

*Pymble Grove
Health Centre*

TICK BORNE INFECTIONS- DIAGNOSIS AND TREATMENT

Dr Richard Schloeffel

OAM

MBBS, FRACGP, FAMAS, Diploma Acup
(China)



Chronic disease experience

- 1976: PNG – TB and Leprosy
- 1978 – 81: Intensive care training
- 1981 – 88, 1991 - 96: Rural general practice
- 1983 - 96: HIV/AIDS
- 1997 – 2018: Chronic and complex disorders, including VBD
- 2014: Australian Chronic Infection and Inflammation Disease Society (ACIIDS) formed
- 2018 Vector-Borne Disease Research Centre
- 2019 “Human Tick Borne Diseases in Australia” Frontiers 2019
- 2020--Current. Senior Clinical Lecturer and Researcher Macquarie University: ME/CFS and VBD

“Lyme” Disease in Australia Exists

- Introduction of “Lyme” Disease
- Unrecognized endemic illness in Australia
- Unknown how many people have Lyme-like illness
- Is impacting thousand of lives
- Medical denialism leading to mistreatment
- Abuse of doctors and patients
- Political Intervention and Research

Context

“Lyme”-like illness is the fastest growing vector borne disease in the world and is highly transmissible

Incidence

USA – 300,000 new cases diagnosed pa or 0.01% of the total population

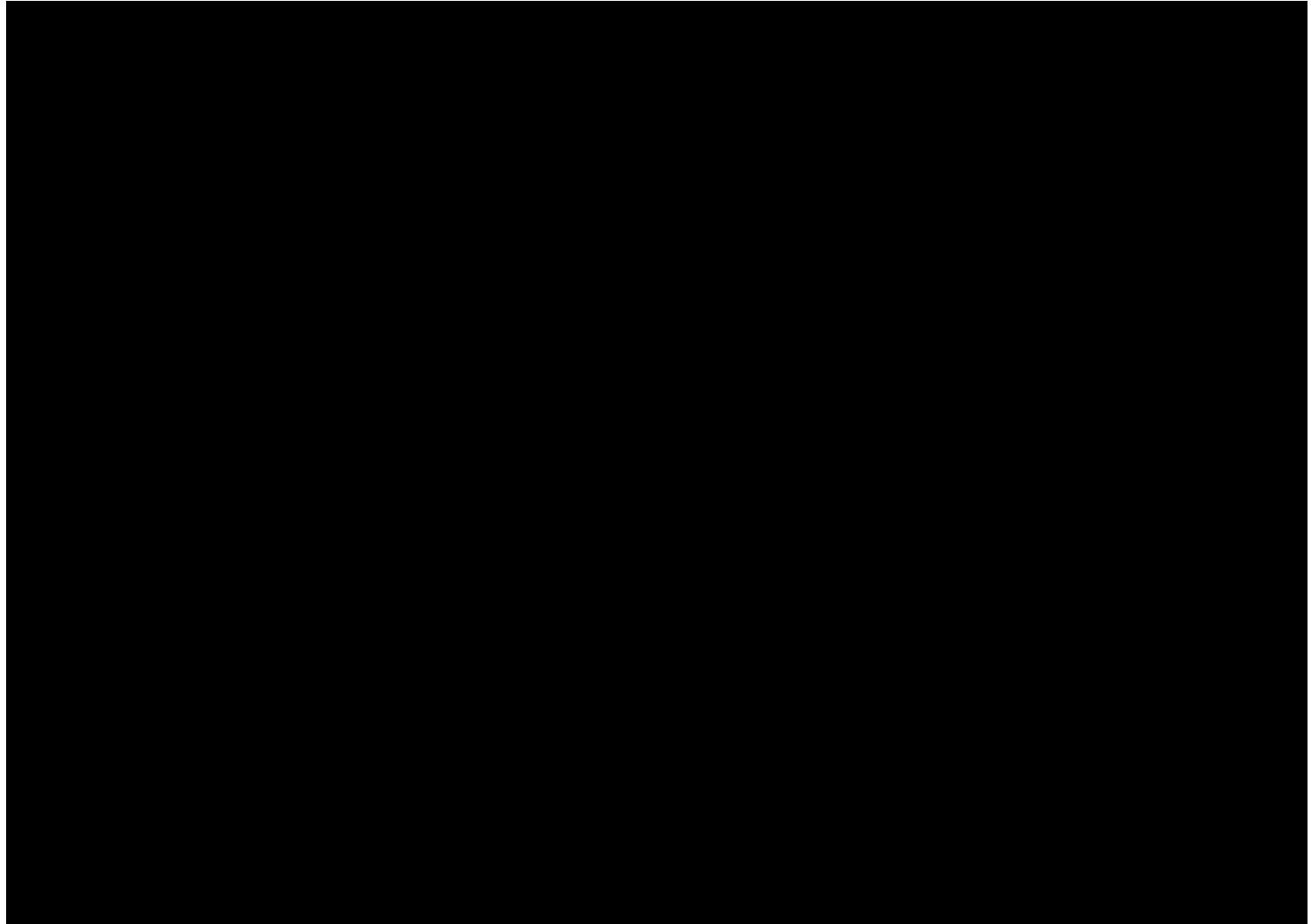
Australia

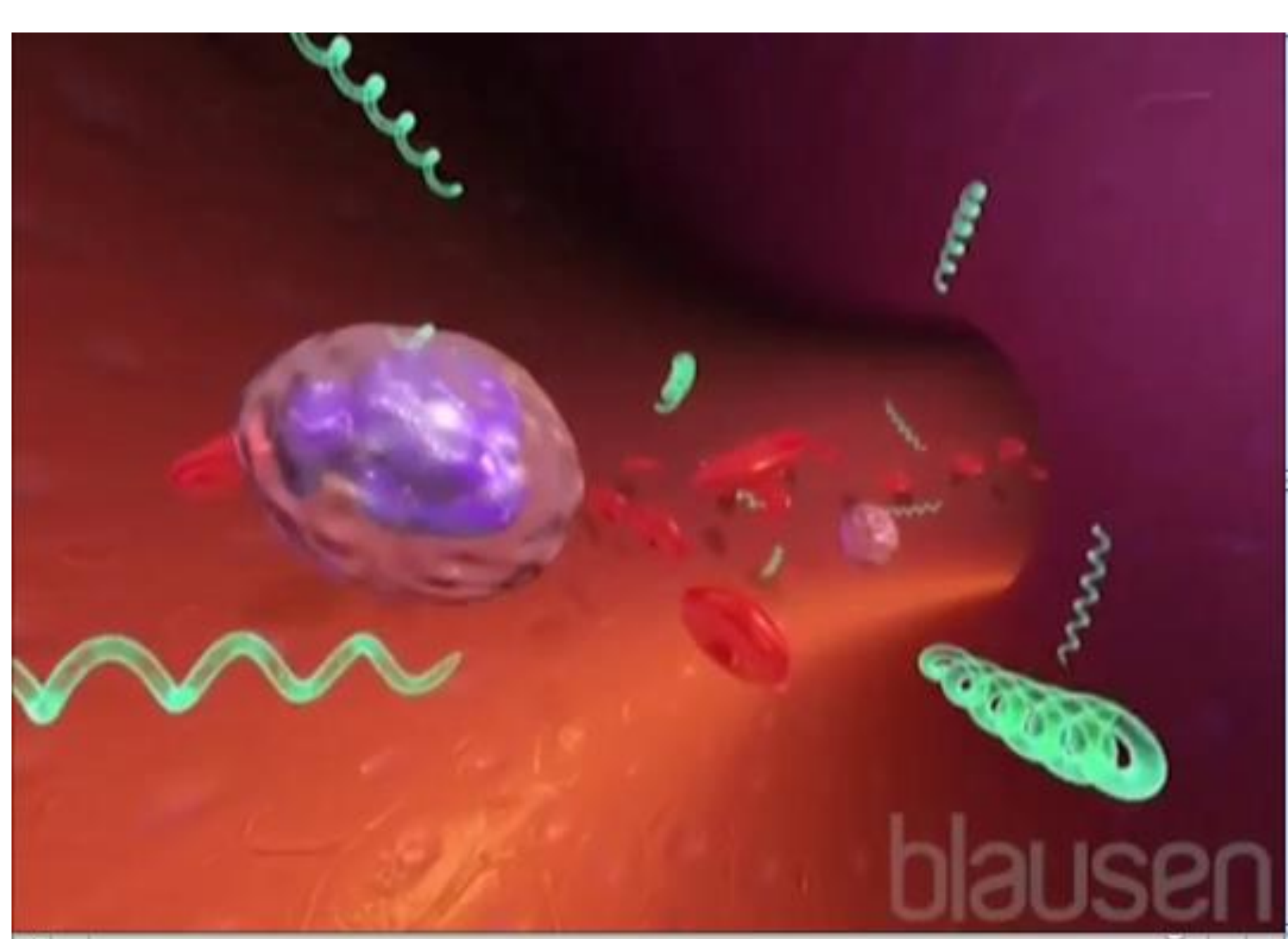


- 5,000+ patients treated by ACIIDS doctors over the past 8 years
- 1,500 patients currently under treatment, thousands on wait lists
- Undiagnosed and infective cases exceeds tens of thousands

There is potential for an logarithmic increased in the burden on the hospital and health network due to this illness

Infection – Tick bite, lice and bed bugs





Infective organisms found in VBD patients

- Borrelia including relapsing fever
- Rickettsias
- Bartonella
- Ehrlichiosis
- Anaplasmosis
- Babesia
- Coxiella Burnetti
- Mycoplasmas
- Viruses

Infected Response



Australian
patient
with tick
bite
induced
erythema
migrans
rash



Clinical Presentation

- Myalgic Encephalomyelitis/Chronic Fatigue Syndrome
- Fibromyalgia
- Autoimmune Disease
- Multiple Sclerosis
- Motor Neurone Disease (ALS)
- Parkinson's Disease
- Alzheimer's Disease
- Chronic Pain Syndromes
- Autistic Spectrum Disorders

Clinical Presentation

- Full Clinical History and Examination
- Appropriate Pathology Testing
- Use of a Specific Questionnaire (Dr Richard Horowitz) – This is in your handouts and is useful in determining the risk of an overseas or Australian acquired VBD
- Discussion

Dr Horowitz Questionnaire

Section 1 - Symptom Frequency Score

Section 2 - Most Common VBD
Symptoms Score

Section 3 - VBD Incidence Score

Section 4 - Overall Health Score

Final Scoring - Totals > 46 = Highly
Probable VBD

- Totals 21-45 = Possible
- Totals < 21 = Unlikely

Testing for Borreliosis

- Current testing in Australia is not suitable for Borreliosis detection
- ELISA is non diagnostic (current standard) New Elisa Test using multiple strains of Borrelia –high specificity (Prof Leonie Gilbert) Tickplex Plus– currently being validated by NSW Health Pathology
- Western Blot
- Polymerase chain reaction Test (PCR)
- Proteomics—Research Macquarie University

Specific Pathology

Australian Rickettsial Reference Laboratory

- Lyme Disease Antibodies, Western Blot, IgG, IgM, PCR
- Rickettsia Antibodies
- Bartonella Antibodies
- Babesia Antibodies
- Ehrlichiosis Antibodies
- Anaplasmosis Antibodies

Specific Pathology

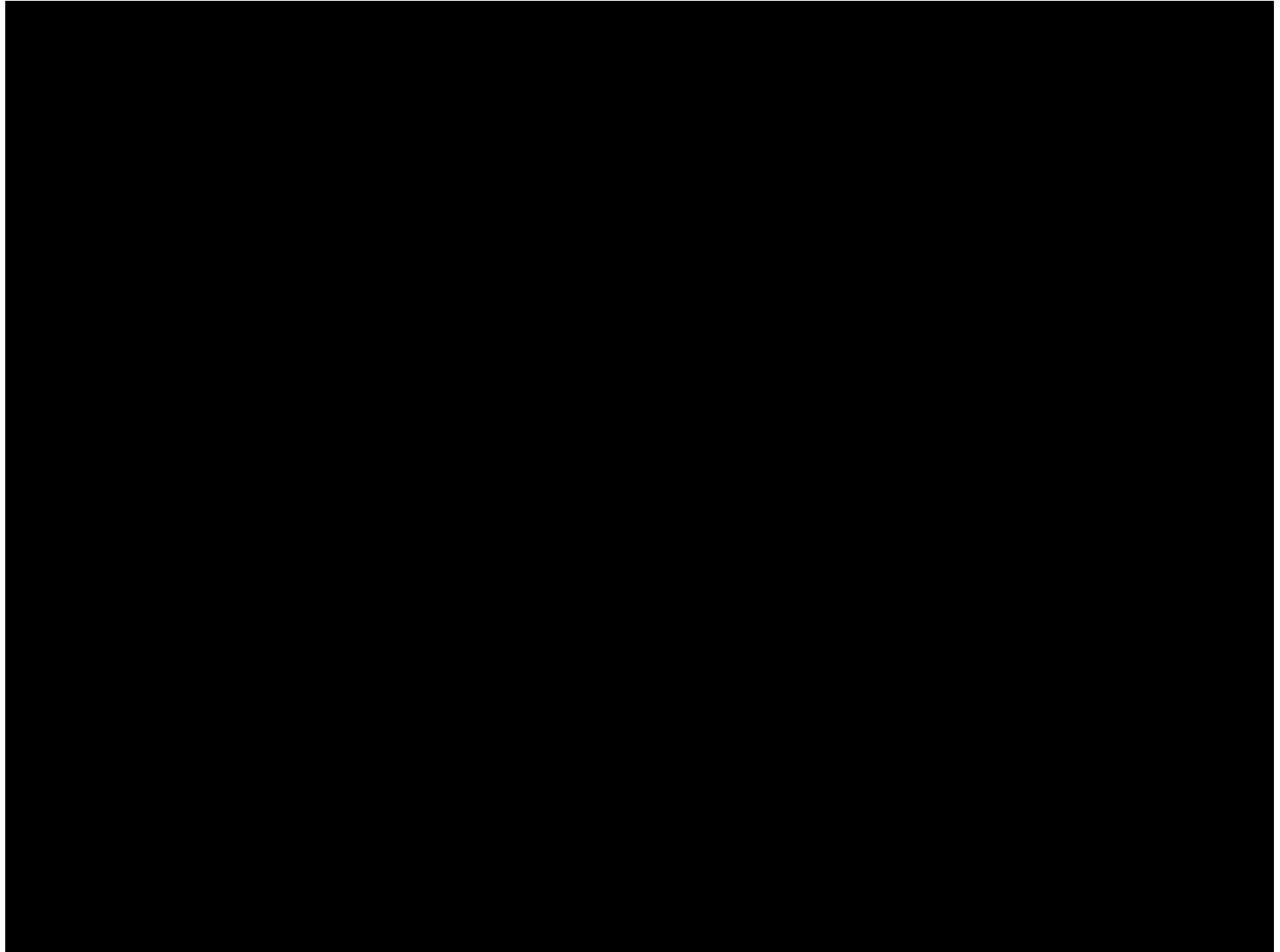
General Pathology Laboratories

- Coxiella Burnetii
- Brucellosis
- Leptospirosis
- Mycoplasma Species
- Chlamydia Species
- Viruses

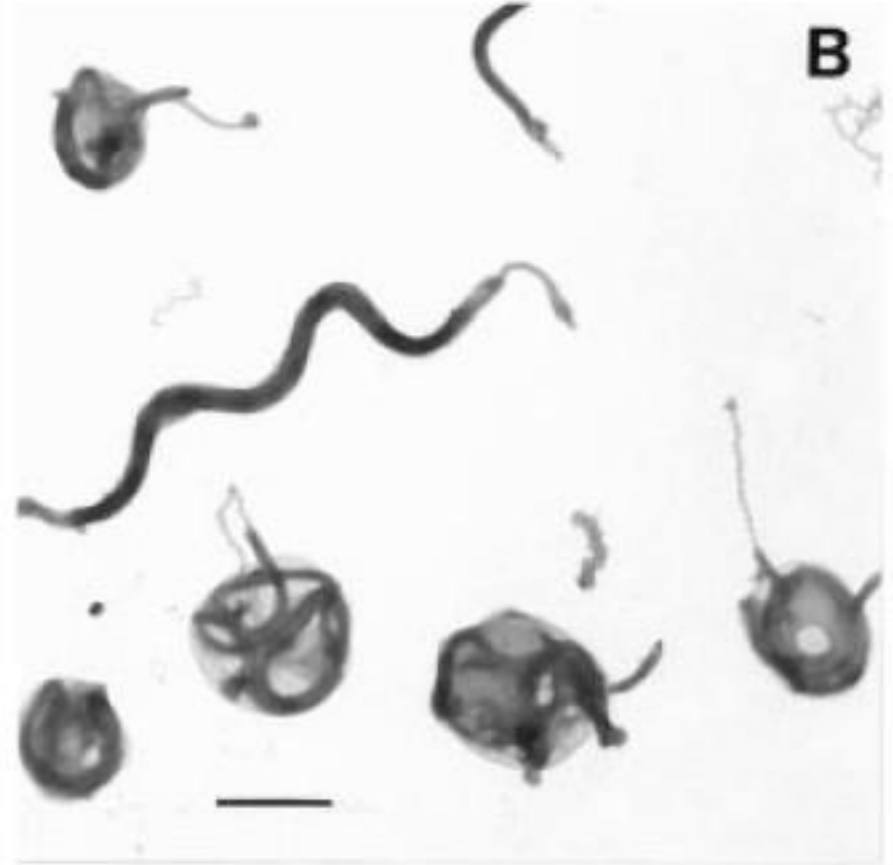
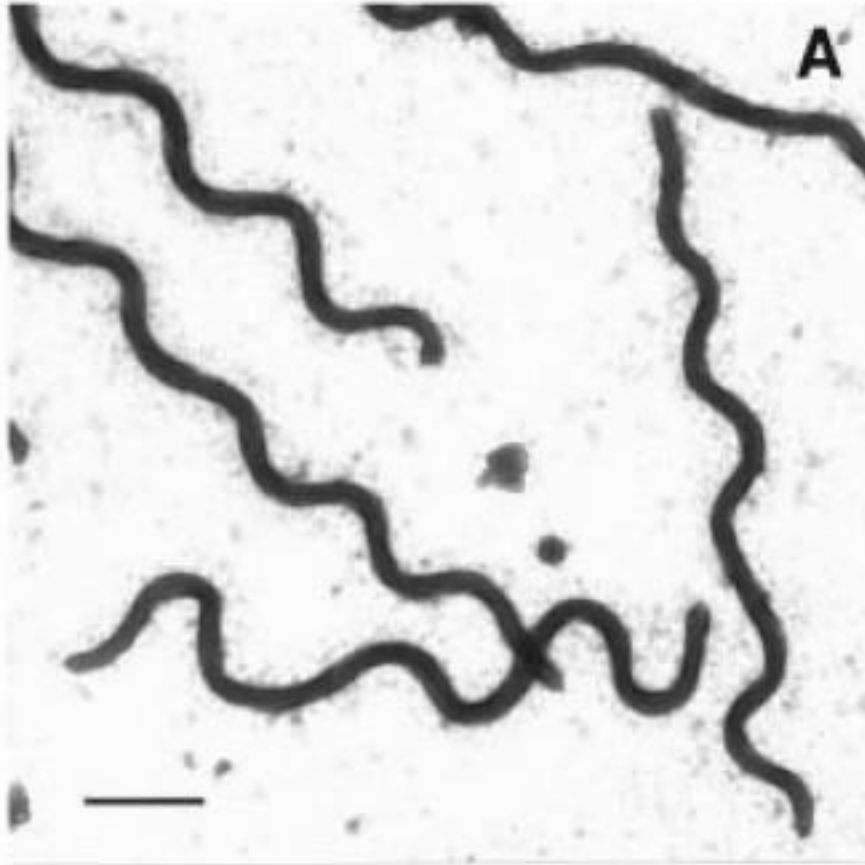
Borreliosis

- Often overseas acquired – Afzelii, Garinii, Burgdorferi
- Relapsing Fever Borrelia, Miyamotoi
- Australian acquired – Current research suggests Afzelii and Garinii as well as a Relapsing Fever type of Borreliosis

Borrelia Bacteria - Metamorphosis



Borrelia Metamorphosis



Red Blood Cell Borrelia



Acute Tick Bite

- Remove Tick by freezing, fine forceps or punch biopsy for pathology
- Mild illness give Doxycycline or Clarithromycin in children under the age of 8 for 10-14 days
- Moderate-Severe illness give Doxycycline or Clarithromycin for 4-6 weeks
- This approach could significantly reduce the development of Chronic VBD

Management

- **Integrative Treatment of the whole person, long term view, 2 – 5 years**
- Supportive therapies with lifestyle management and treatment of co-morbidities and symptoms
- Antibiotics – appropriate use
- Other treatments inclusive of hyperthermia, immunoglobulin therapy, others
- Rehabilitation and long-term support

Specific Management

Borreliosis

- Resuscitate the patient by management of all co-morbidities
- Antibiotics – Short term vs Long term rotational antibiotics (Internationally controversial) – Discussion
- Overseas treatments – Hyperthermia, Ozone and Apheresis (Internationally controversial) – Discussion later.

Antibiotic Treatment for Borreliosis

- IDSA
- ILADS
- ACIIDS
- AUSTRALIAN GUIDELINES DO NOT ADDRESS VBD
- WHERE DO YOU STAND?

Acute Borreliosis- Antibiotics

- Doxycycline 100mg 2 daily with food for 10 days to 6 weeks ---depends on clinical diagnosis and severity
- Always Nystatin 500,000 units 2 twice daily ,plus Probiotics
- Or Minocycline 50mg 2 to 4 daily before food-----10 days to 6weeks
- Clarithromycin for children --- dose, age and weight determined. –10 days to 6 weeks

Chronic Borreliosis----

Antibiotics-----Intracellular

- Doxycycline 100mg 1 then 2 daily with food. Max 4 per day
- Always Nystatin and Probiotics
- Or Minocycline 50mg 2 to 4 daily before food
- Or Clarithromycin 250mg 1 to 2 daily if tetracyclines not tolerated/contraindicated

Chronic Borreliosis----

Antibiotics-----Extracellular

- Amoxicillin 500mg 1 to 2 three times daily with food
- Or Bicillin Injections 900mg 1 to 2 amps IMI once or twice weekly
- Side effects—nausea, diarrhea, penicillin allergy; pain, scarring and abscess risk from buttock injections.

Chronic Borreliosis----

Antibiotics----- Cystic Forms

- Tinidazole 500mg 1 to 4 weekly to twice weekly at night
- Metronidazole 200mg to 400mg daily, 2 weeks on, 2 weeks off.
- Side effects--- nausea, diarrhea, candidiasis, severe reaction to alcohol.

Oral Antibiotics for Borreliosis

- Triple therapies, low dose to maximum therapy , constant versus pulsed, compliance and side effects
- Must manage patients in an integrative way--- diet, supplements, sleep, exercise, psychological support, regular assessments and pathology.
- 6 to 24 months, with no guarantee of remission----- Is this the way forward?

Intravenous Antibiotics for Borreliosis

- Failure of oral treatments
- Unable to tolerate oral therapies
- Very ill and life threatened patients
- Severe Neuroborreliosis
- Necessary in life threatened acute patients

Intravenous Antibiotics for Borreliosis

- Ceftriaxone 2 gms IVI 4 days per week in 100—250mls Normal Saline over 40 minutes
- Ceftriaxone 4 gms IVI 3 days per week over 1 hour
- Pulse 4 to 6 weeks on, 1 to 2 weeks off.
- Side effects--- allergy, biliary stasis (Ursodeoxycholine Acid 250mgs 1 bd), cardiac effects (ECGS), C difficile, candidiasis, Herxheimer

Intravenous Antibiotics for Borreliosis

- Azithromycin 500mgs IVI in 500mls Normal Saline w/wo Magnesium chloride (1 amp)., to reduce severity of Herx. reaction over 1 hour.
- Pulse 4 to 6 weeks on, 1 to 2 weeks off.
- Potentiates oral Minocycline/ Doxycycline
- Side effects—Herx., nausea, stomach pain ,diarrhoea, liver disfunction,QT prolongation, allergies, acute deafness (rare but permanent)

Intravenous Antibiotics for Borreliosis

- Metronidazole 500mg IVI over 30 minutes, once or twice weekly.
- Pulse 4 to 6 weeks on , 1 to 2 weeks off.
- Side effects--- dizziness, headache, nausea, diarrhoea, seizures, mood changes, candidiasis, allergic reactions(severe), severe Herx.

Borreliosis—Successful Treatment in Chronic , Persistant Borreliosis

- All these Antibiotics– individualized for each patient.
- Use 3, 6 ,9 to 12 months (sometimes longer)
- Review regularly, pathology, ECGs.
- Fully inform the patient and family.
- Obtain patient consent always.
- Requires a long term commitment.

Rickettsiosis, Anaplasmosis and Ehrlichiosis

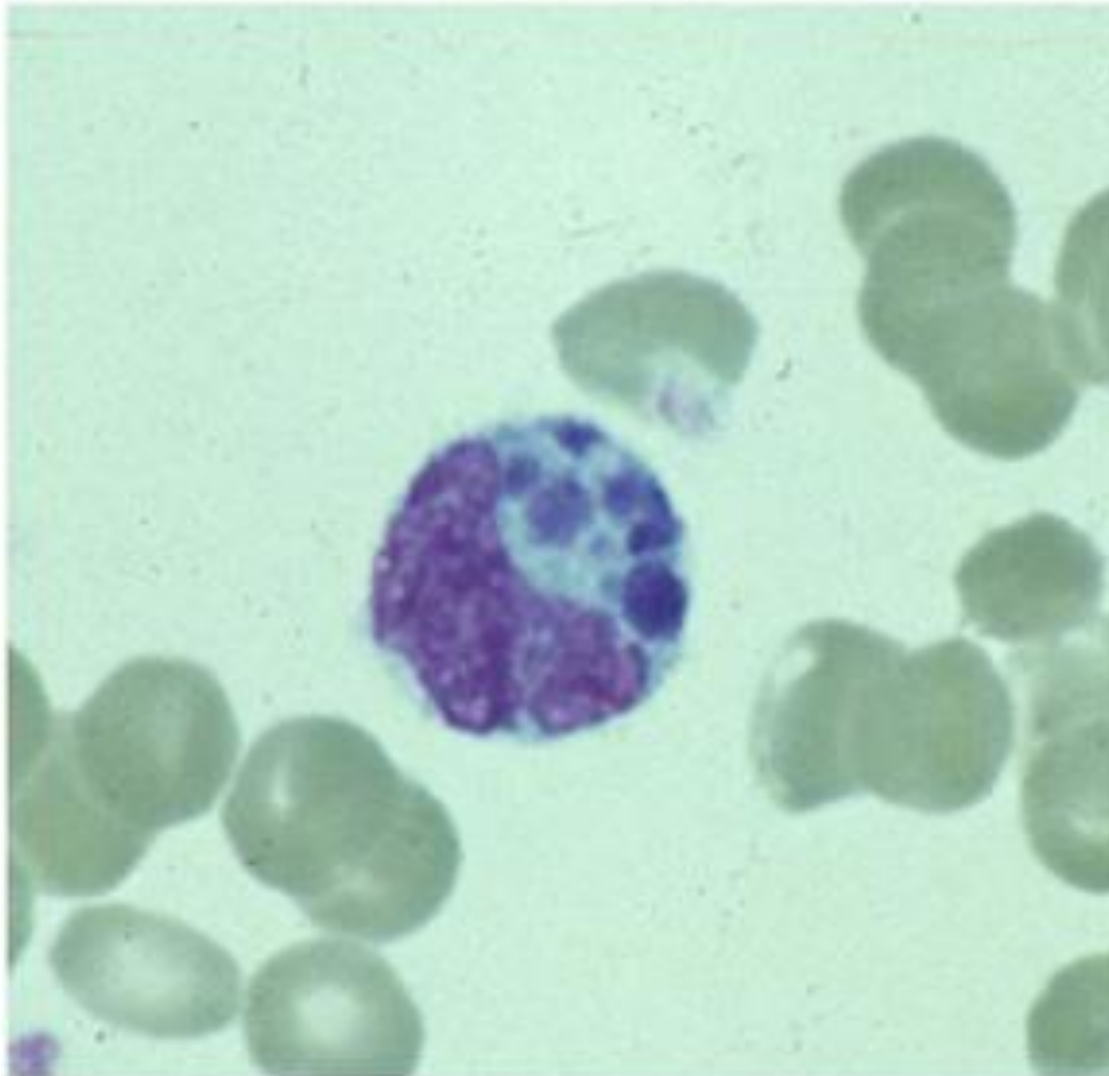
Much more common in Australia from tick bites than Borreliosis, and scientifically supported as being present in Aust. ticks

- Rickettsia Australis, Flinders Island Spotted Fever
- Fever, Malaise, Headache and Rash
- Acute Management – Antibiotics
(Doxycycline 100mg 2 daily, or Minocycline 50mgs 2 to 4 daily Azithromycin 500mg 1 to 2 times weekly 2 to 6 weeks.

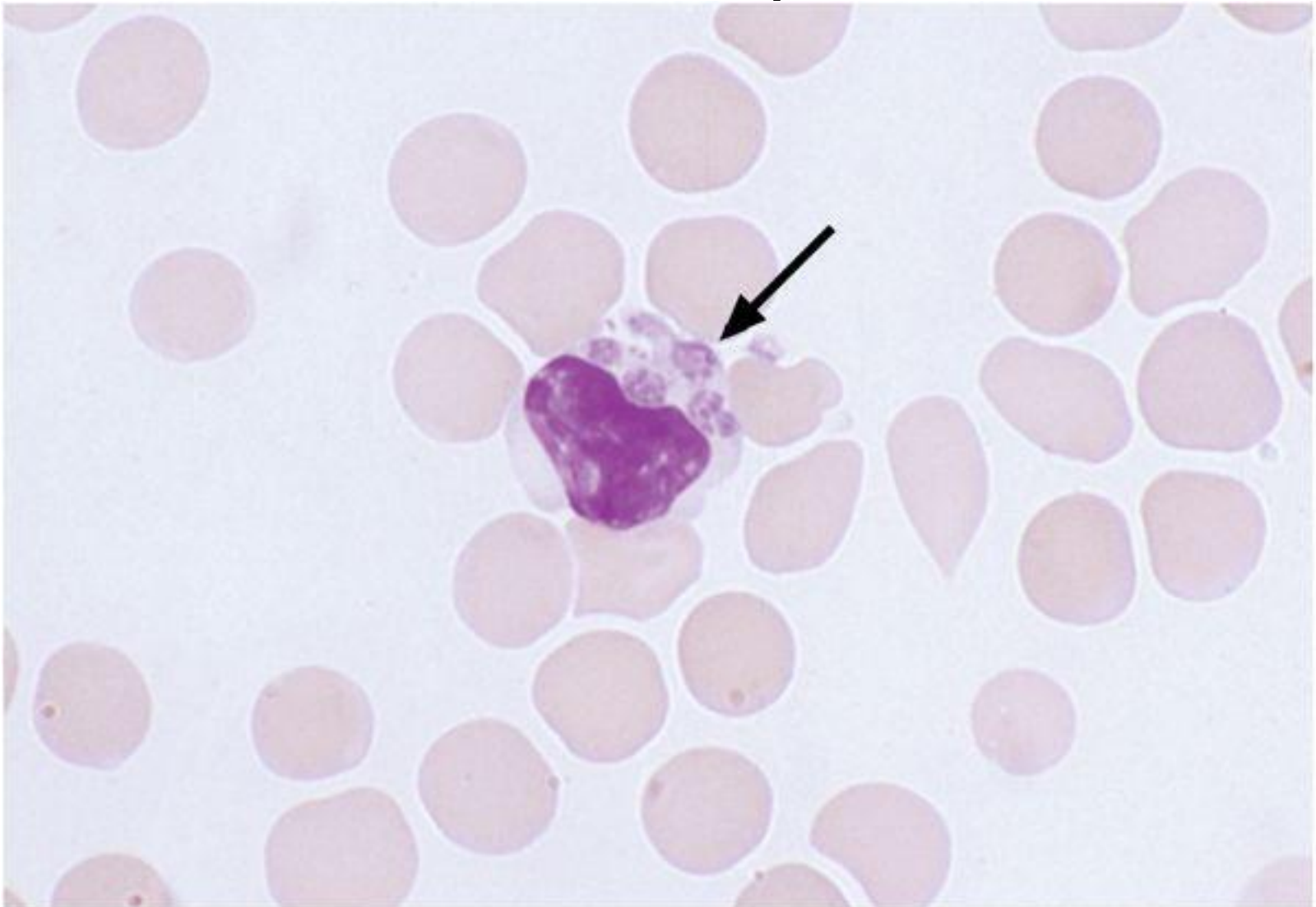
Rickettsia Rash



Anaplasmosis – Granulocytes with Immune Suppression (Infected Neutrophil)



Ehrlichiosis - Infected Monocytes



Chronic Rickettsiosis

- Like Mycoplasmas and Chlamydial infections, Rickettsioses may become Stealth Infections.
- When diagnosed develop a Chronic Disease Management plan: Treat co-morbidities.
- Doxycycline 100mgs 2 daily, or Minocycline 50mgs 2 daily and Azithromycin 500mgs 1 twice weekly for 3 to 9 months.

Specific Management

Bartonella (Cat Scratch Fever)

- Henselae and Quintana – Gram-negative rods and cell-wall deficient
- “Ice-pick” headaches, Depression, Anxiety, Seizures, Severe Neuropathic Pain especially in the feet and classic striae rash
- Acute treatment – Doxycycline 100mg 2 daily or minocycline 50mg 2 to 4 daily, Azithromycin 500mg 1 bd, Rifampicin 300mg 1 daily to 1bd;2 to 6weeks.

Bartonella Striae



Chronic Bartonella-- Antibiotics

- Oral Antibiotics
- Hydroquinolone 200mg 1 to 2 daily
- Trimethoprim/Sulfamethaxazole 1 bd
- Clarithromycin 500mg 1 to 2 bd
- Cefuroxime 250mg 1 to 2 bd
- Rotating these antibiotics as triple therapy is often very effective
- Reduced seizures, pain, brain fog and striae are signs of recovery.

Chronic Bartonella-- Antibiotics

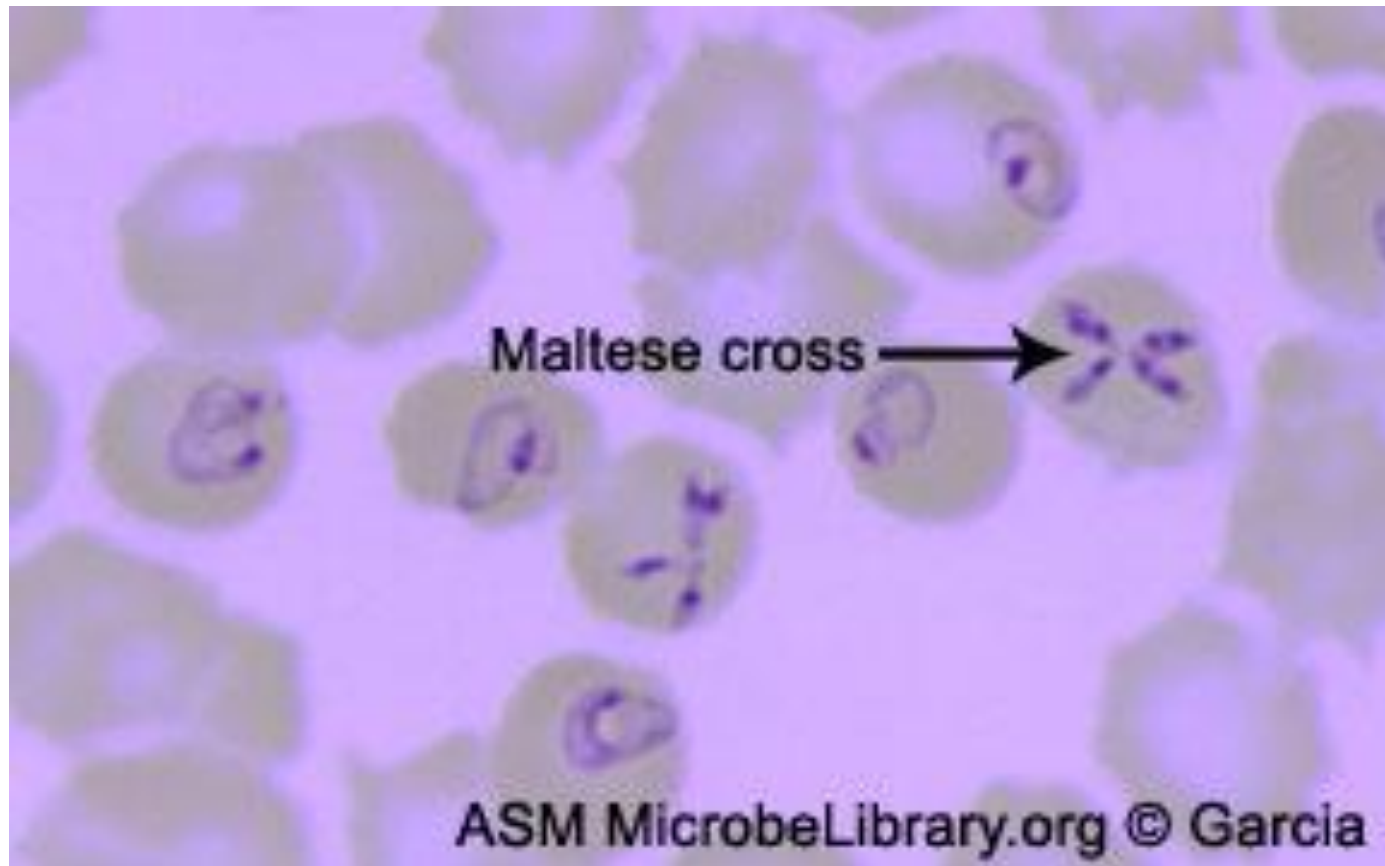
- IV Antibiotics
- Azithromycin 500mg IVI twice weekly
- Gentamicin 40mg to 80mg IVI daily--
5dys on,2 days off for 2 weeks, pulsed -
--6--7mg/Kg as an infusion.
- Check renal function every 3 days, risk
of deafness.
- 3 to 9 months of treatment.

Specific Management

Babesiosis

- Intracellular Erythrocyte Piroplasm (Similar to Malaria)
- Symptoms: Profuse night sweats, Intermittent fevers, Chest pain, Dyspnoea (Air Hunger), Vivid dreams, Haematuria and Spontaneous bruising
- A case of misdiagnosis at Canberra Hospital (Discussion)

Babesia Blood Film



Babesia Treatment

- Babesia is quite difficult to diagnose
- Acute Babesia is treated with Doxycycline, Azithromycin and Hydroxychloroquine
- Chronic Babesiosis is a controversial diagnosis and requires a complex treatment (Discussion)
- Often a cause of Chronic Morbidity

Chronic Babesiosis-- Antibiotics

- Oral Antibiotics
- Atovaquone 5mls bd
- Riamet 4 bd, 3 days per week
- Malarone 250/100mg 1 to 2 daily
- Artemisinin 200 to 400mg , 3days on ,4 days off.
- Nitazoxanide 500mg bd.

Chronic Babesiosis-- Antibiotics

- IV Antibiotics
- IV Clindomycin 600—900mg daily for 2 weeks on ,1 weeks off.
- IV Lincomycin 1200mg daily for 2 weeks on, 1 week off.
- Pulse for up to 3 month. Pathology 2 to 4 weekly
- Side effects– rash, allergy, liver disfunction, vomiting , diarrhea , hypotension

Other Considerations

Biofilm: A structured community of micro-organisms (Clinical implications)

- Serrapeptase, Nattokinase and Lumbrokinase
- Stevia
- These are to be used in combination with antibiotics

Adjunctive Therapies

- Hyperthermia---- Germany, Malaysia: 41.5 C to 42C, 6 to 9 hours, plus antibiotics and General Anaesthetic. Highly effective for Borreliosis.
- Ozone---Limited in Australia; Cyprus Mexico,USA. Very effective for post treatment cellular repairs. Anti-infection?
- Apheresis– Useful in life threatened VBDs

Adjunctive Therapies

- Immunoglobulin – IV IgG: Start 1 gm weekly to 5 gms weekly , better than higher doses. Cytokine regulation.
- Low Dose Naltexone 0.5mg to 4.5mg at night (morning):Cytokine regulation, sleep, GABA pathways.
- Medicinal Cannabis--- sleep, pain , seizures , mood and cognition.

New Allopathic Treatments-- Dapsone

- Dapsone---A sulfone antibiotic
- Used commonly to treat Leprosy, Dermatitis Herpetiformis, Granuloma annulare.
- Dr Richard Horowitz – Persistent “Lyme”.
- Effective for Borreliosis, Bartonella, Babesia
- Always take Folic Acid (Folinic Acid) 1bd

Dapsone Doses

- Standard
- Start Minocycline/Doxycycline 2 daily
- Nystatin, Probiotic
- Dapsone– Week1 25mg 1 twice weekly
- Week2 25mg 1 every 2nd day
- Week3 25mg 1 daily
- Week4-6 50mg to 100mg daily
- Always with food, for 3 to 6 months.

Dapsone Doses

- Sensitive Patients.
- Minocycline 50mg 1 to 2 weekly
- Dapsone 25mg 1 every 2weeks, then 1 weekly to 50mg daily over 3 to 6 months
- Well tolerated and often very effective in highly sensitive patients.
- Significant therapy is a “game changer”

Dapsone Side Effects

- Nausea, loss of appetite , dizziness
- Allergic reaction
- Steven Johnson Syndrome
- Hepatitis
- Haemolytic Anaemia
- Always use folate or folinic acid bd—
appears to prevent more serious side effects.

Latest Treatment ---Disulfiram

- Acetaldehyde Dehydrogenase Enzyme Inhibitor
- Known antimicrobial especially in Streptococcal, Staphylococcal and Malarial infections.
- Extremely useful in Persister “Lyme” Disease
- First line medication?
- Effective for Borreliosis and Bartonella

Disulfiram

- Use with existing antibiotics.
- Must stop Tinidazole/Metronidazole due interaction.
- Pathology every 2 the 4 weeks.
- Take Thiamine 100mg 1 daily.
- No Alcohol!
- Herxheimer is most prominent side effect.
- Off all antibiotics in 4 to 6 months

Disulfiram Dosing Schedule

- Week 1 and 2: 50mg i.e. every 3 days for 5 doses.
- Week 3 and 4: 100mg i.e. every 3 days for 5 doses.
- Week 5 and 6: 150mg i.e. every 3 days for 5 doses.
- Week 7 and 8: 200mg i.e. 1 every 3 days for 5 doses.
- Week 9 and 10: 200mg every 2nd day.
- Week 11 ongoing: 200mg 1 daily

Herbal Treatment for VBD

- Very useful as a first line therapy in mild cases of VBD, adjunctive with antibiotics, or as a post treatment option.
- Andrographis: anti-spirchetal, immune support, organ protective.
- Cats Claw: anti-borellia, mycoplasma, immune modulation, anti-inflammatory.
- Japanese Knotweed: anti-microbial,

Herbal Treatment for VBD

- Houttuynia: anti gram pos and neg bacterial, fungal, viral and parasitic infections. biofilm disruption, anti-inflammatory, anti-oxidant.
- Buccal Skullcap: anti-inflammatory, cytokine modulation, antiviral, neuroprotective.
- Cordyceps: cytokine modulation, immune boosting.

Herbal Treatment for VBD

- Oregon Grape: antibiotic, mycoplasma, babesia, chlamydia, anti-inflammatory.
- Lions Mane: neuroborreliosis, anti-inflammatory, improves cognition.
- Jamaican Dogwood: analgesic, anti-spasmodic, headache, anxiety, insomnia.
- Withania
- St Marys Thistle
- Astragalus
- Ziziphus

“Making tick-borne diseases and stealth infections notifiable will help to build the risk profile of tick bites and other vectors, and allow the impact of such diseases to be better understood”

Prof Gilles Guillemin

The Future

- New Integrative Centre for VBDs
- DSCATT Guidelines.
- Medical opinion will need to be shaped by the published science.
- MBA issues.
- Government.
- Education , awareness and research .
- VBD Research Unit : Macquarie University And NSW Health Pathology