o le tiga i tua o lona tulivae, na ou fai atu ia te ia e alu i le ER. E le‘i atoa se aso, ae maua ai le 23 o pupuni i ona mama ma ona vae. Na ia masalomia o Babesia, fula ma le FL1953. Sa i ai a matou sui na fasiotia nei sui, e aofia ai FL1953, i le 2006.

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It would be an error to say that nattokinase, lumbrokinase, serrapeptidase, EDTA, gentamicin, vancomycin, Samento, Banderol, olive products, poorly known herbs with fair lab testing in humans, clove bud oil, diet, chelation, three to four part amino acid mixes, NAC, Rife, diet changes or a vast range of other options not listed, will **work for all biofilms.** For example, an elderly patient dying of a lung infection or another person with painful and treatment-resistant sinus infection *will not* have the same biofilm.

As a trend, trying different options to destroy a biofilm is less dangerous than allowing it to spread.

## A Brief Word on Biofilms in Lyme

At times, individuals who have tick- and flea-borne infections, like Bartonella, Babesia and Borrelia (Lyme disease), can feel their treatment is minimal or incomplete. Debates rage over the diagnosis and treatment of Lyme and tick-borne diseases; whether the pain is from residual dead infection incorporated into tissue or one of the many infections carried by the I. scapularis tick, we still have patients' misery.

After writing **twelve books** which include many pages on non-Borrelia infections, "Lyme testing" seems like alphabet testing in which ***one only looks for the vowel "a."*** Due to the lack of acceptance of the number and complexity of tick-borne infections, there is a lack of up to date education, leaving quality medical doctors to evaluate tick and flea infections in the ***abstract,*** by which I mean that they very falsely and sadly do not realize the full magnitude of ***"the alphabet."***

Specifically, they "diagnose" by ignoring inflammation alterations, nutrient changes, hormone deficits, immunity changes caused by tick-borne infections, and chemicals made or suppressed by direct tick and flea infectious agents. I discuss these in my three most recent tick and flea infection books. All are available in English. All can be found free through inter-library loan, for less than $20 USD, or at www.personal-consult.com under the "free books" button. No one can expect to become an expert in this massive area after reading any guide or merely going to ten conferences, because these cluster infections impact twenty areas of medical and scientific knowledge.

In the last four years, researchers like **Dr. Eva Sapi have shown Lyme is like some other spirochetes—it has biofilms. These are very tough biofilms to defeat unless caught in the "acute stage."** A tough, "mature biofilm" allows organisms to "**laugh at" many antibiotics.**

Some medical professionals interested in Lyme often ignore the immune suppressing Bartonella bacterium, which is more common than Lyme. Ignoring coinfections may increase the risk of fatality with Babesia and possibly **FL1953**. These healers also may not realize that the highly

genetically complex Lyme spirochete appears to have a troublesome biofilm. Performing a simple direct test at laboratory companies whose testing kits have reduced sensitivity will probably result in more negatives for tick-borne diseases. The ultimate result is anti-science and anti-truth. Searching for tick infections with one test is like writing in "Lincoln" at the next presidential election.

## Lyme Disease (Borrelia) and Biofilms

Several researchers believe *Borrelia burgdorferi,* the active agent of Lyme disease, has biofilms. Lyme organism biofilms have been found in culture and in the tick gut. Lyme cysts and biofilms have also been noted in patient skin biopsies using focus floating microscopy according to Dr. Eisendle publishing in the *American Journal of Pathology.*

Further, we see in Lyme that biofilm formation is dependent on cyclic di-GMP expression and we see that in Lyme (Stricker and Johnson).

Brihuega B, Samartino L, Auteri C, Venzano A, Caimi K. In vivo cell aggregations of a recent swine biofilm-forming isolate of Leptospira interrogans strain from Argentina. Rev Argent Microbiol. 2012 Jul-Sep;44(3):138-43. PMID:23102459

Cogoni V, Morgan-Smith A, Fenno JC, Jenkinson HF, Dymock D. Treponema denticola chymotrypsin-like proteinase (CTLP) integrates spirochaeteswithin oral microbial communities. Microbiology. 2012 Mar;158(Pt 3):759-70. Epub 2012 Feb 7. PMID:22313692

Sapi E, Kaur N, Anyanwu S, Luecke DF, Datar A, Patel S, Rossi M, Stricker RB. Evaluation of in-vitro antibiotic susceptibility of different morphological forms of Borrelia burgdorferi. Infect Drug Resist. 2011;4:97-113. Epub 2011 May 3. PMID:21753890

Stricker RB, Johnson L. Lyme disease: the next decade. Infect Drug resist. 2011; 4: 1-9. PMID: 21694904

Sapi E, Bastian SL, Mpoy CM, Scott S, Rattelle A, Pabbati N, Poruri A, Burugu D, Theophilus PA, Pham TV, Datar A, Dhaliwal NK, MacDonald A, Rossi MJ, Sinha SK, Luecke DF. Characterization of biofilm formation by Borrelia burgdorferi in vitro. PLoS One. 2012;7(10):e48277. Epub 2012 Oct 24. PMID:23110225

lease of bacteria in the human body will be like a dangerous tornado in a field. It is a wise concern.

For these two problems regarding biofilm-held infections suddenly being released, here are useful solutions:

1. You need many infection killing options for use since more is better to prevent “seeding” of dispersed infection.
2. You want the biofilm killing options to destroy biofilms by different mechanisms. This makes the dispersed seeded infections naked to the immune system.
3. Biofilm tools are given initially at low doses and then increased gradually to large doses since often in the beginning patients have massive inflammation and a drastic increase in killing of biofilm organisms in a short time could cause trouble with bone marrow, liver, heart, eye, or kidney issues, or merely create more dead infectious debris resulting in patient misery.
4. You may need to pulse (use every other day) or fully stop this treatment because once a wave of biofilm eroding agents strips off or severely damages a biofilm of an infection, the same antibiotics that were useless in the past can become very effective.
5. There is no single master biofilm destroyer, yet some are broader than others.

## Bartonella and Babesia Biofilms?

Most people have heard of the profoundly common tick infection Lyme disease, but they may not know Bartonella is more common than Lyme and is carried by far more vectors (Breitschwerdt). Babesia decimated the cattle population in the southern United States many decades ago and is more dangerous in humans than Lyme.

Currently, we have no solid data showing Bartonella and Babesia have biofilms.

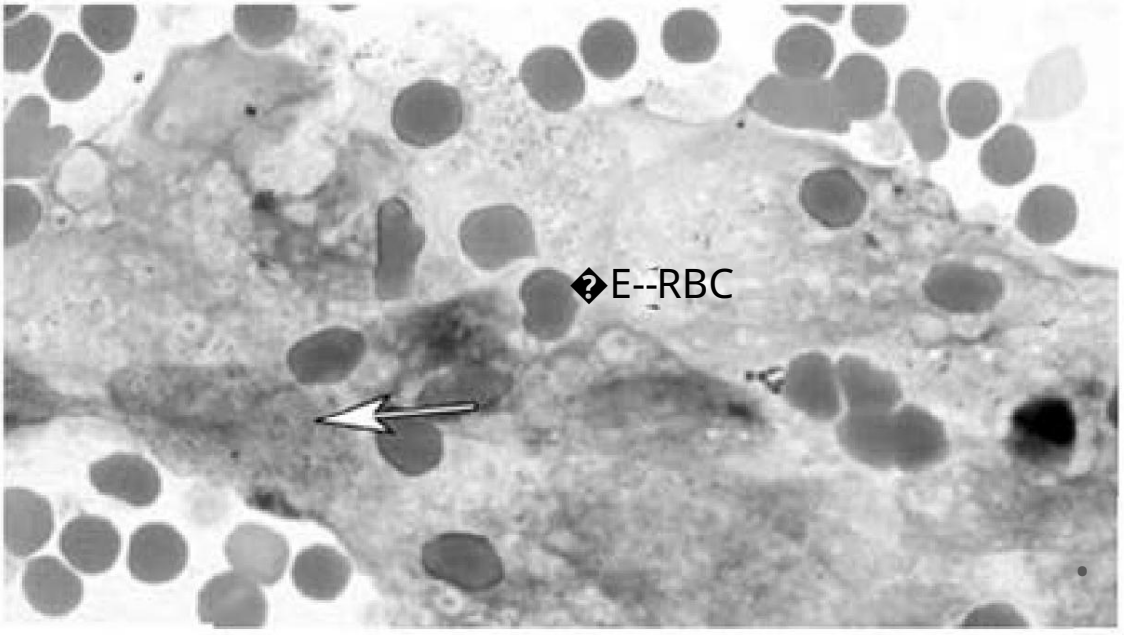
## Tick and Flea-Borne Biofilms Conclusion

Below you will see that mouth spirochetes routinely have biofilms. Another spirochete is Leptospira which is able to make biofilms in many environments and may contribute to lost pregnancy in mammals (Brihuega).

In terms of tick and flea infection biofilms, I would focus on **FL1953** (Protomyxzoa) and Lyme, since both have been known and treated by us since 2006, though the former was killed without knowing its genetic uniqueness. We are learning what decreases their biofilm pathology and have agents that should work if one is open to look at diverse approaches. A synthetic "antibiotic only approach" to biofilms, including antibiotics targeted to hit biofilms, might be similar to typing with one finger.

There are herbalists, such as Stephen Buhner, who propose selected herbs to treat some tick infections. And, in terms of **primary treating herbs to kill organisms,** there are also credible options that are not always herbal in use for a tick or flea infection. We will continue to use **advanced lab testing,** typically only allowed under physician supervision, to determine by serious extensive ***indirect*** **blood exam** biochemistry tests to see which infection is actually destroyed in people experiencing benefit from herbal therapy. In any event, I enjoyed this line from Buhner: *"I can't really say what will clear all biofilms."*

# O le isi Fa'ata'ita'iga Ata Biofilm




O le toto mū mū mū mū (-lau i luga o le matuu), O le "pepa" e amata mai i le taumatau pito i lalo« '°'11«, fa'asolo atu i le itu tauagavale pito i luga, ma'i se mea fa'atumu,\ rnllfffial O le a moaina e le IOW ia poi111i11g i se tama'i bam:rium (Piy Labaratoriea)

# Eugenol Basics

Eugenol e maua i le tele o suauu taua ma laau. Mo se fa‘ ata‘ ita‘ iga, e maua i se malosi maualuga i le suau‘ u taua o le clove bud ae fa‘ apea fo‘ i i se fua maualalo i le lau kinnamon ma lona suauu taua. E maua foi i pimento, bay, sassafras, massoy pa'u suauu, suauu o camphor ma chamchwi laau e tusa ai ma PubChem. O le malosi ma le fa'atonuga e eseese lautele e fa'atatau i le fa'apogai ma le auala e fa'afua ai. E le gata i lea, e le na'o se vaila'au malosi o le biofllm; o lo‘ o i ai isi mea fa‘ apitoa e pei o le anti-viral actions ma anti-cancer effects.

Mo se fa‘ ata‘ ita‘ iga, na fa‘ aalia e Tragoolpua ma Jatisatienr o le eugenol e a‘ afia ai Herpes o le gutu ma le genital e fa‘ atatau i ituaiga, fa‘ alavelave ma isi mea. Na latou faamanino mai o le suauu taua e mafai ona sili atu le malosi nai lo se fa‘ amatalaga faigofie. O le mea moni, o le tautala ma le genital Herpes, HSV-1 ma le HSV-2, i le faasologa, e le mafai ona toe gaosia i le i ai o le euge-nol. Al-Sharif ua fa'aalia ni a'afiaga ogaoga o le kanesa. Ole fa'ato'a maualalo (2 μM) e iai se o'ona fa'apitoa e fa'asaga i sela 'ese'ese ole kanesa o le susu. O lenei aafiaga fasioti tagata na fa'atalanoaina e ala i le fa'aosoina o se ala maliu o le kanesa ma fa'aitiitia ai le maualuga ole E2F 1 ma fa'aola--lua mole-cules e mana'omia mo le ola sela. Na taofia ai foi le kanesa o le susu

**genes.** Importantly, these anti-proliferative and pro-cancer cell death effects were also observed inside body grafts placed in non-human animals.

http://pubchem.ncbi.nlm.nih.gov/summary/summary.cgi?cid=3314

Tragoolpua Y, Jatisatienr A. Anti-herpes simplex virus activities of Eugenia caryophyllus (Spreng.) Bullock & S. G. Harrison and essential oil, eugenol. Phytother Res. 2007; 21(12):1153-8.

Al-Sharif I, Remmal A, Aboussekhra A. Eugenol triggers apoptosis in breast cancer cells through E2F1/survivin down-regulation. BMC Cancer. 2013 Dec 13;13(1):600. [Epub ahead of print]

## Eugenol and Biofilms

Recently, Dr. Zhou has reminded us of a special process that is involved in the formation of dangerous biofilms. Basically, many bacteria have a "chatty" way of talking to other cells such as other bacteria. So, bacteria use chemicals or cause other bacteria to make chemicals to help them survive and often act to harm you or a loved one.

Eugenol is so effective that at very low amounts, it still disrupted bacteria chemical communication. This is very important in a biofilm destroying agent. If cells cannot communicate, it is doubtful they can form communities. Biofilms are community creations. **Further, eugenol at very low doses, called "sub-inhibitory concentrations" inhibited biofilm formation.**

One type of biofilm research being conducted compares biofilm killers head to head. The results are not always the same, perhaps in part because the infections are not always the same. Note that in an Epub abstract before publication, Malic explains that the best essential oil for urinary catheters, with or without biofilms, against fourteen different bacteria was eugenol. This is why I believe this substance is a "double killer." It can defeat many biofilms, and then kill the organism making the biofilm. Finally, in this study, eugenol did better than tea tree oil.

## Linalool

According to the Merriam-Webster dictionary, the word linalool is derived from a Medieval Latin phrase meaning “wood of the aloe.” Linalool has a nice smelling alcohol and essential oils. It is used in perfumes, soaps, and flavoring materials.

In terms of biofilms, it seems to be most effective when **the essential oil part** is used, which has **the most evidence of killing Candida albicans.** (Candida albicans is the cause of yeast infections.) Yet, again, it is the essential oil fraction that not only **inhibits the growth** of Candida albicans but also of the bacteria Lactobacillus casei, Staphylococcus aureus, Streptococcus sobrinus, Porphyromonas gingivalis and Streptococcus mutans cell suspensions, all of them associated with oral cavity disease, according to Alviano and Mendonça-Filho. Yet, Budzyńska reported this essential oil did not fully remove biofilms formed by Staphylococcus aureus (ATCC 29213) and Escherichia coli (NCTC 8196) on the surface of routine medical materials such as urinary catheters, infusion tubes and surgical mesh.

Hsu found that linalool could be effective against Candida albicans due to its many genetic blocking effects. For example, using a scanning electron microscope and other technology, many signs of the effect of linalool to destroy Candida or inhibit its growth could be noted. Hsu found blocking actions against genes involving adhesion production and the formation of “branches” or the mold’s hyphae were both decreased by linalool.

http://www.merriam-webster.com/dictionary/linalool

Budzyńska A, Wieckowska-Szakiel M, Sadowska B, Kalemba D, Rózalska B. Antibiofilm activity of selected plant essential oils and their major components. Pol J Microbiol. 2011;60(1):35-41. PMID:21630572

Alviano WS, Mendonça-Filho RR, Alviano DS, Bizzo HR, Souto-Padrón T, Rodrigues ML, Bolognese AM, Alviano CS, Souza MM. Antimicrobial activity of Croton cajucara Benth linalool-rich essential oil on artificial biofilms and planktonic microorganisms. Oral Microbiol Immunol. 2005 Apr;20(2):101-5.

## Reserpine

Reserpine is a substance found in the roots of some types of Rauwolfia that has been made into a traditional medicine. It is used to lower high blood pressure and help with psychotic symptoms, but side effects have limited its use.

While it may not be comfortable to use at modest or high dosing, very low dosing, according to Magesh, showed it to be profoundly powerful against Klebsiella pneumoniae. In one report, he used reserpine and was able to stop biofilms in this pneumoniae infection at a fraction of the dose thought to inhibit growth.

Specifically, a tiny fraction of this drug, a mere 0.0156 mg/ml, stopped biofilm production in Klebsiella pneumoniae. So, it may be possible that we have another example of a medical truth I use every day:

## "Change the dose and you change the drug or herb."

In this case, perhaps it is possible that 1/10th of the lowest size tablet, 0.1 mg, could harm Klebsiella and other infections and be safe for the patient. However, the raw materials for making it may be hard to find some months according to ASHP who tracks pharmacy shortages.

Magesh H, Kumar A, Alam A, Priyam, Sekar U, Sumantran VN, Vaidyanathan R. Identification of natural compounds which inhibit biofilm formation in clinical isolates of Klebsiella pneumoniae. Indian J Exp Biol. 2013 Sep;51(9):764-72.

http://www.ashp.org/DrugShortages/Current/Bulletin.aspx?id=975

## "Stacking" Biofilm Killers

While physicians may ponder the problems caused by biofilms in practice, I rarely encounter the doctor who understands that it is usually better to have more than one treatment. In the article below, **oral biofilm infections were controlled best by three agents, not merely one.** For example, Alves explains that when you are going to irrigate or clean a root canal area, that two mouth bacteria infections protected by their biofilms have these same film barriers decreased significantly by treatment with farnesol, xylitol and lactoferrin together.

The same results were found in wounds. One of the best treatments for wounds is the use of a silver-based wound dressing or bandage, together with a gel containing xylitol and lactoferrin (Ammons).

Alves FR, Silva MG, Rôças IN, Siqueira JF Jr. Biofilm biomass disruption by natural substances with potential for endodontic use. Braz Oral Res. 2013 Jan-Feb;27(1):20-5. PMID:23306623

Ammons MC, Ward LS, James GA. Anti-biofilm efficacy of a lactoferrin/xylitol wound hydrogel used in combination with silver wound dressings. Int Wound J. 2011 Jun;8(3):268-73. Epub 2011 Apr 1. PMID:21457463

## Terpenoids

I would like to mention a class of options that come from a familiar substance, chemicals from tea tree oil. We have already mentioned linalool which is part of this class individually, since it comes up as a leading biofilm killer. According to Raut, as many as 14 terpenoids derived from tea tree oil inhibit biofilms, and α-terpineol, nerol, isopulegol, carvone, linalool, α-thujone and farnesol are worthy of special note. Eight terpenoids have effects on **mature** yeast biofilms (Candida albicans).

A study by Ramage shows tea tree oil (TTO), terpinen-4-ol (T-4-ol), and α-terpineol displaying potent activity against 69 biofilm-forming Candida strains, of which T-4-ol and α-terpineol displayed rapid kill action.

Of these three, T-4-ol displayed no significant toxicity to cells. These data provide further laboratory evidence that TTO and its derivative components, specifically T-4-ol, exhibit strong antimicrobial properties against fungal biofilms. Further, T-4-ol appears to possess safety advantages over the complete essential oil (TTO) and may be suitable for prevention and treatment of established oral and upper throat cavity candidosis. Certain terpenoids are components of spices or food ingredients generally regarded as safe (GRAS) (Pauli 2006).

In another study, several chemicals from plants were tried against two very common bacteria (Budzyńska), Staphylococcus aureus (ATCC 29213) and Escherichia coli (NCTC 8196), both with biofilms on the surface of ***routine*** medical products, i.e., urinary catheter, infusion tube and surgical mesh. All three are present in most advanced hospitals and other settings. Surgical mesh was the surface most prone to persistent colonization since the biofilms that formed on it, both by S. aureus and E. coli, were difficult to destroy.

Melaleuca alternifolia is the source of Tea Tree Oil (TTO). Lavandula angustifolia yields Lavender, English Lavender and True Lavender (LEO). Melissa officinalis is Lemon balm (MEO). Tea Tree oil, Lemon balm, alpha-terpineol and terpinen-4-ol showed stronger anti-biofilm

## Allicin and Garlic

Garlic has been used as a medicine throughout human history. Allicin is considered one of the medically useful components of garlic. Other useful components are discussed in Chinese language pharmacology texts.

As early as 2003, the use of allicin against Staphylococcus epidermidis had reported effects on biofilm formation at low dosing. Pérez-Giraldo reported that lab testing showed that allicin diminished biofilm formations.

Lihua reported ten years later that allicin impacts Pseudomonas aeruginosa biofilm. This is hardly casual information, since P. aeruginosa is likely resistant to multiple antibiotics, and this resistance may be due to biofilms. Organosulfur allicin has been shown to inhibit surface-adherence of bacteria and Lihua demonstrated that allicin could inhibit early bacterial adhesion which is a first step to bacterial community formation, usually just before biofilm production.

Other researchers isolated various components of garlic and tested the most active components. The following three components were examined:

1. garlic extract
2. allicin
3. diallyl sulfide (DAS)

They were tested against the serious mouth and dental infection Aggregatibacter actinomycetemcomitans, the primary cause of severe aggressive periodontitis and other non-oral infections.

# Lumbrokinase

We appreciate that some people interested in progressive medicine feel this enzyme, Lumbrokinase, is a useful substance. Some have suggested it is useful in the removal of biofilms. If that is true, we had trouble finding the evidence for that position. However, it does seem that some researchers see a potential for this enzyme to "digest" pathological clots. This possibility seems to have some support, and at this time we will only wait for further research. Since we are only proposing biofilm options that are supported by research and since human use is just starting in research settings, we do not promote this agent at this time.

Ryu GH, Park S, Han DK, Kim YH, Min B. Antithrombotic activity of a lumbrokinase immobilized polyurethane surface. ASAIO J. 1993 Jul-Sep;39(3):M314-8. PMID:8268550

Kim JS, Kang JK, Chang HC, Lee M, Kim GS, Lee DK, Kim ST, Kim M, Park S. The thrombolytic effect of lumbrokinase is not as potent as urokinase in a rabbit cerebral embolism model. J Korean Med Sci. 1993 Apr;8(2):117-20. PMID: 8397927

Mihara H, Sumi H, Yoneta T, Mizumoto H, Ikeda R, Seiki M, Maruyama M. A novel fibrinolytic enzyme extracted from the earthworm, Lumbricus rubellus. Jpn J Physiol. 1991;41(3):461-72. PMID:1960890

Wang KY, Tull L, Cooper E, Wang N, Liu D. Recombinant Protein Production of Earthworm Lumbrokinasefor Potential Antithrombotic Application. Evid Based Complement Alternat Med. 2013;2013:783971. Epub 2013 Dec 12. Review. PMID:24416067

Cao YJ, Zhang X, Wang WH, Zhai WQ, Qian JF, Wang JS, Chen J, You NX, Zhao Z, Wu QY, Xu Y, Yuan L, Li RX, Liu CF. Oral fibrinogen-depleting agent lumbrokinase for secondary ischemic stroke prevention: results from a multicenter, randomized, parallel-group and controlled clinical trial. Chin Med J (Engl). 2013 Nov;126(21):4060-5. PMID:24229674

Huang CY, Kuo WW, Liao HE, Lin YM, Kuo CH, Tsai FJ, Tsai CH, Chen JL, Lin JY. Correction to Lumbrokinase Attenuates Side-Stream-Smoke-Induced Apoptosis and Autophagy in Young Hamster Hippocampus: Correlated with eNOS Induction and NFκB/iNOS/COX-2 Signaling Suppression. Chem Res Toxicol. 2013 Jul 15;26(7):1126. Epub 2013 Jun 7. PMID:23746067

tract also made the pneumonia far more susceptible to the antibiotic tobramycin. Further, genes involved with resistance to antibiotics were down-regulated.

- Bag published that highly resistant urine organ infections were more vulnerable to treatment with T. chebula but proposed this is due to its ability to collect iron, since adding iron reduced its effect. However, Bag only tested one of many chemicals from this fruit, and I would suggest other components may have antibacterial action and work by other means.
- Four carefully chosen antibacterial plants *(P. guajava, T. chebula, A. aspera,* and *M. elengi)* are combined with four solvent extracts (hexane, ethyl acetate, ethanol, and methanol) by Kamal Rai Aneja, who initially evaluated their anti-cavity activity against *S. mutans.* All four of the plants showed activity against *S. mutans.* Ethyl acetate extracts of the four plants showed high antibacterial activity against *S. mutans,* superior to the other solvent extracts. Further, *T. chebula* ethyl acetate extract acts as an effective anti-cavity agent by inhibiting *S. mutans* and *C. albicans.* However, we were unable to find evidence if the benefit of these chemicals involved biofilm removal.

In conclusion, we appreciate that this medicine is proposed to both dissolve Lyme biofilms and also destroy the underlying Lyme bacteria. We offer no opinion on this belief. We do not want to oppose or support its use in terms of biofilm ability. It appears this fruit does act on the bacteria biofilm of P. aeruginosa, but Lyme bacteria are not the same as P. aeruginosa bacteria. Lyme is also profoundly more genetically complex than a “relative” spirochete bacterium, syphilis.

Therefore, while we do note that this medicine has antibacterial and cell protection actions, and **we accept some patients feel better,** we presently cannot say it is due to biofilm removal in those with tick-borne infections.

## Cancer

Cancer has many causes. Some things increase your risk and other things can decrease your risk. It is rarely pure genetics, even in those with genetic vulnerability. We know some types of plastics increase rates of breast cancer. We know the 200 poisons in cigarettes cause lung cancer. We know various chemicals made by various companies can increase cancer, despite the reality that most US and international chemicals have limited or no top research on their safety.

I like my dental hygientist. And, I like making sure my gums and teeth are "safe." Why? At first it was because I want to have teeth in twenty years. But, she correctly reminds me that heart attacks are increased by gum disease which is routine in many countries.

Yet, even this passionate healer was not aware of the role of biofilms in cancer. Yes, I said cancer. We are only beginning to understand the role of infections in triggering cancer diseases.

Many years ago, I was working with a physician who asked me to help research possible cures for his cancer. Eventually, that cure was found and written up, taking over 200 hours and many months to complete, with the help of a top medical editor in North America—the former editor of the *Journal of the American Medical Society* and forty other journals, specifically, George Lundberg, who worked feverishly to get this death disorder cure in print ASAP (Schaller).

Years later, he asked me to write a follow up, and we had found that over eight top infection specialists in the United States had missed Babesia, a common parasite that is harder to kill than malaria and which can occasionally increase eosinophils (Schaller). The patient's trouble included the fact that he had so many eosinophils, his blood could clot quickly. The point? Eosinophils are a type of white blood cell designed to kill parasites. The man's disorder (HES) Idiopathic Hypereosinophilic Syndrome, which is often fatal and means that eosinophils reproduce out of control, was primed by a Babesia infection. Not all patients with HES also have a Babesia infection, but after writing six books which

## Lactoferrin Xylitol Combination Treatment

In a fascinating look at this proposed double treatment, Mary Ammons shares that treatment of Pseudomonas aeruginosa biofilm with both lactoferrin and xylitol inhibits the ability of bacteria to respond to damage resulting from lactoferrin iron chelation.

Pseudomonas aeruginosa has been identified as the most common biofilm-forming infection in chronic wounds. The immune stimulating molecule lactoferrin and the rare sugar alcohol xylitol, together, were effective in the lab against P. aeruginosa biofilms.

How? Lactoferrin iron chelation was identified as the primary means by which lactoferrin undermines the bacterial membrane. Amazingly, this combination showed huge alterations in the expression of the bacteria's genes, but these changes are too complex for a summary. The findings mean that critical chemicals made by P. aeruginosa had changed.

Siderophore detection verified that xylitol is the component of this unique double treatment that inhibits the ability of the bacteria to produce siderophores under conditions of iron restriction. Siderophores sound complicated—here is the simple meaning: they are some of the strongest iron binders in the world and they are made by bacteria, viruses and fungi.

The study concludes with two points:

1. Lactoferrin treatment of P. aeruginosa biofilms results in destabilization of the bacterial cell membrane through iron chelation.

2. Combining lactoferrin and xylitol inhibits the ability of P. aeruginosa biofilms to respond to environmental iron restriction.

Access to iron is profoundly hard for bacteria when this combination is used.

## Erythritol

Erythritol is an amazing sugar. For example, when it was given to children head-to-head with xylitol or sorbitol it was clearly superior. Here is a summary of the research:

Runnel writes: "Three-year consumption of erythritol-containing candies by initially 7- to 8-year old children was associated with reduced plaque growth, lower levels of plaque acetic acid and propionic acid, and reduced oral counts of mutans streptococci compared with the consumption of xylitol or sorbitol candies."

In a similar way, Japanese researchers show highly advanced reasons for erythritol superiority over xylitol and sorbitol (Hashino). While this study is very dense, let me at least try to list the stunning findings:

1. By advanced confocal microscopic observations, the most effective sugar used to reduce P. gingivalis accumulation onto an S. gordonii substratum was erythritol, as compared with xylitol and sorbitol.

2. In addition, erythritol moderately suppressed S. gordonii monotypic biofilm formation.

3. To examine the inhibitory effects of erythritol, they analyzed the metabolomic profiles of erythritol-treated P. gingivalis and S. gordonii cells. Metabolome analyses showed that a number of critical bacteria chemicals were decreased by erythritol.

4. Next, metabolites of erythritol- and sorbitol-treated cells were examined. Erythritol significantly decreased the levels of P. gingivalis dipeptides. They tended to be increased by sorbitol.

Amazingly, it appears erythritol has inhibitory effects on two diverse species with biofilms, and it acts by at least five very distinct mechanisms.

Dowd reported that biofilm formation was completely inhibited in a standard wound approach by 10% erythritol in either of the two San-

## Does Magnesium Deprivation Hinder Biofilms?

Before we decide to remove an element that is used in vast numbers of important enzymes, we have to have a foundation. First, in some basic physiology texts, calcium displaces magnesium inside human cells. My impression of this research is that suboptimal magnesium increases systemic inflammation, vascular death such a heart attacks, and cancer. Dibaba shows that the higher the magnesium in diet the lower C-reactive protein. This protein is associated with inflammation. If you lower inflammation you decrease deaths.

Qu pooled studies of approximately a half a million people to examine the results. The greatest risk reduction occurred when magnesium intake increased from 150 to 400 mg/day. A significant inverse association was found between dietary magnesium intake and total cardiovascular events. Serum magnesium concentrations are linearly and inversely associated with the risk of cardiovascular troubles such as heart attacks and brain strokes. Since magnesium is poorly absorbed even when chelated to an amino acid, it is perhaps useful to note the useful dose was 400 mg, when compared to minimal benefit from 150 mg orally.

Del Gobbo also examined vast studies and wrote: “Clinical hypomagnesemia and experimental restriction of dietary magnesium increase cardiac arrhythmias.” Deadly ischemic heart disease, in which a person dies due to poorly oxygenated blood reaching the entire heart, was more common in those with no magnesium supplementation or very low oral magnesium dosing. Simply, “circulating and dietary magnesium are inversely associated with [cardiovascular disease].” Further, Qu shows, in another study, a significant drop in intestinal cancers with a reasonable magnesium intake. While we may not know the mechanism for these useful findings, they are not felt to be due to chance.

Song and Leff clearly show why a small number of scientists and physicians have pondered lowering human magnesium $Mg^{2+}$ levels. They remind us that $Mg^{2+}$ can influence bacterial adhesion, which is part of biofilm process. In their study, the bacterium Pseudomonas fluorescens was used to investigate the influence of $Mg^{2+}$ on biofilm growth.

## Nitroxoline

We are not going to spend significant time on this fifty year-old antibiotic because it is not used in many countries, and it is a quinolone, and quinolones all seem to have serious risk of tendon damage. For example, it is possible nitroxoline has the same risks as other quinolones (www.drugbank.ca/drugs/DB01422).

Quinolones easily enter cells and are often used to treat intracellular pathogens such as Mycoplasma pneumoniae.

The FDA has increased warnings regarding side effects since the drugs were first approved. I just want to focus on three side effects that might not be routine but are possible risks with many quinolones:

- Damage to nerves outside the brain: This could present as sensory nerve or muscle nerve injury causing paresthesias, hypoaesthesias, dysesthesias, and weakness. New pain, burning, tingling, numbness and/or weakness, or new decreased abilities to detect light touch, pain, temperature, position sense, vibratory sensation, and/or motor strength are basic nerve functions and show damage; these are reasons to stop taking the drug.
- Tendon damage: While some focus on the Achilles tendon, actual tears of tendons have occurred in the hand, the shoulder, the thigh, or other locations. Some are helped with surgery. Other patients feel the surgical or other treatment still leaves them with damage. It is believed by some that the use of prednisone and other cortical steroids meant to drop inflammation increases the risk of tendon damage. Perhaps this is especially true in older seniors. Surprisingly, tendons can rupture after the medication is stopped. Some have suggested that IV, transdermal or sublingual magnesium might decrease the risk, but I am not aware this hypothesis has been proven (Schaller).

## Aspirin and NSAIDS

We have previously said it is best to see biofilms like a key, and using AIDS as an example, it was only after AZT in 1996 with **the arrival of protease inhibitors that those quickly dying, experienced a "Lazarus effect," in which AIDS patients who looked to be ready to die recovered markedly in 30 days.** Medications used in AIDS are tough medications, even if they are miracles. Some may question offering a section on the tough medications aspirin and NSAIDS.

While we appreciate that aspirin and various other over the counter NSAIDS may not be optimal, perhaps due to concerns of liver, kidney or ulcer issues, we are discussing infections that invade and cannot be stopped by your body. You might need all the help you can get. So we offer some synthetic options here that may offer help against a top killing and disabling problem—**biofilm-protected** infections.

For example, fluconazole-resistant Candida is increasing worldwide. Fluconazole is also called Diflucan. Biofilms are one reason for a decreased effect in treatment. Aspirin, diclofenac, ketoprofen, tenoxicam, and ketorolac all undermined biofilms or their processes. They all reduced fungal adhesion, and increased biofilm detachment with low concentrations of anti-inflammatory agents. Microscopic examination confirmed the tested drugs had a significant effect on reduction of Candida adhesion and biofilm development. The drugs also made fluconazole work more effectively against fluconazole-resistant C. albicans (Abdelmegeed).

Another useful way to involve aspirin is by teaming it up with the chelation chemical EDTA. Both aspirin and EDTA possess broad antimicrobial activity for biofilm cultures. Aspirin used for 24 hours was successful in eradicating P. aeruginosa, E. coli and C. albicans biofilms. Moreover, exposure to the Aspirin-EDTA combination completely destroyed bacterial biofilms after only four hours in simulation lab testing (Al-Bakri).

## Azithromycin (Zithromax)

This medication is almost a household name and is known as the "Z-Pak" which contains brand name Zithromax pills that are still in use today. Despite being in use many years and used very routinely, this medication still has a strong use in addressing biofilms.

For example, Maezono showed that azithromycin was markedly superior compared to other routine antibiotics in killing gum infection bacteria. Specifically, azithromycin at **very low dosing** undermined four strains of Porphyromonas gingivalis. This determination involved the use of two fascinating techniques.

Azithromycin dropped the bacteria "gasoline" or ATP in the bacteria, which means the bacteria had decreased function or were dead. Cyanide kills humans in part due to dropping ATP levels—it is not a trivial substance. Further, the power of azithromycin was seen clearly with a confocal laser scanning microscope, which has the ability that the long name suggests—seeing the decreased amount of bacteria.

One of the most common hospital infection risks is MRSA; it causes a number of potentially deadly diseases. This "MRSA"simply means routine staph aureus is no longer able to be killed or it is resistant to methicillin, so it reproduces unchecked. Azithromycin is proposed as one solution to MRSA based partly on its biofilm defeating abilities at very low dosing.

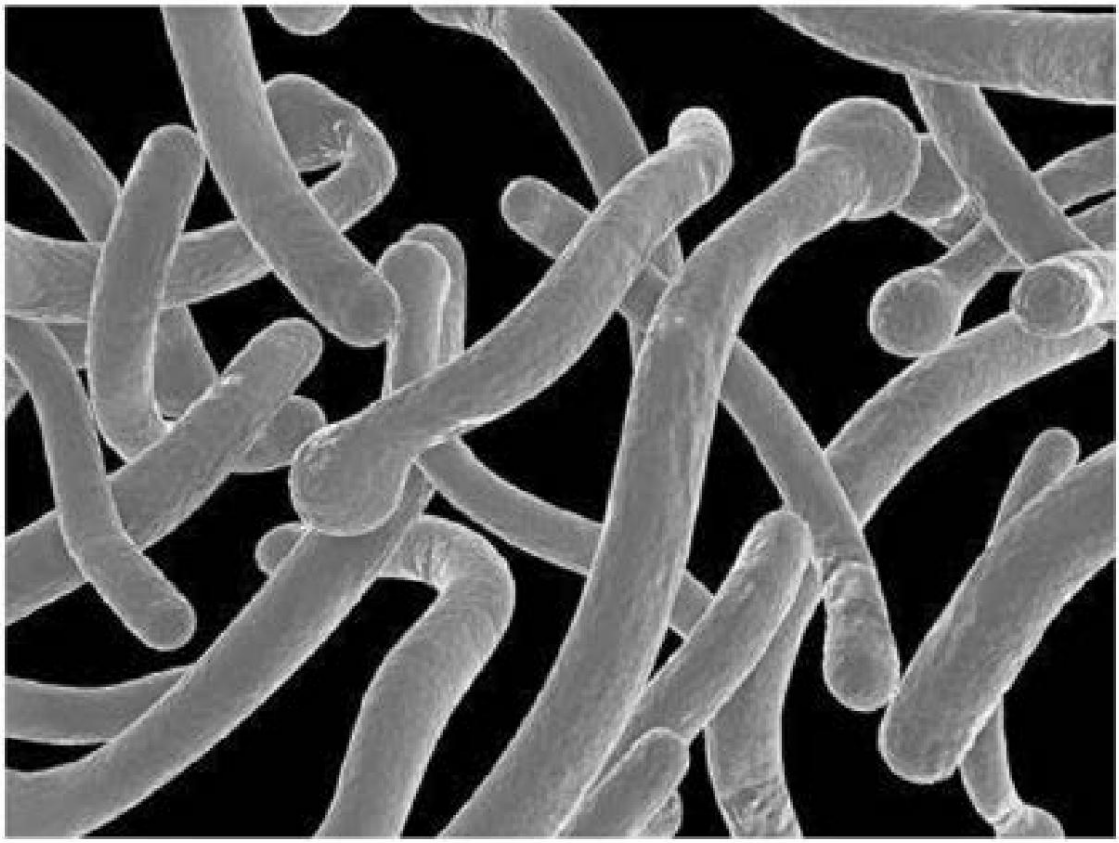
Gui shows that azithromycin was active against methicillin-resistant Staphylococcus aureus (MRSA) strains. It reduced the production of α-hemolysin and biofilm formation at very low "sub-inhibitory" concentrations. So, azithromycin may be useful in the treatment of α-hemolysin-producing and biofilm-forming MRSA infections.

Maezono H, Noiri Y, Asahi Y, Yamaguchi M, Yamamoto R, Izutani N, Azakami H, Ebisu S. Antibiofilm effects of azithromycin and erythromycin on Porphyromonas gingivalis. Antimicrob Agents Chemother. 2011 Dec;55(12):5887-92. Epub 2011 Sep 12. PMID:21911560

# siliva

O togafitiga siliva na fa'aaogaina e fa'asaga i biofilms i manu'a ua manino le aoga. O le mea moni, o le kulimi siliva 1% ua fa‘ aaogaina ma le manuia e togafitia ma puipuia ai fa‘ ama‘ i pipisi i tagata mama‘ i i le lalolagi atoa.

O se iloiloga a le International Wound Infection Institute o lo‘ o fa‘ aalia ai o fa‘ amaumauga o lo‘ o fa‘ aalia pea i le siliva o se togafitiga pito i luga. Mo se fa‘ ata‘ ita‘ iga, na fa‘ ata‘ ita‘ iina e Monteiro le siliva colloidal e fa‘ asaga i meaola olaola. O le faaiuga o lena galuega e matua mausali lava: e tusa lava po o le a le fa‘ aogaina o lo‘ o fa‘ aaogaina i le su‘ esu‘ ega, o le siliva e a‘ afia ai le matrix ma le fausaga o Candida biofilms.



3-dimensional fa'alatalata mai Candida albicans.

## Cumanda and Biofilms

Dr. Eva Sapi and her colleagues found in their superior laboratory that cumanda had some mild killing effects on the Lyme bacteria, but more importantly for this book, Lyme **biofilm** communities grown in her lab were reduced 43% by this herb at low dosing. The dosing for a dynamic human or animal body was not explored or proposed by this researcher or any other researcher as of February 2014. Searching by its Latin and popular name did not yield any articles relevant for use on infections.

Finally, while Lyme disease is a common and disabling infection, it is hardly the only infectious agent in the many infections carried by Ixodes ticks. While this preliminary research is very useful, it is possible cumanda may have impact inside a body for Lyme and Bartonella treatment. More study is needed. I regret that we only examined cumanda for Bartonella and not Lyme.

Our conclusion was that cumunda hindered Bartonella more than Levaquin (levofloxacin), Zithromax (azithromycin), Rifabutin (mycobutin) and other proposed options. To determine treatment effect one needs to know **the indirect actions of Bartonella, Babesia, FL1953, Lyme, inflammation systems, etc. by *lab analysis using different companies.***

Theophilus PA, Burugu D, Pourur i A, Luecke DF. Sapi E. Effect of Medicinal Agents on the Different Forms of Borrelia burgdorferi Lyme disease or Lyme borreliosis is a tick-borne multisystemic disease caused by different species of Borrelia. http://healthyeats-nl.blogspot.com/2013/07/effect-of-medicinal-agents-stevia-and.html

## Erythromycin

Gomes found that erythromycin at low doses actually enhanced the growth of biofilms in C. diphtheriae. Penicillin acted the same way. Of further concern is that not only did these antibiotics increase biofilm formation but in this case they enhanced infections by strains of C. diphtheriae. Diphtheriae is a very dangerous infection without access to effective antibiotics. It is dangerous enough with good ones.

Returning to biofilm-promoted gum disease such as gingivitis, in the United States, over 50% of adults had gingivitis on an average of 3 to 4 teeth. Adult periodontitis, measured by the presence of periodontal pockets > or = 4 mm, was found in about 30% of the population on an average of 3 to 4 teeth. Lost gum attachment to teeth of at least 3 mm was found in 40% of the population (Oliver).

The density of adherent P. gingivalis cells were significantly decreased by using erythromycin at very low dosing called “sub-MIC levels.” One strain was not affected by erythromycin. Finally, erythromycin was not effective for inhibition of P. gingivalis biofilm cells at very low dosing.

Erythromycin Key Findings

- Low doses actually grew some biofilms
- Penicillin also grew some biofilms
- It enhanced strains of dangerous C. diphtheriae
- Gum disease from P. gingivalis cells was much less sticky at very low dosing.
- Erythromycin was not effective for inhibition of P. gingivalis biofilm cells at very low dosing.

## Contacting Dr. Schaller

Should you wish to talk to Dr. Schaller he offers individualized education consults, which can be arranged by calling 239-263-0133. Please leave all your phone numbers, a working email and a fax number. These consults are typically in 15 minute units and can last as long as you wish. All that is required is the completion of a short informed consent form.

If you would like a full diagnostic consult or to see Dr. Schaller as a patient, know he treats patients from all over the USA and from outside the country. He meets with you first and then does follow-up care with you by phone.

If you would like to fly in to see Dr. Schaller, his staff are very familiar with all the closest airports, and we have special hotel discounts.