

Paul Ehrlich - Another coworker of Koch's lab,
and made the reaching discoveries in immunology
and chemotherapy. He suggested the staining
technique of bacteria in tissues. He also found
bacterial cells absorb selected dyes to a greater extent
than surrounding tissue. He further
hypothesized that a toxic dye might destroy
the bacterium without significant damage to
the host tissue. He suggested organic
arsenicals might be synthesized which
would be harmless to animals but toxic to invading
parasite.

Arsenicals - organic derivative of arsenic - a toxic element. Arsenicals were synthesized and used on trypanosomal infections on mice. 606th compound he synthesized proved to be effective in curing these protozoan infection.

At this time Spirochete - caused syphilis was reported by its discoverer Fritz Schaudinn. Ehrlich proceeded to test 606 as the cure for syphilis, remarkably successful, and thus the magic bullet against dreaded disease syphilis was discovered.

The Magnitude of the discoveries can be understood by considering that he developed his method in 1881, when Anthrax was reported to be causal agent of disease. In later 20 years, Koch & his coworkers confirmed that microbes were the causative agents of a no. of human & animal diseases.

Chemical antiseptics originated with Joseph Lister 1827-1912 - English physician who employed ~~plastic surgery~~ carbolic acid for antiseptics during surgery. Koch extended his work and devised a method for comparing efficiency of chemical antiseptics.

He dried cultures of bacteria, generally anthrax spores, on small pieces of thread of silk, which were then immersed in the antiseptic solution.

At intervals, a thread was removed from this antiseptics, washed ^{ed} in sterile water and placed in a growth medium to determine whether the organism remained viable. Koch - found that

carbolic acid - weak in its disinfecting power and all the substances he tested - perchloride of Hg was most effective. It destroyed bacterial spores at high dilution and in the shortest period of time.

Ferdinand Cohn suggested in 1872, that microbes are involved in the cycling of all matter and that the activity of organisms in the biosphere allowed for the reutilization of cellular constituents.

Martinus Beijerinck :- a great botanist provided much foundation for the elucidation (1851-1931)

of various functions of microbes in cycles of matter.

Introduced principle of enrichment culture (a means by which an organism evolved to exist under any chosen conditions of temp., pH, salinity, osmolarity and so on can be isolated). This provided a test for isolating various types of microbes (Physiological forms) from natural environments. An enrichment medium is prepared with a defined chemical composition and inoculated with soil or water rich in microbes.

He discovered free living, N_2 fixing bacteria by enrichment - media derived of Nitrogen.
Anaerobic form he named - Archaeobacterium and studied

Symbiotic N_2 fixing organism (Rhizobium)
He described many major groups of bacteria: The
Ruminant organism (Photobacterium), the sulfate
reducers (Desulfovibrio), methane generating bacteria
Thiobacillus denitrificans - organism involved

in denitrification.

He proposed the genus Lactobacillus - recognised existence of stable living genus - which he called "Centarium vivum fluidum" - accepted as initial description of a virus (specially TMV). Microbial physiology & ecology.