how can we better understand the difference to make it simple look to its purpose cilia for movement and microvilli for absorption.

To understand what each of them does let's look at each of them in the context of the human body.

**Cilia:**

In the lining of your upper respiratory tract you have simple columnar epithelial tissue that have cilia projections.

Goblet cells around these cells produce mucus which captures foreign particles that are in your airway.

The purpose of the cilia is to move the mucus and the foreign particles up the airway where it can be swallowed or coughed out.

Cilia has a protein microtubule filament structure which in conjunction with motor proteins allows for movement.

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| Epithelia may possess cilia these cilia may sweep a secretion on the outside of the cell. for example in this pseudo stratified columnar epithelia the cells are ciliated because they are sweeping mucus away from the lungs. This mucus has trapped dirt debris microbes dust etc and it sweeps it away from the lungs in order to protect the lungs.  this is another ciliated epithelium, it is simple columnar epithelia it is ciliated because this lines the oviduct and the current which is created in part by the action of the cilia helps to move the secondary oocytes after ovulation towards the uterus. |

**Microvilli-**

let's talk about microvilli similarly in the lining of your small intestines you have simple columnar epithelial tissue but it is non-ciliated.

The purpose of the microvilli is to increase absorption of nutrients by increasing the surface area of the cell.

Since a flat apical cell surface cannot absorb as much as a surface with multiple finger-like projections that extend the surface area.

If you want to know differences in structure they are similar in the sense that they are both protein-based protrusions of a cell.

The cilia protein microfilaments are free to bend and move with the help of motor proteins while the protein projections of the microvilli also have lateral structure proteins which prevent movement of destruction.

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| The surface projection is cilia, these surface projections are in the apical region of the cells and there will be a basal body from the basal body they will be moving upward and they have some microtubule arrangement.  The centriole mechanism is there for motility and they have this 9+2 arrangement of the microtubules for bending movement.  they'll have the protein dynein for dynamic activity and they also have this atpase activity which can help to bend the cilia and to move the fluid in the lumen that could be the respiratory tract like the paranasal sinuses or the trachea bronchi or maybe it is the female reproductive system where the uterine tube or the oviduct will move the fertilized conceptus towards the uterus for implantation.  The cilia are also seen in the ventricles containing the csf to move the csf you need cilia so with that description the ventricles themselves are lined by ependyma so they will have the cilia to move the csf.  In bronchus they'll have the cilia to move the mucus cuff outside the respiratory tract.  **Epidermis and the ductus difference in the male reproductive system**  They don't have cilia actually they have stereocilia so how it is different from the cilia.  These are all surface projections there are three which we can discuss  **microvilli the cilia and stereocilia.**  Cilia with the basal body and centriole mechanism for movement. But then there are some cells which will have just the finger like projections to increase the surface area of absorption they are called as the **microvilli.**  These microvilli lie in the gastrointestinal tube, like small intestine having a striated border.  So, striated border in the small intestine is the microvilli regular arrangement. or you can have brush powder in the proximal convoluted tubule, the renal tubule for absorption.  So basically the brush border which we find in the functional convoluted tubule is also for absorption.  The microvilli, the finger like projections are increasing the surface area of absorption made peaceful understand or the uriniferous tubule, the nephron and these microbial life will have internal core of some microfilaments like actin filament.  now the difference is that in microvilli you have actin filaments, the microfilaments whereas in the cilia you have micro tubules.  In the ductus difference or the apparent damage, we have stereocilia. The stereocilia appears like microvilli because it also has this acting filament like the microvilli.  **How will i differentiate between a stereocelia and microvilli.**  Main difference is the location  The stereocilia are found in the inner ear, to detect movement.  In the male reproductive system it is just to increase the surface area of the absorption.  Difference in the length  Sterocilia are quite long as compared with the the finger like projections microvilli.  If microvilli is one unit of length then this could be four times longer. The length can be the differentiating feature .  **how will you differentiate stereocilia with cilia**  the length-  Sterocilia is quite long, the shortest is microvilli, intermediate height will be the cilia and the tallest will be stereocilia.  Moreover if you are comparing the stereocilia with the cilia they don't have any central mechanism for movement.  They are immobile and they do not have any microtubules what they have is only microfilaments like we said actin filaments.  So may be the stereocilia or microvilli they don't move as compared with the cilia which is basically to move the fluid made with the csf, maybe the mucus or made with the conceptus.  The central system having brain and the spinal cord and then we have taken a transverse section of the spinal cord which will then show you the h shape gray matter here and around that will be the white matter. White matter means exons and the gray matter means the neuron bodies.  The central canal which is filled with csf and is lined by appending depending on epithelium can be cuboidal, epithelium, or columnar.  Now the simple cape hurdle or columnar epithelium which you find lying the central canal is going to have the modification which is both the microvilli and cilia also now those microvilli are to increase the surface area of absorption and modify the contents that is the Cerebral spinal fluid (csf) constituents.  The cilia which are lining the ventricles filled with the csf like the central canal they will be moving the csf from the brain ventricles towards the central canal or towards the subarachnoid space so definitely a pandemic lining have cilia and also have microvilli.  **How does cilia work**  During fertilization, These cilia are present in the nutrient tube. Nutrient tube is actually simple columnar epithelium with cilia.  so there are two type of cells in the fallopian tube-  one is the peg cell which doesn't have the cilia which is to give nutritive factors or capacitive factors for the sperm.  other cell is the simple columnar cell with cilia. Cilia is important because now that cilia will help the muscular pedestals to send the conceptus towards the uterus hair.  Cartagena syndrome now we were talking about the cartagena syndrome in cartagena syndrome there is a triad  number one it is the decreased fertility and  number two there will be recurrent sinusitis and  number three there will be bronchi ectasis standardization of the bronchi  why does that happen plus in the lungs  because the respiratory system requires the cilia to move the mucus the bacteria out of the respiratory tube.  if there is immortal ciliac syndrome and cartilage syndrome you cannot clear the sinuses. There will be recurrent sinusitis and there will be recurrent lrti lower respiratory tract infection leading to bronchitis direction of the bronchi and pass accumulation in the lungs  anyhow that means we require cilia in the bronchus, we do have cilia only after eleventh subdivision of bronchus ,when you have lumen very small almost one millimeter then it becomes bronchioles.  The bronchus has the cilia to move mucus  Vas difference have stereocilia. They are present in the epidemic actually.  Columnar cells which are also called as the principal cells have the stereocilia.  look at the length of the stereocilia they have an inner core of actin filaments just like microvilli but then the difference between the microbial eye and stereocilia is their extreme length the length of the stereocilia is almost equal to the length of the nucleus of the principal cells here it is so tall.  stereocilia are immobile they are just to increase the surface area of absorption here.    The stereocilia was just to increase the surface area of absorption in the epidermis |

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| The **key difference** between cilia stereocilia and microvilli is that **cilia are tiny hair-like structures composed of actin filaments and microvilli are folds of cell membranes composed of actin filaments.**  Cilia, stereocilia and microvilli may appear as similar structures when observed from the outside. But they are structurally and functionally different from each other. They are hair-like structures which are microscopic. Moreover, they are protein fibers that extend outward from the cells.  **What are Cilia?**  Cilia are shorter and tiny hair-like structures present on certain cell surfaces. Generally, cilia have a uniform length. They are composed of hollow tubes known as microtubules. Cilia are mainly motile. They show rhythmic, sweeping motion in order to move materials in one direction parallel to the epithelial surface. There are three parts of a cilium. They are the basal body, the transition zone and the axoneme. The basal body is the base of the cilium.  There are some non-motile cilia as well. Motile cilia show 9+2 microtubule arrangement while non-motile cilia have 9+0 arrangement. Cilia line the epithelium of our respiratory tract. In respiratory passages, cilia sweep out mucus, dust, and dirt, helping us to breathe easier. Moreover, cilia are present in reproductive tracts, especially in the male reproductive system. What are Stereocilia? Stereocilia are hair-like protrusions composed of actin-based protein filaments. In fact, they are bundles of hair-like projections. They are longer than cilia. Unlike cilia, stereocilia are non-motile. Similar to microvilli, stereocilia are absorptive.  There are stereocilia in the inner ear in auditory and vestibular sensory cells.  In there, stereocilia serve as sensory transducers. Moreover, stereocilia are present in the male reproductive tract. There, stereocili facilitate absorption on the epididymis and ductus deferens. What are Microvilli? Microvilli are folds of the cell membrane of certain cells, especially in cells where absorption and secretion take place. They extend outward from the surface of the cell. Similar to cilia, they have a hair-like appearance. In fact, they are protein fibers. They contain actin filaments.  Microvilli are specialized for absorption and secretion. Hence, they are mainly present in the digestive tract and kidneys. Our small intestine has a lot of microvilli.  Microvilli increase the surface area of the cell membrane for absorption. Therefore, the efficiency of the absorption process enhances. Unlike cilia, microvilli do not move. Moreover, microvilli are shorter than cilia. What are the Similarities Between Cilia Stereocilia and Microvilli?  * Cilia, stereocilia and microvilli are hair-like structures found in the human body. * They are microscopic structures that consist of protein fibers. * They extend outward from the cell.  What is the Difference Between Cilia Stereocilia and Microvilli? Cilia are microtubule-based hair-like structures that project from the surface of cells. Stereocilia are bundles of actin-based filaments while microvilli are folds of cell membranes of absorptive and secretory cells. So, this is the key difference between cilia stereocilia and microvilli. Cilia are mainly motile while stereocilia and microvilli are non-motile. Moreover, stereocilia and microvilli are absorptive while cilia are not.  The below infographic shows more descriptions of the difference between cilia stereocilia and microvilli. Summary – Cilia Stereocilia vs Microvilli Cilia, stereocilia and microvilli are three types of hair-like microscopic structures found in the human body. Cilia are motile while stereocilia and microvilli are non-motile. Moreover, stereocilia and microvilli are absorptive while cilia are not. Cilia are composed of microtubules while stereocilia and microvilli are composed of actin filaments. Thus, this summarizes the difference between cilia stereocilia and microvilli. |