Treponema PBL day one: questions arising from class discussion

1. What are the genetic properties that might contribute to an epidemic?
2. What are yaws and bejel and what is their relationship to VS?
3. How do we identify VS (venereal syphilis) archaeologically?
4. What are the historical sources that discuss VS? Do they give an origin? Cures?
5. Is it possible that VS was being identified as leprosy or other similar conditions? Treatments?

Day 2: library research (in groups, all together)

Day 3: Discussion on findings and formulation of further questions
S1 -- background on yaws/bejel and VS. Spread and areas of origin. Infects mostly children, most susceptible both because of behavior and biology.
S2: yaws has been found in Africa in Homo erectus. Diffusion of bejel with the slave trade, reduces with improvement in sanitation.
S3: genetics; like leprosy, very difficult to culture in a Petri dish, can't be observed over time and genes from other species are difficult to map. How does it infect a cell? Leprosy has fatty coating and DNA preservation, but treponema doesn't.
S4 suggests an article on pre-C syphilis in Europe & article on St. Mary Spital from England.

S5: differences in bones between yaws, bejel and syphilis. Each affects different bones in different ways. Hands/feet in bejel and yaws more often but all three affect long bones.
S6: looking at congenital versus VS.
S7 asked about rickets; S9: syphilis starts earlier and the cause on the bone is different.
S8: bone involvement is one of the last stages and is 15-20 percent. Saber shin as symptom, gumma of bones.
S9: caries sicca pitting in the bones.

S4: syphilis is the most written-about infectious diseases. Timeline: ancient Greeks and Romans; China?
S10; social status? how does stigma affect or not affect syphilis? German astrology; emphasis on cleanliness; German and Italian writers for the most part, Spanish rec for mercury cure; cannibalism? as cause of syphilis?
S10: codpiece?

S11: gonorrhea, malaria, leprosy and measles are the most commonly confused similar to leprosy.
Guiac wood: syphilis, leprosy and arthritis.
Mercury imported by Romans from Spain, North Africa, China.
S12: mercury applied topically. How toxic is it?

S3 will talk to Dr. Keeney in re virulence question.
What were the sources of guiac and mercury historically?
How toxic is topical mercury?
Day 4. Final presentations

S1: yaws, bejel and VS
Yaws: Very quick incubation 9-90 days, hard boil, which left untreated causes more lesions on the body. Disfigurement of bones will occur in third stage.
Bejel: nomadic Bedouin tribes, regarded as incurable so people in community expect to have it. More commonly contracted orally, so lesions on face, 3 stages. Last stage serious and affects bone, causes gumma. Both yaws and bejel are easily treatable by azithromycin/ penicillin.

S2: biological history. Yaws found 1.6 million years old, probably oldest treponemal disease, spread through slave trade. North America is where treponema mutated to form syphilis, after crossing of land bridge. Contact with yaws-based strain and new world strain, which evolved from bejel, and combination caused the epidemic. Study in 1998.

S3: genetics. Very small genome, only a little more than a million base pairs. Only 12 transmembrane proteins seem to indicate virulence. aDNA cannot be observed in archaeological record because the cell is too fragile. Syphilis has a very slow generation time: doubles population in 30 to 50 hours, as opposed to 20 minutes for E. coli. (=90% faster)
Horizontal genetic transfer: 2 bacteria come together and exchange genetic information, can increase virulence or give rise to new strain. Could this be why the sudden outbreak of a much worse venereal infection?

Intersection group
S7: connection of black bile to syphilis as all the other diseases blamed on humoral causes (leprosy, elephantiasis, cancer, etc.) Therapies also similar for those conditions. Confusion case of leprosy and syphilis. Lesions do come and go.

S12: took us through the chart of comparisons.

S11: on mercury; where it comes from, how you get it, less toxic than modern environmental mercury. Guaiac tree, from Spain, made into tea for drinking/ anti-inflammatory properties.

S7: what is the Bible reference? To an earlier strain. Passing around of blame between various populations, e.g. “French disease,” “Polish disease.”

Literary and written evidence.
S10: early sources, recommendations, astrology.
Theory about cannibalism; experiments on pig, bird, dog.
S14: eighteenth-century origins of syphilis theories. Blaming of the neighbor, leprous, menstruating female, whores, etc.

S13: German physician Grunpeck, 1496. Grunpeck has a lot of suggestions about what to do, but nothing about where the disease comes from, except for a theological one. Theory on sin, top three lust, pride and avarice.

S4. 1908: theories on the system of Syphilis. Three "primary and authentic" sources that support the new world hypothesis. Diaz de Isla notes that people in the new world already had a name for the condition and a well-developed cure incl. guiac tree. Oviedo, courtier and scholar, friends with Ferdinand Columbus, "loose Indian woman" gave syphilis to Spanish, but book is all about how Spanish should dominate native populations. Las Casas, father acc Columbus in 1498 and ended up moving there permanently. In Haiti natives told him that the disease had been there a long time.

Skeletal remains.
S5: bone markers of treponemal disease in archaeological remains. Microscopic evidence: sp? poulsters, tiny lesions; grenzstreifen, marks that distinguish where the bone grows back after lesions develop.
S8: distinguishing between the treponematoses in bone. Caries sicca, buckshot to the top of the head. Gummatous and non-gummatous lesions, soft growth (NB: not growth), putrefying. Saber shin in children. Hutchinson's teeth; eats away at middle of tooth, so that tooth looks like a half moon. Higoumanaki's sign, enlarged clavicle, similar to saber shin. Yaws and bejel do not usually have skull damage, though they will have mostly hands/feet (sausage finger, dactylitis), sometimes center face.

S6: limitations. Most cases (<20 percent) don't show skeletal evidence; fragmented bones can cause a big problem.

S9: old world versus new world: articles tend to identify skeletons with "treponemal disease" for old world, mostly isolated long bones. Scientists are not comfortable with identifying which treponema it is aside from IDing the main skeletal characteristics that show treponematosis.