



A 'CUR BIOFILMS AN-ASGAIDH

ORAN DO ANTIBIOTICS ANTI FUNGALS f AIL

Fuasglaidhean airson Galar Lyme, Sinusitis Adhartach,
Pneumonia, galairean beirm, lotan, cluas
Galairean, Galar Guma, Galar intestinal,
Droch anail, Fibrosis Cystic agus Implants

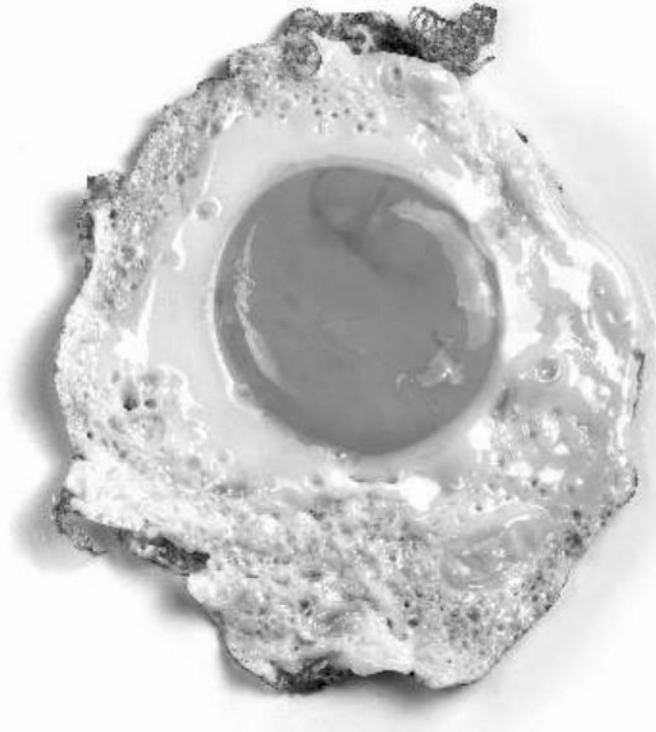
PÀRR MÒR A THA A CHUR AIR A CHUR ANN AN PUZZLE GALAR CHRONIC

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Dè a th' ann am Biofilm?

Am mineachadh simplidh, saidheansail biofilm: buidheann sam bith de meanbh-organan anns am bi ceallan a' cumail ri chèile air uachdar. Mar as trice tha iad taobh a-staigh còmhdach a chruthaicheas iad ris an canar "slime."



Dèan coimeas eadar biofilm agus ugh friochte. Is e am buidheag buidhe ann am meadhan na h-ugh friochte an galar bactaraidh no fungach.

Canar "bio-film" ris a' phàirt gheal as motha a tha timcheall air am buidheag. Bidh e a' dìon a' ghalair a-staigh, no buidheag, an dà chuid bho antibioteicean agus an siostam dìon daonna.

Tha oir a-muigh na h-ugh a 'sealltainn cuid de dh' oirean friogais glè bheag. Tha iad furasta an call air sgàth meud an ugh. Tha sinn a' dol a leigeil orra gur e antibiotics a th' annta, no ceimigean a tha a' marbhadh ghalaran. Tha iad gun fheum air sgàth 's nach tèid iad seachad air oir geal a-muigh na h-ugh. Tha an geal-ubh mar bhalla dhaibh.

Cò aig a bheil galairean biofilm?

Nuair a dh' ionnsaicheas tu mun iomadachd mòr de dh' àiteachan agus de shuidheachaidhean anns a bheil biofilms cumanta agus nuair a smaoinicheas tu gur e sin gu tric suidheachadh gnàthach bacteria agus fàs-bheairtean fungach, tòisichidh tu a' tuigsinn gum faodadh galar biofilm no galairean a bhith aig neach sam bith.

Dè a tha sinn a' sireadh san leabhar seo?

Seallaidh an stuth a leanas iomadh dòigh air briseadh tron “gheal ugh,” no biofilm. Aon uair 's gun tachair sin, mar as trice tha e mòran nas fhasa an galar a tha air a riochdachadh leis a' bhuineag ugh no an ionad buidhe a thoirt air falbh.

Tha Biofilms nam prìomh adhbhar airson fulangas is bàs

Àite agus suidheachaidhean bodhaig Biofilm

- Galar a mhaireas còrr air 2 sheachdain
- Am prìomh adhbhar bàis ann an cloinn fo aois 6 bliadhna
- Clàr fhiaclan - tha timcheall air 25,000 gnè de lobhag ann am beul an duine, agus tha mu 1,000 dhiubh sin a' fuireach ann am biofilm plaic an fhiaclan.
- Galairean giosta
- Galairean postsurgical
- Ailse
- Droch anail
- Galar guma no periodontitis*
- Lobhadh fhiaclan
- Galar sgamhain
- Galairean siostam urinary
- Bacteria beòil - faodaidh iad cron a dhèanamh air cladhaidhean cridhe agus bàs adhbhrachadh agus aillsean caolain a mheudachadh
- Galairean cluais leantainneach
- Galaran sinus**
- Tonsillitis leantainneach
- Leòintean
- Cinn bhruis fhiaclan – a' gabhail a-steach stoidhlichean ceann gluasadach sonic

- Catheters gus fual a thoirt air falbh
- Glùinean fuadain, cromagan, agus stuthan ùra eile
- Galairean bhalbhaichean cridhe
- Leòintean no lotan
- Galar Lyme
- Catheters IV de sheòrsa sam bith
- Catheters urinary
- Lionsan-conaltraidh
- Innealan air an cuir a-steach - faodaidh inneal sam bith a thèid a chuir a-steach no a chuir a-steach bacteria a chuir chun eanchainn, grùthan no dubhagan.
- Galaran prostate cronach
- Galar an Legionnaire agus mòran bacteria biotoxin eile a bhios a 'spreadhadh ann an uisge sam bith a-staigh
- Tinneasan molltair - a dh'fhaodadh èirigh mar thoradh air togail molltair ann an uisge a-staigh sam bith a sheasas a-staigh, ie, tuiltean, mullach, làr iséal no aoidion uinneig, humidifiers, Waterpik™ neo innealan glanaidh fhiaclan eile, co-chòrdadh ann an ductan AC, msaa. • Cystic fibrosis - tha cus cinneasachadh mucus anns na slighean adhair a' leigeil le bacteria mar Pseudomonas aeruginosa a' chùis a dhèanamh air luchd-marbhadh bacteria air cùl còta biofilm.
- Pàirtean bodhaig air chall
- Galaran craicinn, falt no tairn
- Airthritis
- Endocarditis
- Galaran cnàimh
- Acne

Dh' fhaodadh mòran rudan eile a bhith air an cur ris an liosta, a' toirt a-steach fìor dhroch chùisean truailleadh biofilm ann an uisge agus dusanan de chleachdaidhean eile co-cheangailte ri slàinte agus saothrachadh.

* Bha an Dotair Dàibhidh Ceanadach, fìaclair air a dhreuchd a leigeil dheth, a' caoidh gu bheil galar guma air a' mhòr-chuid de dh' Ameireaganaich inbheach - suidheachadh biofilm bacterial eile a' toirt a-steach galar leantainneach. Mar sin dìreach dè cho farsaing 's a tha an tinneas slàinte stealthy seo?

** Aig Ondine Biopharma, nochd agallamh [le Richard Longland] gu bheil (no bha) duilgheadas sinus leantainneach aig 38,000,000 neach san dùthaich seo.

***Ricardo Murga; Terri S. Forster. Dreuchd biofilms ann a bhith a' mairsinn Legionella pneumophila ann am modail siostam uisge òil. Microbio-eòlas (2001), 147, 3121–3126.

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Carson a tha na Antibiotics agus antifungals agad a 'fàilligeadh

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Galairean, Galar Guma, Galar intestinal,
Droch anail, Fibrosis Cystic agus Implants**

Prìomh phios a tha a dhith anns an tòimhseachan tinneas tuiteamach

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A' dèanamh Freagairtean Sàbhalaidh Beatha Biofilm gnàthach Soilleir agus Rock Solid

An-dràsta b' urrainn dhut luach dà bhliadhna de roghainnean a' chùis air biofilm a leughadh ann am pàipearan, blogaichean agus leabhraichean. Bheireadh seo 1,000-1,500 uair a thide dhut. Agus bhiodh grunn roghainnean agad ri mholadh. Seo eisimpleirean de roghainnean a lorgadh tu anns na pàipearan, blogaichean agus leabhraichean sin:

Seachain magnesium	EDTA	Jelly Rioghail
Seachain siùcar agus gràn	DMSO	Tiom
NAC	Vancomycin	Leòmhan-feòir
Norspermidine	Gentamicin	Serrapeptidase
Cis 2 - Decenoic Acid	Banderol	2-Aminobenzimidazole
Lumbrokinase	Seachain saillte	Echinocandins

Ciamar a lorgas tu margaidheachd reusanta agus misneachd ann an àidseant biofilm mar fhuasgladh?

Bidh Tom agus Lisa a' blogadh gu bheil an toradh "x" agus an òrdugh "d" nan leigheasan air leth gus a bhith a' lagachadh galairean biofilm ann an Tuirse Chronic (CFS) agus Fibromyalgia (FM). Tha daoine air bhioran leis nach eil fhuasgladh mòr aig an dotair àbhaisteach aca agus gun ùidh ann an galairean biofilm.

Is e an duilgheadas a th' ann gum faodadh "x" no "d" a bhith feumail ann a bhith a' lagachadh biofilm no cuideachadh le faighinn seachad air tinneas. Ach bi faiceallach ceanglaichean luath a dhèanamh. Is dòcha nach obraich làimhseachadh "a" ach ann am biofilm de dheich galairean, agus chan eil againn ach dearbhadh gu bheil e ag obair ann an trì ga

Is e an t-amas againn sealltainn dhut na tha deagh rannsachadh a' sealltainn gus an urrainn dhut fhèin agus do lighiche tòiseachadh le firinnean agus gun tuig thu an adhbhar air cùl deuchainn biofilm sam bith a dh' fhaodadh a bhith ann.

Mar eisimpleir, is dòcha gum bi an galar agad mar Lyme nuair a bhios e a' cleachdadh iarann. Tha Saito agus mòran eile ag aithris, eu-coltach ris a h-uile fàs-bheairt aithnichte eile, faodaidh Borrelia, adhbhar galair Lyme, a bhith ann às aonais iarann, meatailt a dh' fheumas a h-uile beatha eile. An àite sin, bidh Borrelia a 'cleachdadh manganese.

Dè ma lorgar gu bheil an aon chomas aig do thinneas stèidhichte air biofilm san àm ri teachd a bhith beò gu math às aonais iarann? Is dòcha gu bheil e a' ciallachadh gum faodadh àidseant biofilm a tha a' lagachadh biofilm galair Lyme obrachadh dhutsa. Tha biofilms gabhaltachd bacteriach agus fungach buailteach a bhith a' roinn an aon so-leòntachd ri aimhreit biofilm. Dh' fhaodadh fios a bhith agad mar a tha an galar agad ag obair cuideachadh gus faighinn a-mach de an àidseant biofilm a dh' obraicheas.

<http://phys.org/news/2013-03-scientists-reveal-quirky-feature-lyme.html#jCp>. Thàinig iad còmhla: 26 March 2014.

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Ar-a-mach Leigheil

Tha teòiridh gabhaltachd biofilm na ar-a-mach domhainn ann an sgrùdadh ghalaran a dh' fhaodadh a bhith goirt, ciormach agus gu dearbh, a tha nam prìomh mharbhadh a rèir aois neach.

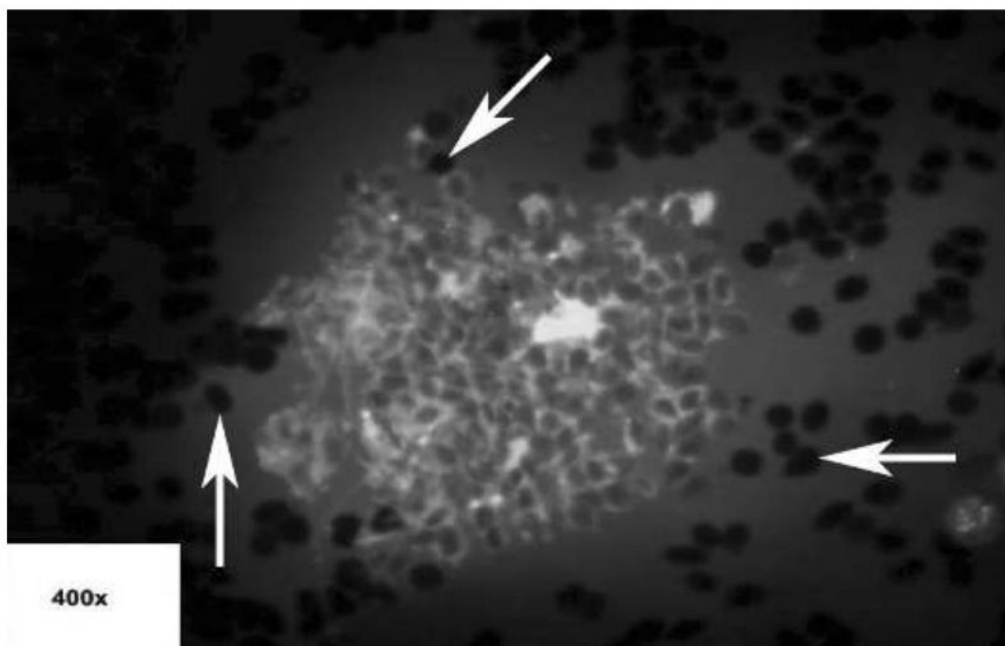
Tha galairean a' tòiseachadh gar tilleadh gu na làithean nuair a bhàsaich daoine le galairean sìmplidh. Dh' fhaodadh an saoghal galair biofilm ùr barrachd dhaoine a mharbhadh na an Dàrna Cogadh agus an Dàrna Cogadh còmhla mura h-atharraich cùisean gu sgiobalta ann an dùthchannan leasaichte agus neo-leasaichte. Air sgàth tuigse slaodach air cho cudromach sa tha biofilms agus mar sin, le bhith a' gabhail gu slaodach le lighichean de fhuasglaidhean biofilm ùra, is dòcha nach bi eadhon dotairean adhartach a' toirt aire dha bith-filmichean nuair a tha e air a dhearbhadh gu bheil barrachd dhaoine a' fàs ciormach agus a' bàsachadh mar thoradh orra. . An-dràsta, tha a' mhòr-chuid ag ionndrainn biofilms mar adhbhar fulangais is bàis. Mar sin, tha biofilms gun fhuasglaidhean cho dona ri polio san 19mh linn às aonais banachdach, agus a thaobh àireamhan luchd-fulaing.

Bidh a' mhòr-chuid de bacteria a' fuireach ann an coimhearsnachdan aig a bheil biofilms dìon gun samhail. Tha 1% de na bacteria a tha a' toirt buaidh air daoine no a' toirt buaidh air beatha dhaoine a' fleòdradh leotha fhèin agus nuair a lorgar iad ann am fuil, cha lorgar iad còmhla ri slime biofilm sam bith.

Tha Institiudan Nàiseanta na Slàinte a' dèanamh a-mach gu bheil còrr air 80% de ghalaran microbial ann am bodhaig an duine air adhbhrachadh le biofilm, mòran dhiubh a' cruthachadh dhuilgheadasan leantainneach agus ath-chuairteachaidh. No, a bheil Glowacki ceart agus 99% de bacteria beò ann am biofilm? Co-dhiù a chleachdas tu NIH's 80% no Glowacki's 99% mar an tuairmse, tha biofilms na fhìor bheachdachadh ann an galairean.

Gyowacki R, Strek P, Zagórska-Swiezy K, Składziey J, Olej K, Hydzik-Sobocińska K, Miodoyski A. [Biofilm bho euslaintich le rhinosinusitis leantainneach. Sgrùdaidhean SEM morphologach].[Artaigil sa Phòlainn]. Otolaryngol Pol. 2008; 62(3):305-10.

Ìomhaighean Ro-ràdh Biofilm



Diosganach aon-cheallach ùr a bhios a' dèanamh biofilm gun samhail leis an t-ainm FL1953 no *Protomyxzoa rheumatica*. (Is e an smear sònraichte seo an dòigh as fheàrr air na dìosganaich aon-chealla sin a lorg ann am bodhaigean daonna, leis nach eil deuchainn DNA no PCR an-còmhnaidh deimhinneach).

Is e na ceud ubhal dorcha air taobh a-muigh na h-ìomhaigh seo a chithear gu h-àrd ceallan fala dearga meud 8 micron (RBCn). Is e ball biofilm a th' anns a' mheadhan sa mheadhan le mòran cheallan fala dearga ann am meud an biofilm.

Tha am biofilm seo a chithear gu h-àrd air a lorg gu cumanta anns an fheadhainn le galairean air an giùlan le diog leithid am *Bartonella* gu math cumanta, bacterium *Bor-relia* galar Lyme, agus *Babesia* marbhtach. Ged a dh' fhaodadh cuid de ghalaran air an giùlan le diog a bhith nas miosa na cuid eile no nas cumanta na cuid eile, dh' fhaodadh iad uile a bhith marbhtach mura tèid an cur às. Tha am parasite seo a chithear gu h-àrd na ghalair aon-chealla co-cheangailte ri *Babesia* agus malaria, agus nuair a thèid a biofilm a thoirt air falbh, tha e coltach ri malaria neo-aibidh. A rèir nan Ionadan airson Smachd Galar, is e protozoan sònraichte a tha seo. Chan e *Babesia* no malaria a th' ann. Canar FL1953 no *Protomyxzoa rheumat-ica* ris a' ghalair seo. Bidh e a' dèanamh tòrr mòr de bhith-film agus tha na ceudan de cheallan fala dearga anns an tomad mòr sa mheadhan.



Leis gu bheil sinn a' coimhead air diofar bhuill-bodhaig agus adhbharan biofilms, cha bu chòir dhuinn vectar de ghalaran biofilm a ghiùlan le còrr air 200 rud beò ann an co-dhiù trì mòr-thìrean - an diog Ixodes. Bidh e a' giùlan co-dhiù dà neach-dèanamh biofilm trom: FL1953 agus am bacteria Lyme fìor iom-fhillte a tha adhartach gu ginteil. Tha sinn fhathast ag ionnsachadh mu na galairean a dh' fhaodadh a bhith ann.

Thoir an aire gu bheil am falt coltach ri feur mòr, agus mar sin tha an diog seo na bloigh den mheud seo. Nuair a bhios tu a' cothlamadh neo-fhaicsinneachd le bìdeadh aig a bheil marbhadh pian, anti-histamine, anti-coagulant agus àidseant anti-inflammatory, tha neach-giùlain gabhaltachd stealth agad. Tha aon cheimigeach saliva diog, Sialostatin L, na einnsean dìon dìonach cho math is gum faodadh e bacadh a chuir air asth-ma (Horka 2012).



Faodaidh coin a bhith nan caraid as fheàrr aig duine, ach chan ann ma chuireas tu suathadh air an t-seile aca agus chan ann ma bheir iad breaban no cuileagan a-steach don dachaigh no don chàr agad.

Thoir an aire gur dòcha gu bheil a h-uile cù is cat a tha a' fuireach taobh a-muigh baile-mòr air bideadh diog no flea.



Dèan “Biofilms” soilleir

Tha biofilm coltach ri dime ann am meadhan amar de ola ollaidh, agus air oir a-muigh na h-ola tha piobar a' riochdachadh galair a' marbhadh cheallan. Chan urrainn dhaibh gluasad a-steach gus an dime a sgrios. Is e coimhearsnachdan bacteria biofilm an suidheachadh àbhaisteach anns a' mhòr-chuid de ghalaran daonna. Chaidh ionnsachadh dhuinn gur e bacteria iomallach a th' ann an galairean a tha a' seòladh timcheall agus is e fìor mhearachd a tha seo.

Tha e a' sealltainn dè cho fada 's a dh' fheumas sinn a dhol ann an saidheans ma tha am prìomh sheòrsa bacteria—coimhearsnachdan bacteria biofilm - na bhun-bheachd ùr, ach deatamach. Nuair a rinn mi liosta ann an 2004 de chòig roghainn air fhichead airson biofilms a mharbhadh, cha robh mòran ùidh ann.

An-diugh, tha an neo-chomas air biofilms a sgrios le diofar roghainnean gu litearra na mhòr-thubaist slàinte.

Is e an t-amas ann an sgrìobhadh agus foillseachadh an leabhair seo seata de roghainnean aig pris reusanta a dhèanamh stèidhichte air ath-sgrùdadh còmhla ri roghainnean eile a dh' fhaodadh a bhith ann, gus leabhar fìor fhuasglaidhean a thaisbeanadh a bheir seachad na fuasglaidhean gnàthach is as ùire a tha comasach airson na ceudan de ghalaran co-cheangailte. le biofilms. Faodaidh cnap-starra film bith-eòlasach a bhith gu tur do-dhèanta a thoirt air falbh no a dhol a-steach leis na roghainnean àbhaisteach a bhios lighichean, eòlaichean gabhaltachd, naturopaths, sgoiltean leigheis eile, cleachdaichean ola riatanach, acupuncturists, banaltraman no luibh-eòlaichean a' cleachdadh.

Leis an leabhar seo tha sinn an dòchas seirbheis a thoirt dhut fhèin agus don dotair / neach-slànachaidh agad le bhith a' sgrùdadh nan roghainnean a tha rim faighinn an-dràsta. Rannsaich sinn na còig bliadhna mu dheireadh de fhoillseachaidhean air PubMed - an stòr-dàta mòr airson saidheans meidigeach - airson “làimhseachadh biofilm.” Tha an raon de roghainnean drùidhteach agus chan eil e an-còmhnaidh rudan ris am biodh dùil agad. Tha an leabhar seo airson roghainnean farsaing a thoirt dhut gus casg a chuir air d' fhuilg, ciorram agus eadhon bàs.

Às deidh bliadhnaichean de rannsachadh agus sgrùdadh, tha mi air faighinn a-mach gur dòcha gu bheil na “eòlaichean” galair gabhaltach air biofilm air an cogadh a chall o chionn fhada, agus gu dearbh, is dòcha nach robh mòran a-riamh mothachail air na blàran gu lèir. Pa-

Eisimpleirean Glè ghoirid de Dhaoine agus Biofilm

Ann an 2004, fhuair Richard Longland seachad air gu math bho ghalar diomhaireachd às deidh lannsaireachd droma. Anns na mìosan a lean, dh'fhuiling e bho iomadh duilgheadas - ceann goirt, pian co-phàirteach, agus an dèidh sin cùisean cridhe is eanchainn, sgiths brùideil agus trioblaid smaoineachadh.

Chuir an siostam meidigeach na aghaidh, ach mu dheireadh, ann an 2007, chaidh a làimhseachadh airson mycoplasma a thàinig bho phròiseas lannsaireachd a dh' fhaodadh a bhith ann, àite sam bith san ospadal no ann an àite poblach no diog.

Tha a' mhòr-chuid de na h-euslaintich agam air 3 gu 200 dotair fhaicinn mus tàinig iad thugam. Tha mi a 'tuigsinn an eòlas aige. Bha aig Mgr Longland ri còrr air fichead dotair fhaicinn airson breithneachadh. Rè na h-ùine dhoirbh seo, chruthaich e film adhartach leis an t-ainm "Carson a tha mi cho tinn?" Tha e na neach-taic euslainteach ann a bhith a' cleachdadh riochdairean phar-maceutical agus naturopathic gus cuir às do bhodhaig biofilms bacteriach siostamach.

Tha Eideard 78 bliadhna a dh'aois agus tha triùir nighean aige agus ochdnar oghaichean. Bha e san ospadal airson gann an anail. Tha droch ghrèim air neo galar na sgamhan. Tha e a' fàs nas mìosa. Tha daoine fa-leth air faighinn seachad air le bhith a' cleachdadh àidseantan a nì a' chùis air mòran neumonia a tha fo dhìon biofilm.

Tha Linda air a bhith sgith airson grunn bhliadhnaichean agus tha trioblaidean aice leis an sgoil. Lorg mi o chionn ghoirid gu bheil grunn ghalaran diog oirre a tha air còrr air còig-deug toradh deuchainn-lann adhbhrachadh gu bhith neo-àbhaisteach. An-dè ghairm i, agus air sgàth pian air cùl a glùin, thuir mi rithe a dhol chun ER. Ann an nas lugha na latha, chaidh a lorg gu robh 23 clots aice na sgamhanan agus casan. Tha amharas aice gur e Babesia, sèid agus FL1953 a th' ann. Bha riochdairean againn a mharbh na riochdairean sin, FL1953 nam measg, ann an 2006.

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 spirochaetes within 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.

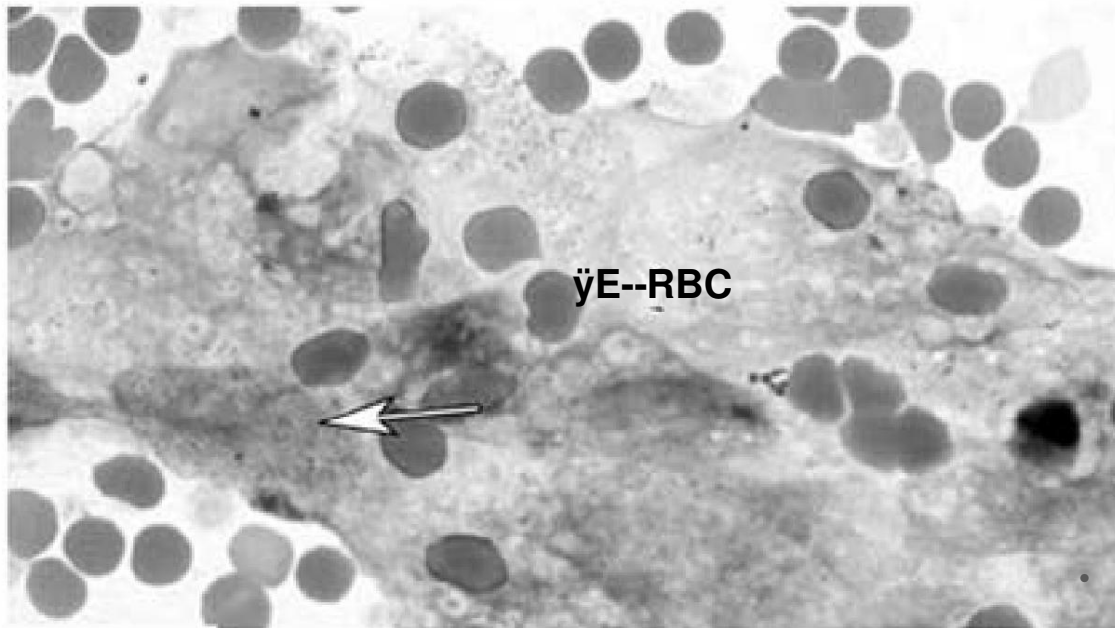
Tick and Flea-Borne Biofilms Conclusion

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.”*

Eisimpleir eile de Ìomhaigh Biofilm



The dark IOWld ofVlls aie fuil dhearg "° Us (-blade upp« crow), Tho "sheet" diat a' tòiseachadh o 'n deas gu h-ìosal« ' °11«, mowig a dh'ionnsaigh an oomer àrd cli, tinn, an biofill, \ rnlffiffial An IOWld' mow ia poi11i11g gu bam:rium beag. (Piy Labaratoriea)

Bun-bheachdan Eugenol

Tha Eugenol air a lorg ann am mòran de dh'olan agus luibhean riatanach. Mar eisimpleir, lorgar e aig comas àrd ann an ola deatamach clove bud ach cuideachd aig dòs nas ìsle ann an duilleag cinnamon agus an ola riatanach aige. Tha e cuideachd ri lorg ann am pimento, bàgh, sassafras, olaichean rùsg massoy, ola de lusan camphor agus chamchwi a rèir PubChem. Bidh an comas agus an dùmhachd ag atharrachadh gu farsaing a rèir an stòr agus an dòigh àstharraing. A thuilleadh air an sin, chan e dìreach àidseant biofilm cumhachdach a tha seo; tha feartan iongantach eile aige leithid gnìomhan anti-bhiorasach agus buaidhean an-aghaidh ailse.



Mar eisimpleir, sheall Tragoolpua agus Jatisatienr gu bheil eugenol a' toirt buaidh air herpes beòil is ginideach a rèir gnè, cuideam agus factaran eile. Rinn iad soilleir gum faod an ola riatanach a bhith nas cumhachdaiche na earrann simplidh. Gu dearbh, cha b'urrainn do herpes beòil agus ginideach, HSV-1 agus HSV-2, fa leth, ath-chruthachadh an làthair eugenol. Tha Al-Sharif air buaidhean ailse cudromach a nochdadh. Tha dùmhachd gu math ìosal ($2 \mu\text{M}$) le puinnseanta sònraichte an aghaidh diofar cheallan ailse broilleach. Chaidh a' bhuidhe marbhadh seo a mheadhanachadh tro bhith a' toirt a-steach slighe bàs cealla ailse agus a' lughdachadh ìrean E2F 1 agus mairsinn - dà mhill-cules a tha riatanach airson mairsinn cealla. Chuir e bacadh air ailse broilleach cuideachd

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>

Tragoalpua Y, Jatisatiennr 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, Różalska 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-Pradón 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 bio-film 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, α -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 Lumbrokinase for 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 NF κ B/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 hygienist. 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 as 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.

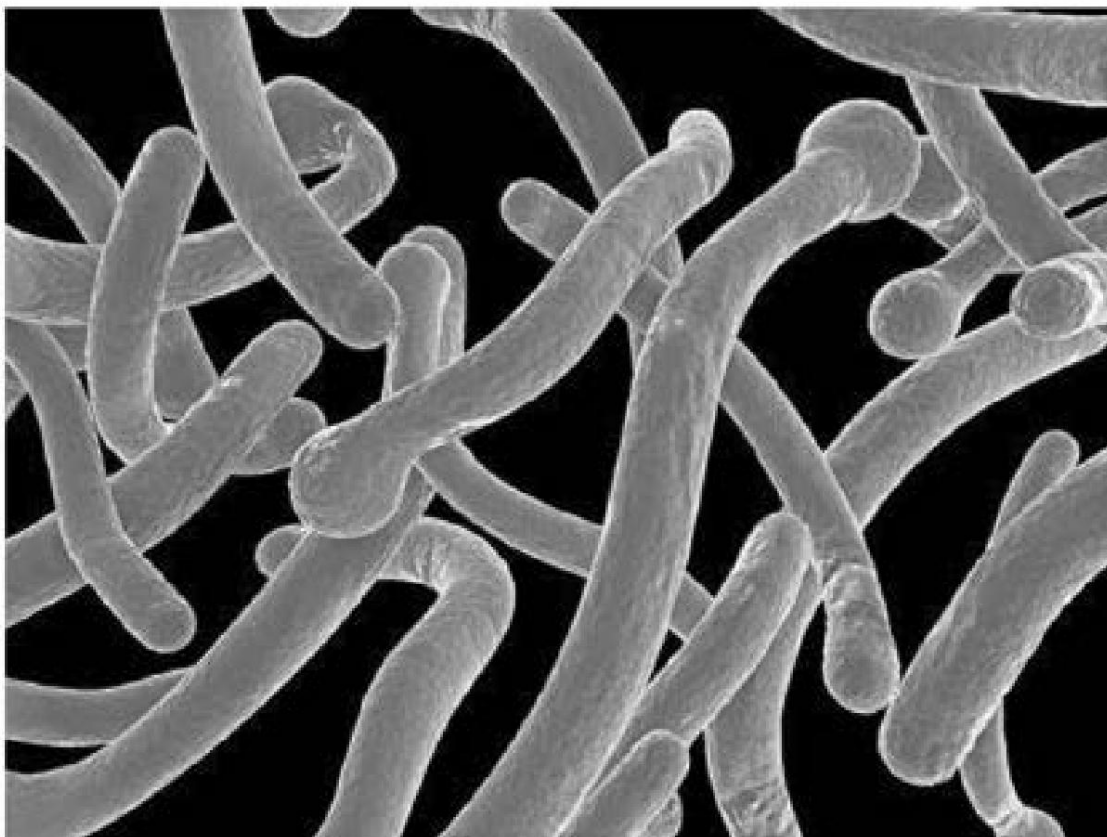
Gui shows that azithromycin was active against methicillin-resistant *Staphylococcus aureus* (MRSA) strains. It reduced the production of α -hemolysin and biofilm formation at very low “sub-inhibitory” concentrations. So, azithromycin may be useful in the treatment of α -hemolysin-producing and biofilm-forming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

Airgid

Tha e soilleir gu bheil làimhseachadh airgid a chaidh a chleachdadh an aghaidh biofilms ann an lotan èifeachdach. Gu dearbha, chaidh uachdar airgid 1% a chleachdadh gu soirbheachail airson làimhseachadh agus casg ghalaran ann an euslaintich brònach air feadh an t-saoghail.

Tha làirmheas leis an Institiud Eadar-nàiseanta Galar Leòn a' sealltainn gu bheil an dàta fhathast a' comharrachadh airgead mar phrìomh làimhseachadh. Mar eisimpleir, rinn Monteiro deuchainn air airgead colloidal an aghaidh biofilms fungach. Tha co-dhùnadh na h-obrach sin gu math daingeann: ge bith dè an ìre a chaidh a chleachdadh san sgrùdadh, thug airgead buaidh air co-dhèanamh matrix agus structar biofilm.



Dùin suas 3-mheudach de *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 Levofloxacin (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, Poururi 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://healthyats-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 ≥ 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.