

Proteus mirabilis

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Proteus Mirabilis Proteus mirabilis is part of the Enterobacteriaceae family. It is a small gram-negative Rod, and a facultative anaerobe, lastly, it is a Prokaryote. Furthermore, Proteus mirabilis is characterized by its swarming motility, its ability to ferment maltose, and its inability to ferment lactose. P. mirabilis has the ability to elongate itself and secrete a polysaccharide when in contact with solid surfaces, making it extremely motile on items such as medical equipment (catheters). Moreover, Proteus mirabilis is part of the normal flora of the human gastrointestinal tract. It can also be found free living in water and soil. The most common infection involving Proteus mirabilis occurs when the bacteria moves to the urethra and urinary bladder, which can cause Urinary Tract Infections. In addition, Urinary tract infections caused by P. mirabilis occur usually in patients under long-term catheterization. Additionally, the bacteria have been found to move and create incrustations on the urinary catheters which cause the catheters to be blocked (Biofilms). On the other hand, Proteus mirabilis can enter the bloodstream through wounds which happens when people have contact between the wound and an infected surface. Then, the bacteria induce an inflammatory response that can cause sepsis and systemic inflammatory response syndrome (SIRS). The flagellum of P. mirabilis is crucial to its motility, a characteristic that helps this organism colonize. Moreover, since P. mirabilis flagellum has also been linked to the ability to form biofilms, it aids in the bacteria's resistance to defenses of the host and select antibiotics. On a switching note, since P. mirabilis is Urease positive this allows it to thrive by raising its PH which can lead to stone formation in the kidneys (kidney Stones). Infections caused by P. mirabilis are seen most often in nursing

home patients because of infected medical materials such as gloves and catheters. The medical materials used in nursing homes are not properly sanitized and therefore causing *P. mirabilis* infections. UTI's are high amongst sexually active individuals and those that have unprotected sex (No Condoms). Signs and symptoms of *P. mirabilis* are dark and smelly urine which is common of the UTI and maybe even blood in urine. Furthermore, another sign is an increase urge to urinate even if not a lot of urine comes out. *Proteus mirabilis* infections can be treated with broad-spectrum penicillins or cephalosporins except in severe cases. *P. mirabilis* is not susceptible to nitrofurantoin or tetracycline and has experienced increasing drug resistance of ampicillin, trimethoprim, and ciprofloxin. In cases with severe stone formation, surgery is necessary to remove the blockage. Since *Proteus mirabilis* is part of the normal flora of the gastrointestinal tract, as a result the bacteria enter the urinary tract or infects medical equipment by the fecal route. Consequently, prevention includes good sanitation and hygiene, including proper sterilization of medical equipment. It is also suggested that patients not requiring catheterization should not receive catheterization, despite its convenience for the caretaker. An alkaline urine sample is a possible sign of *P. mirabilis*. *P. mirabilis* can be diagnosed in the lab due to characteristic swarming motility, and inability to metabolize lactose (on a MacConkey agar plate). *Proteus Mirabilis* Cruz Leon

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