

{{Uncurated}}

{{Biorealm Genus}}

==Classification==

===Higher order taxa===

Domain: Bacteria; Phylum: Firmicutes; Class: Bacilli; Order: Bacillales; family; Bacillaceae

===Species===

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"Bacillus infantis"

==Description and significance==

"Bacillus infantis" are a rod-shaped, endospore forming, Gram-positive, aerobic, oxidase-negative, catalase-positive species of *"Bacillus"*. *"B. infantis"* was originally determined to be distinct from other species of *"Bacillus"* on the basis of 16S rRNA gene sequencing (3).

The species name *"infantis"* is Latin for 'infant' and refers to the source of the first strain –SMC 4352– to be studied. *"B. infantis"* was first isolated in blood cultures from a newborn child with sepsis and described in 2006 by medical researchers in South Korea (3).

On the basis of 16S rRNA gene sequencing, *"B. infantis"* shows the closest similarity to *"B. firmus"*. Other strains of *B. infantis* have since been described. Most notable of these is *B. infantis* sp. AAA, which in at least one study has been shown to be effective at biodecolorizing azo dyes (2).

Synthetic dyes are often harmful to the environment because of their complex structure that resists degradation (2). Despite this, some microbes have the ability to degrade dyes, and thereby alleviate some of the environmental strain caused by pollution. *B. infantis* sp. AAA has been shown to possess the ability to degrade these dyes (2). This ability may prove useful in future bioremediation efforts.

==Genome structure==

B. infantis has one circular chromosome that is 4.88 Mb in length (1). The study that provided this statistic did not provide a strain. The chromosome contains a total of 4828 putative genes along with 45 expected pseudogenes (1). G+C content was determined spectrophotometrically to be 40.8 mol% (3). The proteome of this species includes at least 4670 distinct proteins (1). Another study using the strain NRRL B-14911 found the genome to be 4.88 Mb in length and

predicted a total of 5178 putative genes along with 1 pseudo gene (5). This same study predicted that of the 5178 putative genes, 5066 of there are protein coding and 112 and RNA genes (5). It should be noted that this study predicted the genome characteristics of *B. infantis* strain NRRL B-14911 using computer software – Pathway Tools software version 18.5 and MetaCyc version 18.5 to be specific.

==Cell and colony structure==

The cells of *B. infantis* are Gram-positive and rod-shaped (3). The major fatty acid found to be present in *B. infantis* is iso- C_{15:0} (44.0%), as determined by gas chromatography (3). Following the fatty acid iso- C_{15:0}, the next most common fatty acid is anteiso- C_{15:0} (30.9%), and followed by anteiso- C_{17:0} (7.4%) (3).

Little has been written about the colony structure of *B. infantis*.

==Metabolism==

B. infantis is organotrophic aerobe that has the ability to metabolize *D*-xylose, galactose, glucose, fructose, mannitol, sorbitol, methyl α-D-glucoside, N-acetylglucosamine, amygdalin, arbutin, aesculin, salicin, maltose, melibiose, sucrose, trehalose, raffinose, starch, glycogen, gluconate, cellobiose, lactose and inulin (3). One study predicted the strain NRRL B-14911 to have over 321 possible metabolic pathways and 1088 different participating enzymes (5). As mentioned previously, the AAA strain of *B. infantis* has been shown to degrade azo dyes (2).

==Ecology==

B. infantis strain SMC 4252 has been found to grow well at 37 °C on blood agar (3). *Bacillus infantis* was first found in a newborn child with sepsis (3). Likewise, the *B. infantis* strain AAA has also been found to grow well at 37 °C on Marine Zobell agar (2). The AAA strain of *B. infantis* has also been isolated from marine seawater (2). On the basis of these results, *B. infantis* may be considered mesophilic and, in the case of strain AAA, halotolerant. At least one study of *B. infantis* have shown it to be isolated from open ocean at a depth of ~10 m (bio). This study isolated the strain NRRL B-14911 from the Gulf of Mexico, USA (5).

==Pathology==

As mentioned, *B. infantis* was first isolated from a newborn with sepsis (3). Sepsis is defined to be clinical syndrome associated with a systemic response to infection (4). *B. infantis* could not be identified as the cause of neonatal sepsis. This uncertainty was the result of the presence of several other microorganisms isolated from the child (3).

==References==

- (1) *Bacillus infantis* (2013). Retrieved from <http://www.ncbi.nlm.nih.gov/genome>
- (2) K V Bhaskara Rao, & A S Arun Prasad. (2014). Biodecolourisation of azo dye reactive red 22 by *Bacillus infantis* strain AAA isolated from seawater and toxicity assessment of degraded metabolites. *Nature Environment and Pollution Technology*, 13(2), 369.
- (3) Ko, K. S., Oh, W. S., Lee, M. Y., Lee, J. H., Lee, H., Peck, K. R., . . . Song, J. (2006). *Bacillus infantis* sp. nov. and *Bacillus idriensis* sp. nov., isolated from a patient with neonatal sepsis. *International Journal of Systematic and Evolutionary Microbiology*, 56(11), 2541-2544. doi:10.1099/ijs.0.64213-0
- (4) O'Brien, J. (2007). Sepsis. *Am J Med*, 120(12), 1012-1022. doi:10.1016/j.amjmed.2007.01.035
- (5) Subhraveti, P., Ong, Q., Holland, T., Kothari, A., Keseler, I., Caspi, R. & Karp, P. (2014). Summary of *Bacillus infantis*, strain NRRL B-14911, version 19.0. Retrieved from <http://biocyc.org/BINF1367477/organism-summary?object=BINF1367477>

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