

Mechanisms of Disintegrants

1. Capillary action (Wicking):

- Disintegrants may act by facilitating the transport of liquids through the pores of the tablet and which weakens the intermolecular bond, as a result the tablet may break into fragments.
- Water uptake by tablet depends upon hydrophilicity of the drug /excipient and on tableting conditions.
- Example: Microcrystalline cellulose (Avicel).

2. Swelling:

- Rupturing of tablets can be caused by swelling of the disintegrant particles by absorption of water.
- Tablets with high porosity may show poor disintegration due to lack of adequate swelling force. On the other hand, sufficient swelling force is exerted in the tablet with low porosity.
- It is worthwhile to note that if the packing fraction is very high, fluid is unable to penetrate in the tablet and disintegration is again slows down.
- Example: Starch.

3. Deformation:

- During tablet compression, disintegrant particles get deformed and these deformed particles get into their normal structure when they come in contact with aqueous media or water.

- The swelling capacity of starch improved when granules were extensively deformed during compression.
- This increase in size of the deformed particles produces a breakup of the tablet.
- This may be a mechanism of starch and has only recently begun to be studied.

4. Particle repulsive forces:

- No swelling particle can also cause disintegration of tablets. The electric repulsive forces between particles are the mechanism of disintegration and water is required for it.
- Researchers found that repulsion is secondary to wicking.