Chronic Conditions

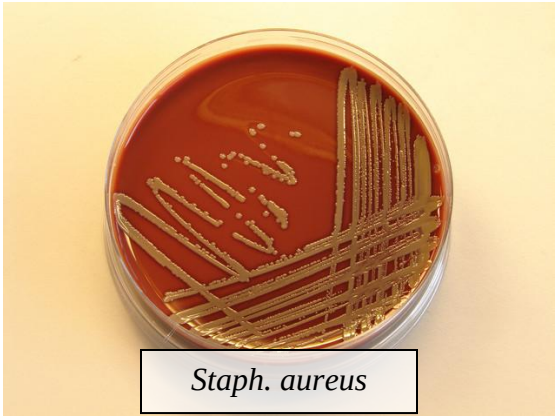
By: Bryon Verhaeghe

A single and moving bacteria is called planktonic and may replicate in this phase. While bacteria are stationary and dormant they are called sessile. In these different physiological states it takes different agents (antibiotics) to inhibit or kill them.

For survival in the sessile state bacteria will group in colonies and form a protective coating called biofilm. This biofilm protects the bacteria from harm. Disturbing the biofilm allows the immune system to reach the bacteria. The only way for the bacteria to repair their biofilm is to become planktonic and replicate. This is a very vulnerable time as the cell wall is accessible and rapid killing is possible. This is the only time that penicillin's are effective. All established infections in the body contain biofilm and this is why the lab will test microbial sensitivities only until the 48 hour point of a culture as then the biofilm is formed and the antibiotics become inactive.

Some agents block the formation of biofilm, some destroy the biofilm, and some destroy the bacteria's cell wall. Using a combination of agents to affect the bacteria in multiple states is called physiological conflict. Few single agents can cause this conflict and a combination appears to be the future direction of anti-microbial therapies. The inability to eradicate infections has lead to widespread use of the term auto-immune disorders and chronic conditions that constantly recur even though antibiotics help with acute flare-ups.

The lab tests one and occasionally two agents against a bacteria without presence of active immune cells. What is being realized is that the in vitro (in the lab) is much different than in vivo (in the body). Surprising results are being realized in vivo when they were found to be inactive in vitro.



Staph. aureus

Two of the most revered bacteria are *Staph. aureus* and *Pseudomonas aeruginosa*. Consequently they are the highly studied and are commonly found in auto-immune and chronic conditions. *Staph. aureus* is noted to produce one of the largest repertories of toxins including the unusual ability to coagulate

blood. This inhibits the arrival of the immune system. The *Pseudomonas. aeruginosa* is a formidable pathogen that can live in environments void of nutrients such as distilled water, high temperature hot tubs, and frozen mountain streams. They have been found living in surgical scrub agents (iodine and betadine) and are commonly found on the hands of surgeons. Often they are the cause of childhood "swimmers ear" and are found below the water line of toilets in North America. They are known to cause disease in all areas of the body and are very common in chronic respiratory disorders such as bronchitis and asthma. Both of these pathogens are opportunistic in such a way that they might not be the original cause of the problem, but often establish in a weakened host to create the chronic and recurrent condition.

Pseudomonas. aeruginosa

Newer thinking in infectious disease is the target of the biofilm more than the direct killing of the bacteria. This is leading to the discovery of old agents previously thought inactive to be useful and effective therapies. An example of this is found with the family of macrolide antibiotics that are based on erythromycin and the enhanced versions known as clarithromycin and azithromycin. The last is produced by Pfizer under the brand name Zithromax. The drug is supplied with an insert paper stating "Inherently resistant organisms – *Pseudomonas*". In medicine today it is believed that azithromycin has no activity against Pseudomonas, yet a study from Japan printed in April 2005, **Antimicrobial Agents and Chemotherapy**, reporting the cidal activity of azithromycin against *Pseudomonas. aeruginosa* by affecting the biofilm in people with chronic respiratory ailments.

Azithromycin is not effective against *Staph. aureus* when in the physiological state called dwarf form and another agent may be required.

Western medicine is focused on treating acute conditions and the symptoms of long term problems. Many universities are interested in chronic conditions and publish the results of their study. Occasionally there is a text book on the subject. Slowly some of these findings are being used in mainstream medicine. Part of the problem is that the research is done in vivo where vast numbers of variables exist and is sometimes so confusing that the study ends in frustration. It is time and patience consuming.