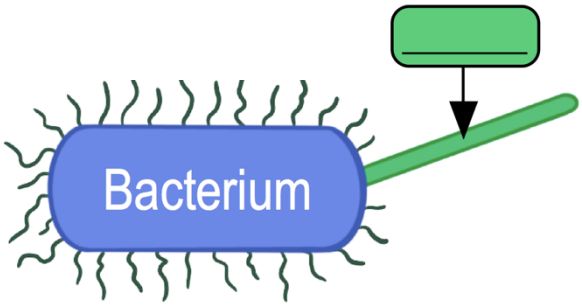
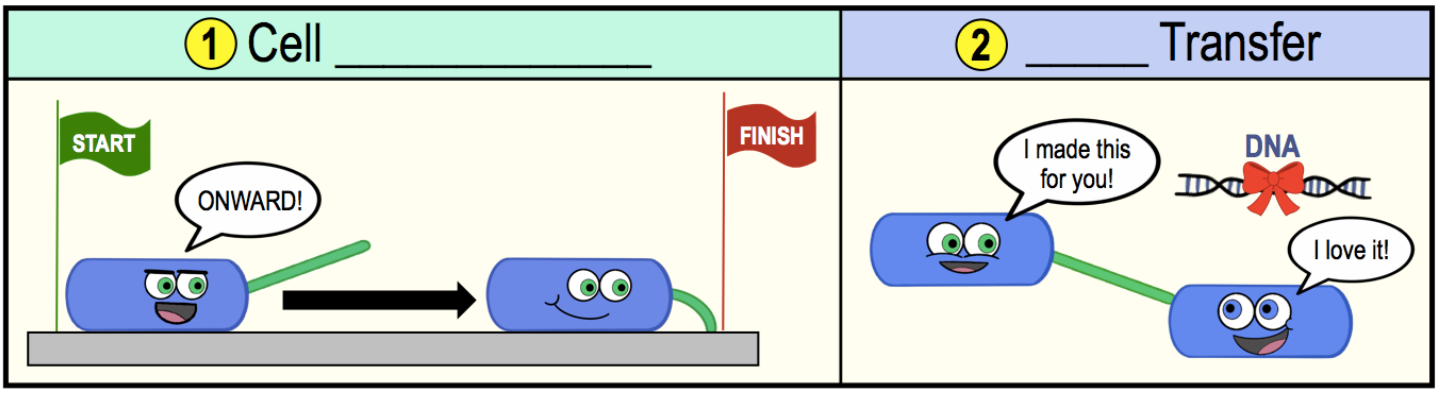
CONCEPT: PILI

- The surface of bacterial cells can have relatively _____, *filamentous* protein structures called *pili.*
  - □ **Pili (*singular* Pilus):** protein filaments that _____ from the cell surface & can have varied functions.



Functions of Pili

- Pili typically number in only 1-2 per cell & generally have _____ primary functions:



- **Motility:** the ability of an organism to _____.

PRACTICE: Which of these are true about pili?

a) Pili are short filaments of pilin on the surface of bacterial cells that allow neighboring cells to adhere to one another.
b) Pili allow cells to "crawl" across a surface.
c) Pili are short filaments on the surface of archaea cells that allow neighboring cells to adhere to one another.
d) Pili allow cells to share genetic information through a process called DNA transfer or conjugation.
e) A and B.
f) B and C.
g) A and C.
h) B and D.

CONCEPT: PILI

Cell Motility by Pili

●Pili are involved in ____ types of cell *motility*:

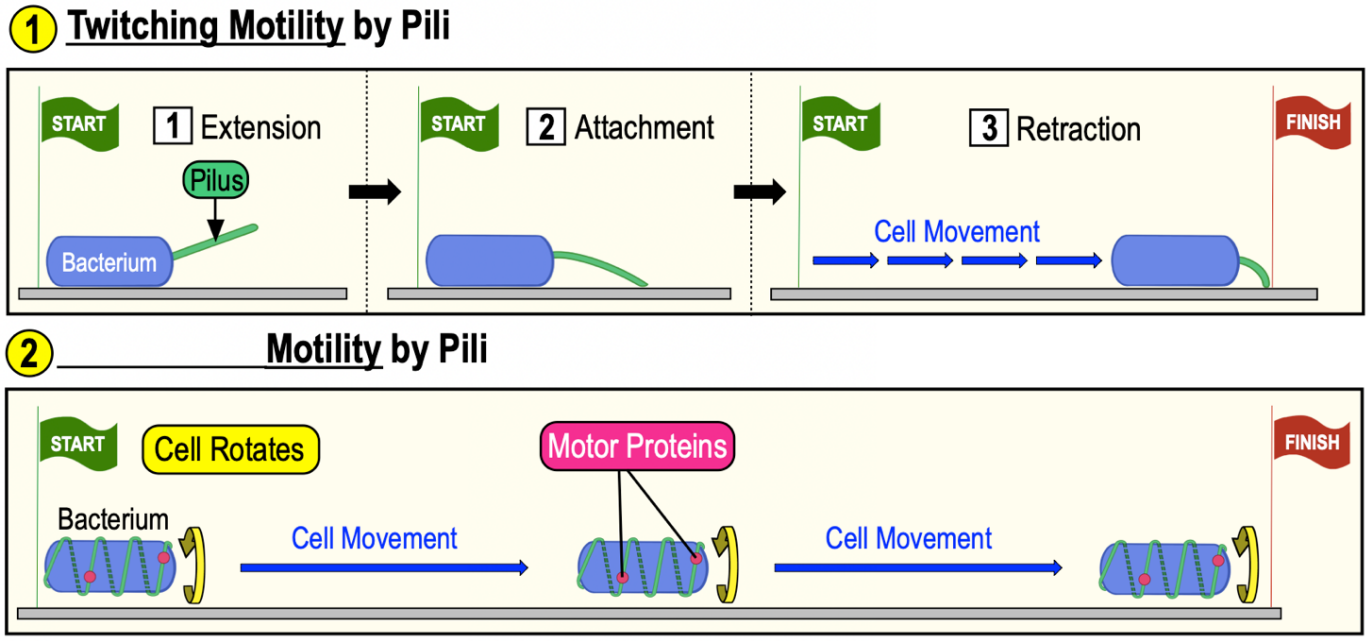
1) _____ **Motility:** *pili* extends from cell & attaches to a surface then retracts & drags cell forward.

□ During retraction, cell moves towards destination in a "*twitching*" or "_____" motion.

2) **Gliding Motility:** the _____ movement of a cell along an axis.

□ _____ proteins attach to surfaces surrounding the cell, but exact mechanism is unknown.

EXAMPLE: Two different types of cell motility driven by pili.



PRACTICE: _____ is the mechanism where a bacterial cell uses its pili to crawl across a surface towards a destination:

a) Conjugation.
b) Gliding motility.
c) Cell swimming.
d) Twitching motility.
e) None of the above.

PRACTICE: Scientists believe some bacteria are able to "glide" through their environment by…

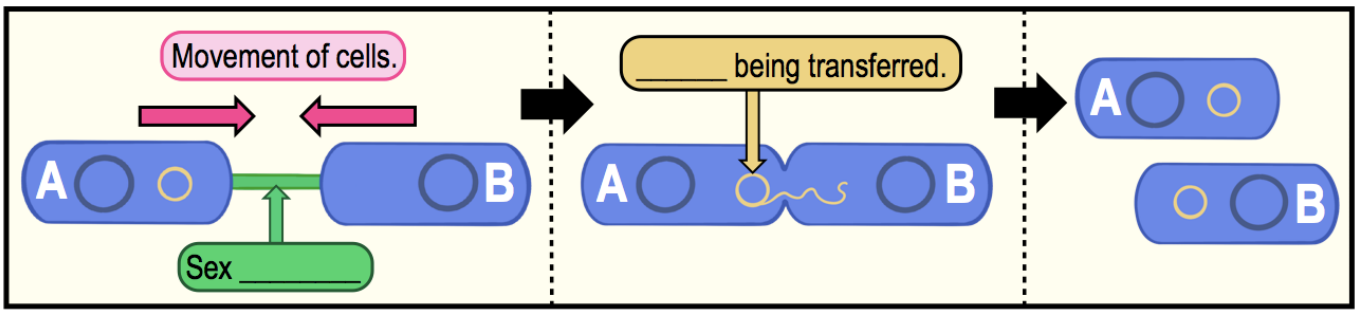
a) Attaching their pilus to a surface and pulling the cell towards the destination.
b) Moving their flagella back and forth allowing them to swim towards the destination.
c) Using motor proteins on the cell's surface to spin the cell along an axis towards the destination.

CONCEPT: PILI

Sex Pilus

- _____ **Pilus (Conjugation Pilus):** connects two cells for a special type of DNA transfer.
  - □ _____: process of transferring *DNA* from one bacterial cell to another by *direct contact*.
  - □ Transferred DNA can add a new function to a cell (for example _____ to *antibiotics*).

EXAMPLE: A Sex pilus brings two cells together to directly transfer genetic material.



PRACTICE: Which cellular structures are involved in conjugation?

a) Cilia.
b) Fimbriae.
c) Flagella.
d) Pili.
e) All of the above.

PRACTICE: Which of the following is NOT a function of pili?

a) Gliding motility of cells.
b) Conjugation (DNA transfer).
c) Antibiotic resistance.
d) Twitching motility of cells.
e) All are functions of pili.