An **EXCIPIENT** is an inactive substance used as a carrier for the [active ingredients](http://en.wikipedia.org/wiki/Active_ingredient) of a [medication](http://en.wikipedia.org/wiki/Medication)

used to bulk up formulations that contain very potent active ingredients, to allow for convenient and accurate dosage.

[1 Types of excipients](http://en.wikipedia.org/wiki/Excipient#Types_of_excipients)

* [1.1 Antiadherents](http://en.wikipedia.org/wiki/Excipient#Antiadherents)
* [1.2 Binders](http://en.wikipedia.org/wiki/Excipient#Binders)
* [1.3 Coatings](http://en.wikipedia.org/wiki/Excipient#Coatings)
  + [1.3.1 Changing the dissolution rates of active species](http://en.wikipedia.org/wiki/Excipient#Changing_the_dissolution_rates_of_active_species)
* [1.4 Disintegrants](http://en.wikipedia.org/wiki/Excipient#Disintegrants)
* [1.5 Fillers and diluents](http://en.wikipedia.org/wiki/Excipient#Fillers_and_diluents)
* [1.6 Flavours](http://en.wikipedia.org/wiki/Excipient#Flavours)
* [1.7 Colours](http://en.wikipedia.org/wiki/Excipient#Colours)
* [1.8 Lubricants](http://en.wikipedia.org/wiki/Excipient#Lubricants)
* [1.9 Glidants](http://en.wikipedia.org/wiki/Excipient#Glidants)
* [1.10 Preservatives](http://en.wikipedia.org/wiki/Excipient#Preservatives)
* [1.11 Sorbents](http://en.wikipedia.org/wiki/Excipient#Sorbents)
* [1.12 Sweeteners](http://en.wikipedia.org/wiki/Excipient#Sweeteners)

**Antiadherents**

[Antiadherents](http://en.wikipedia.org/w/index.php?title=Antiadherent&action=edit&redlink=1) are used to reduce the [adhesion](http://en.wikipedia.org/wiki/Adhesion) between the [powder](http://en.wikipedia.org/wiki/Powder_(substance)) ([granules](http://en.wikipedia.org/wiki/Granule)) and the punch faces and thus prevent sticking to tablet punches. They are also used to help protect tablets from sticking. Most commonly used is [magnesium stearate](http://en.wikipedia.org/wiki/Magnesium_stearate).

**Binders**

Binders hold the ingredients in a tablet together. Binders ensure that tablets and granules can be formed with required mechanical strength, and give volume to low active dose tablets. Binders are usually:

* [Saccharides](http://en.wikipedia.org/wiki/Saccharide) and their derivatives:
  + [Disaccharides](http://en.wikipedia.org/wiki/Disaccharide): [sucrose](http://en.wikipedia.org/wiki/Sucrose), [lactose](http://en.wikipedia.org/wiki/Lactose);
  + [Polysaccharides](http://en.wikipedia.org/wiki/Polysaccharide) and their derivatives: [starches](http://en.wikipedia.org/wiki/Starch), [cellulose](http://en.wikipedia.org/wiki/Cellulose) or modified cellulose such as [microcrystalline cellulose](http://en.wikipedia.org/wiki/Microcrystalline_cellulose) and [cellulose ethers](http://en.wikipedia.org/wiki/Cellulose#Derivatives) such as [hydroxypropyl cellulose](http://en.wikipedia.org/wiki/Hydroxypropyl_cellulose) (HPC);
  + [Sugar alcohols](http://en.wikipedia.org/wiki/Sugar_alcohol) such as [xylitol](http://en.wikipedia.org/wiki/Xylitol), [sorbitol](http://en.wikipedia.org/wiki/Sorbitol) or [maltitol](http://en.wikipedia.org/wiki/Maltitol);
* Protein: [gelatin](http://en.wikipedia.org/wiki/Gelatin);
* Synthetic [polymers](http://en.wikipedia.org/wiki/Polymer): [polyvinylpyrrolidone](http://en.wikipedia.org/wiki/Polyvinylpyrrolidone) (PVP), [polyethylene glycol](http://en.wikipedia.org/wiki/Polyethylene_glycol) (PEG)...

Binders are classified according to their application:

* Solution binders are dissolved in a solvent (for example [water](http://en.wikipedia.org/wiki/Water) or [alcohol](http://en.wikipedia.org/wiki/Ethanol) can be used in wet granulation processes). Examples include gelatin, cellulose, cellulose derivatives, polyvinylpyrrolidone, starch, sucrose and polyethylene glycol.
* Dry binders are added to the powder blend, either after a wet granulation step, or as part of a direct powder compression (DC) formula. Examples include cellulose, methyl cellulose, polyvinylpyrrolidone and polyethylene glycol.

**Coatings**

Tablet coatings protect tablet ingredients from deterioration by moisture in the air and make large or unpleasant-tasting tablets easier to swallow. For most coated tablets, a cellulose ether[hydroxypropyl methylcellulose](http://en.wikipedia.org/wiki/Hypromellose) (HPMC) film coating is used which is free of sugar and potential [allergens](http://en.wikipedia.org/wiki/Allergen). Occasionally, other coating materials are used, for example synthetic polymers, [shellac](http://en.wikipedia.org/wiki/Shellac), corn protein [zein](http://en.wikipedia.org/wiki/Zein) or other polysaccharides. [Capsules](http://en.wikipedia.org/wiki/Capsule_(pharmacy)) are coated with gelatin.

**Changing the dissolution rates of active species**

[Enteric coatings](http://en.wikipedia.org/wiki/Enteric_coating) control the rate of drug release and determine where the drug will be released in the digestive tract

**Disintegrants**

[Disintegrants](http://en.wikipedia.org/w/index.php?title=Disintegrant&action=edit&redlink=1) expand and dissolve when wet causing the tablet to break apart in the [digestive tract](http://en.wikipedia.org/wiki/Digestive_tract), releasing the active ingredients for [absorption](http://en.wikipedia.org/w/index.php?title=Absorption_(pharmcokinetics)&action=edit&redlink=1). Disintegrant types include:

* Water uptake facilitators
* Tablet rupture promoters

They ensure that when the tablet is in contact with [water](http://en.wikipedia.org/wiki/Water), it rapidly breaks down into smaller fragments, facilitating [dissolution](http://en.wikipedia.org/wiki/Solvation).

Examples of disintegrants include:

* Crosslinked polymers: crosslinked [polyvinylpyrrolidone](http://en.wikipedia.org/wiki/Polyvinylpyrrolidone) (crospovidone), crosslinked sodium [carboxymethyl cellulose](http://en.wikipedia.org/wiki/Carboxymethyl_cellulose) ([croscarmellose sodium](http://en.wikipedia.org/wiki/Croscarmellose_sodium)).
* The [modified starch](http://en.wikipedia.org/wiki/Starch#Modified_starches) [sodium starch glycolate](http://en.wikipedia.org/w/index.php?title=Sodium_starch_glycolate&action=edit&redlink=1)...

**Fillers and diluents**

Fillers fill out the size of a tablet or capsule, making it practical to produce and convenient for the consumer to use. By increasing the bulk volume, the fillers make it possible for the final product to have the proper volume for patient handling.

A good filler must be inert, compatible with the other components of the formulation, non-hygroscopic, relatively cheap, compactible, and preferably tasteless or pleasant tasting.

Plant cellulose (pure plant filler) is a popular filler in tablets or hard gelatin capsules. [Dibasic calcium phosphate](http://en.wikipedia.org/wiki/Dicalcium_phosphate) is another popular tablet filler. A range of [vegetable fats and oils](http://en.wikipedia.org/wiki/Vegetable_fats_and_oils) can be used in soft gelatin capsules.

Other examples of fillers include: [lactose](http://en.wikipedia.org/wiki/Lactose), [sucrose](http://en.wikipedia.org/wiki/Sucrose), [glucose](http://en.wikipedia.org/wiki/Glucose), [mannitol](http://en.wikipedia.org/wiki/Mannitol), [sorbitol](http://en.wikipedia.org/wiki/Sorbitol), [calcium carbonate](http://en.wikipedia.org/wiki/Calcium_carbonate), and [magnesium stearate](http://en.wikipedia.org/wiki/Magnesium_stearate).

**Flavours**

[Flavours](http://en.wikipedia.org/wiki/Flavouring) can be used to mask unpleasant tasting active ingredients and improve the likelihood that the patient will complete a course of medication. Flavourings may be natural (e.g. fruit extract) or artificial.[[1]](http://en.wikipedia.org/wiki/Excipient#cite_note-whoppt-0)

For example, to improve:[[1]](http://en.wikipedia.org/wiki/Excipient#cite_note-whoppt-0)

-a bitter product - [mint](http://en.wikipedia.org/wiki/Mentha), [cherry](http://en.wikipedia.org/wiki/Cherry) or [anise](http://en.wikipedia.org/wiki/Anise) may be used

-a salty product - [peach](http://en.wikipedia.org/wiki/Peach), [apricot](http://en.wikipedia.org/wiki/Apricot) or [liquorice](http://en.wikipedia.org/wiki/Liquorice) may be used

-a sour product - [raspberry](http://en.wikipedia.org/wiki/Raspberry) or liquorice may be used

-an excessively sweet product - [vanilla](http://en.wikipedia.org/wiki/Vanilla) may be used

**Colours**

[Colours](http://en.wikipedia.org/wiki/Colouring) are added to improve the appearance of a formulation. Colour consistency is important as it allows easy identification of a medication.

**Lubricants**

[Lubricants](http://en.wikipedia.org/wiki/Lubricant) prevent ingredients from clumping together and from sticking to the tablet punches or [capsule filling machine](http://en.wikipedia.org/w/index.php?title=Capsule_filling_machine&action=edit&redlink=1). Lubricants also ensure that tablet formation and ejection can occur with low[friction](http://en.wikipedia.org/wiki/Friction) between the solid and die wall.

Common minerals like [talc](http://en.wikipedia.org/wiki/Talc) or [silica](http://en.wikipedia.org/wiki/Silica), and [fats](http://en.wikipedia.org/wiki/Fat), e.g. vegetable [stearin](http://en.wikipedia.org/wiki/Stearin), [magnesium stearate](http://en.wikipedia.org/wiki/Magnesium_stearate) or [stearic acid](http://en.wikipedia.org/wiki/Stearic_acid) are the most frequently used lubricants in tablets or hard gelatin capsules.

**Glidants**

[Glidants](http://en.wikipedia.org/wiki/Glidant) are used to promote powder flow by reducing interparticle friction and cohesion. These are used in combination with lubricants as they have no ability to reduce die wall friction. Examples include [fumed silica](http://en.wikipedia.org/wiki/Fumed_silica), [talc](http://en.wikipedia.org/wiki/Talc), and [magnesium carbonate](http://en.wikipedia.org/wiki/Magnesium_carbonate).

**Preservatives**

Some typical [preservatives](http://en.wikipedia.org/wiki/Preservatives) used in pharmaceutical formulations are

* [Antioxidants](http://en.wikipedia.org/wiki/Antioxidants) like [vitamin A](http://en.wikipedia.org/wiki/Vitamin_A), [vitamin E](http://en.wikipedia.org/wiki/Vitamin_E), [vitamin C](http://en.wikipedia.org/wiki/Vitamin_C), [retinyl palmitate](http://en.wikipedia.org/wiki/Retinyl_palmitate), and [selenium](http://en.wikipedia.org/wiki/Selenium)
* The [amino acids](http://en.wikipedia.org/wiki/Amino_acid) [cysteine](http://en.wikipedia.org/wiki/Cysteine) and [methionine](http://en.wikipedia.org/wiki/Methionine)
* [Citric acid](http://en.wikipedia.org/wiki/Citric_acid) and [sodium citrate](http://en.wikipedia.org/wiki/Sodium_citrate)
* Synthetic preservatives like the [parabens](http://en.wikipedia.org/wiki/Paraben): [methyl paraben](http://en.wikipedia.org/wiki/Methyl_paraben) and [propyl paraben](http://en.wikipedia.org/wiki/Propyl_paraben).

**Sorbents**

[Sorbents](http://en.wikipedia.org/wiki/Sorbent) are used for tablet/capsule moisture-proofing by limited fluid sorbing (taking up of a liquid or a gas either by [adsorption](http://en.wikipedia.org/wiki/Adsorption) or by [absorption](http://en.wikipedia.org/wiki/Absorption_(chemistry))) in a dry state.

**Sweeteners**

[Sweeteners](http://en.wikipedia.org/wiki/Sugar_substitute) are added to make the ingredients more palatable, especially in chewable tablets such as [antacid](http://en.wikipedia.org/wiki/Antacid) or liquids like [cough syrup](http://en.wikipedia.org/wiki/Cough_syrup). Therefore, [tooth decay](http://en.wikipedia.org/wiki/Tooth_decay) is sometimes associated with [cough syrup](http://en.wikipedia.org/wiki/Cough_syrup) abuse. [Sugar](http://en.wikipedia.org/wiki/Sugar) can be used to disguise unpleasant tastes or smells.