



The Cereal Mash



When to Use

- Only required for non-malted or otherwise unprocessed grain
- Makes starches available to enzymes
- Like decoction, this technique is rarely if ever required, but if homebrewers took the easy way out we would just *buy* craft beer...

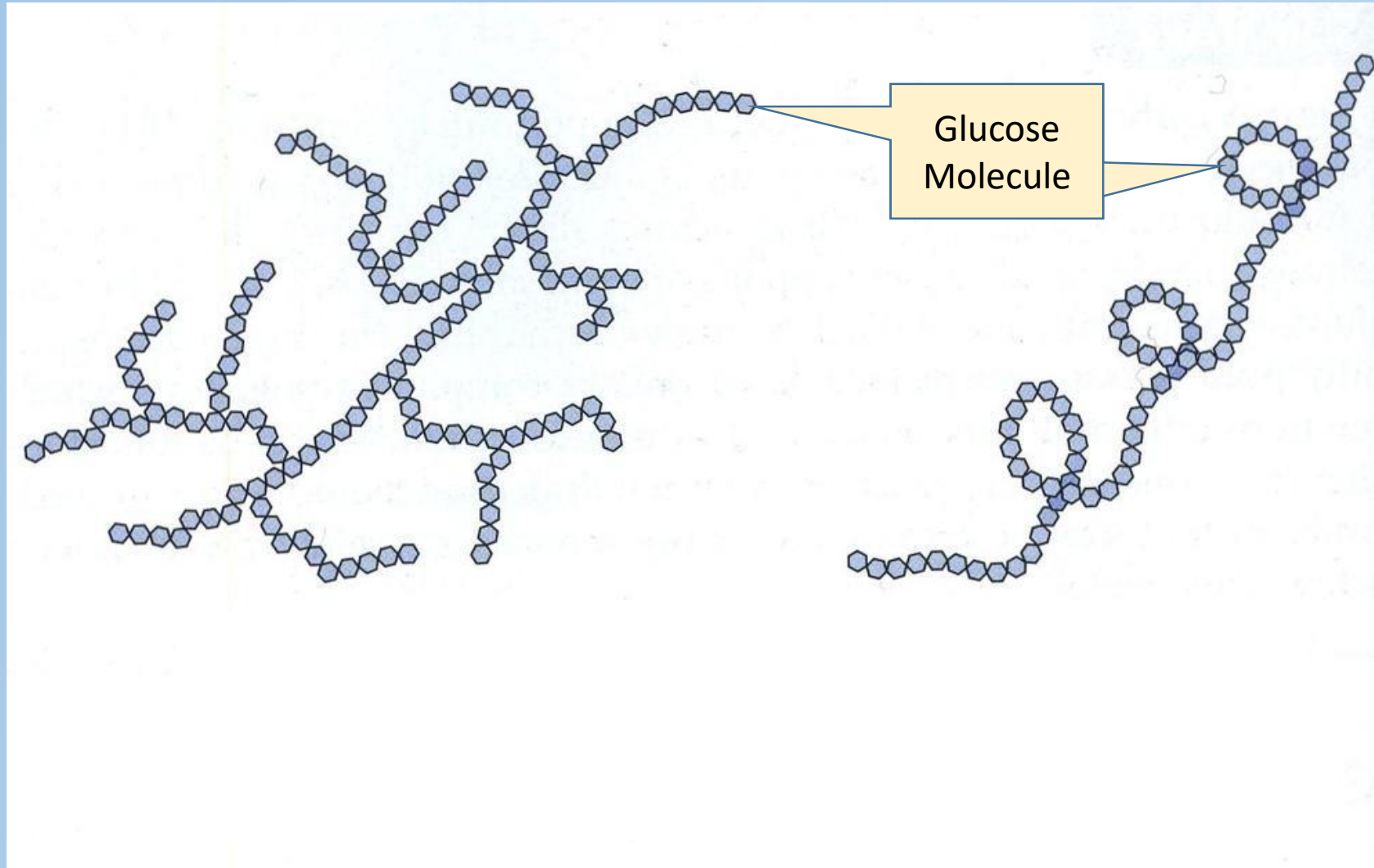


When to Use...

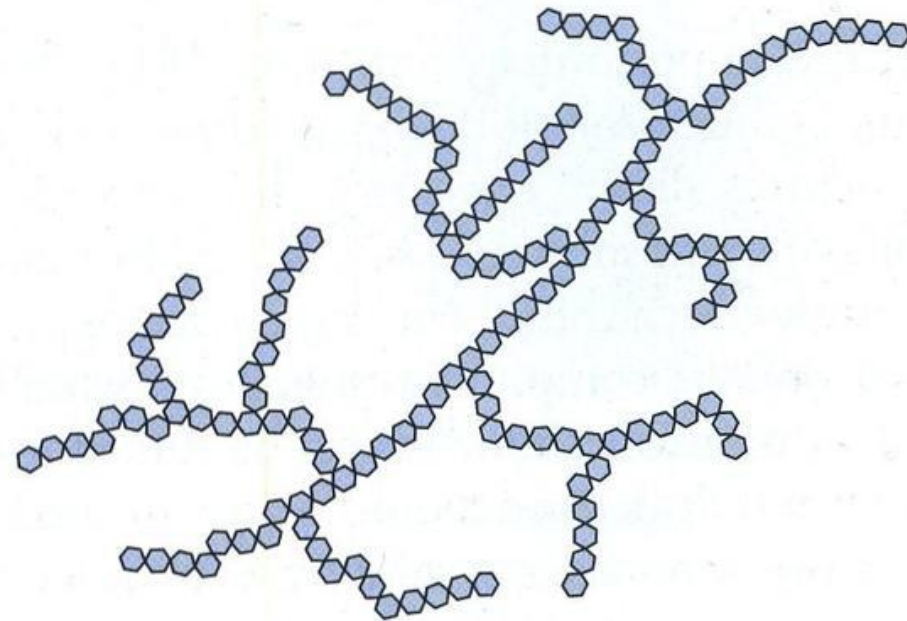
Doesn't Require Cereal Mash	Does Require Cereal Mash
Malted Barley	Unmalted Barley
Malted Wheat	Corn Grits or Polenta
Malted Rye	Unmalted Wheat
Flaked Maize	Spelt
Flaked Oats	Uncooked Rice
Flaked Rye	Millet
Flaked Barley	Rye
Flaked Rice	Oats (whole or steel cut)
Torrified Wheat	



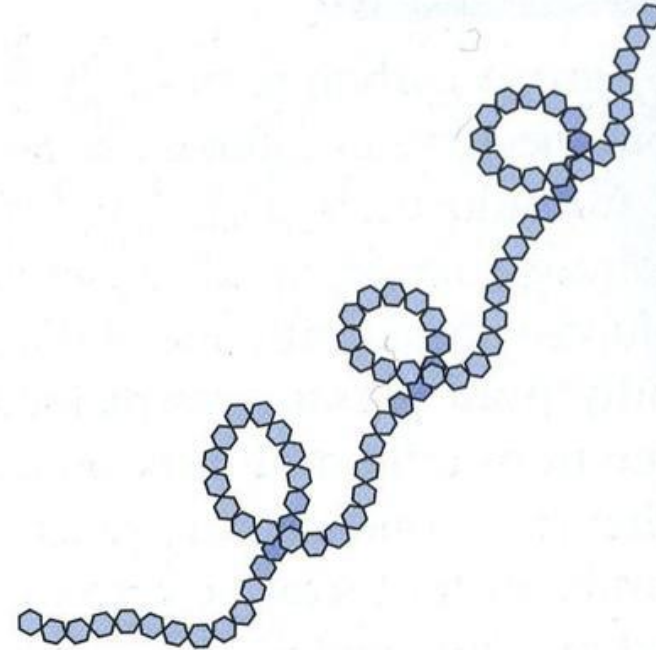
Structure of Starch



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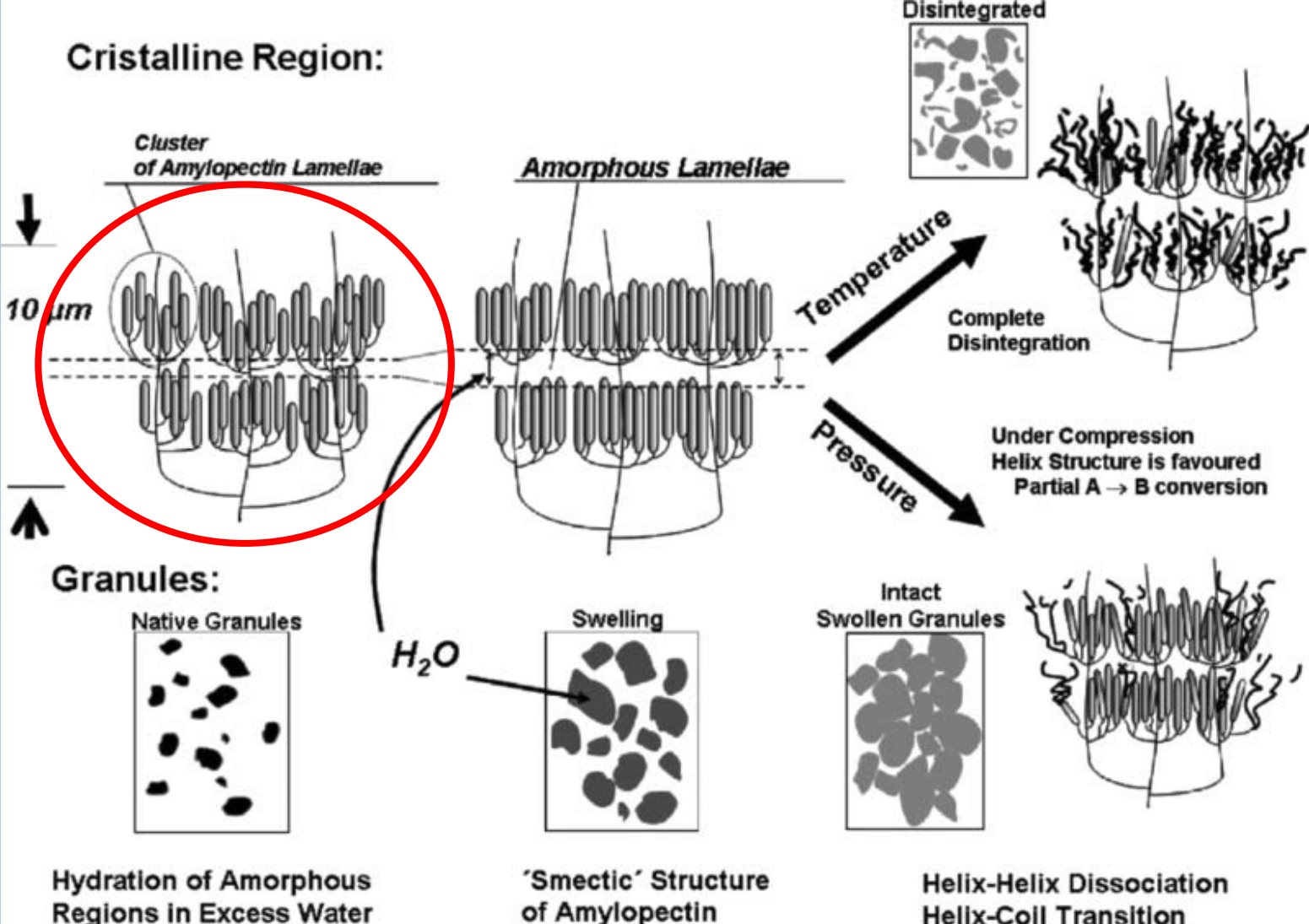
Starch (amylopectin)



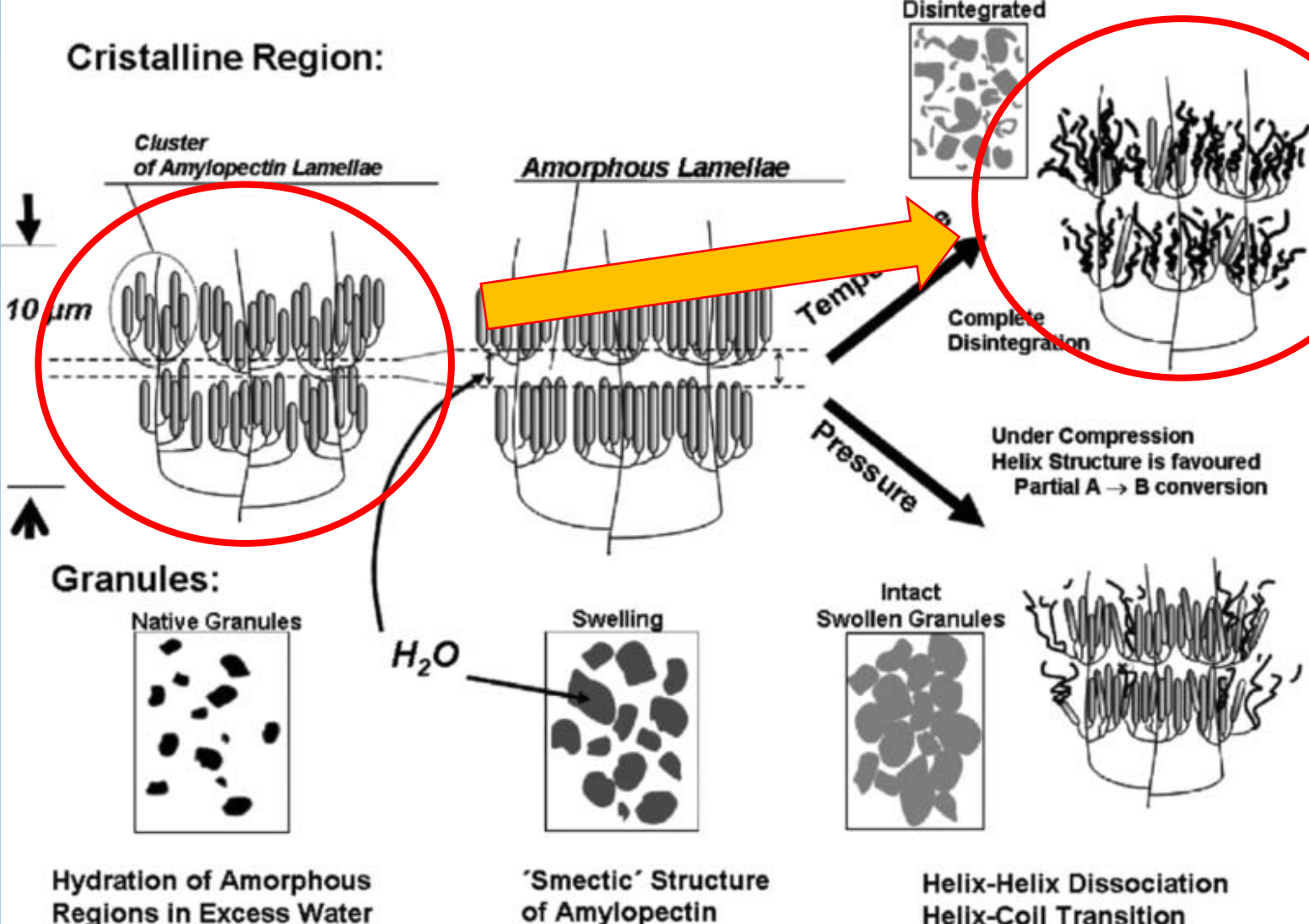
Starch (amylose)

A starch molecule contains hundreds of glucose molecules in either occasionally branched chains (amylopectin) or unbranched chains (amylose).

Un-Gelatinized Starch Structure



Un-Gelatinized Starch Structure



Gelatinization Temperatures

Raw (<u>unmalted</u>) grain	Starch gelatinization temperature
Barley	126–138°F (52–59°C)
Buckwheat	167–203°F (75–95°C)
Maize	144–162°F (62–72°C)
Millet	152–170°F (67–77°C)
Rice	154–171°F (68–77°C)
Rye	135–158°F (57–70°C)
Wheat	136–147°F (58–64°C)
Oats	127–138°F (53–59°C)



Example Process

- Pre Prohibition Lager Grain Bill:
 - 10 pounds six row malt
 - 3 pounds corn grits
- Prepare the cereal mash
 - 3 pounds corn grits
 - Add crushed malt to grits, around 20% of corn weight (0.6 pounds)
 - Use a generous water to grain ratio, at least 1.5 quarts per pound



Example Process

- Conduct cereal mash:
 - Mash in at starch gelatinization temperature, 150° to 155° for corn
 - Hold temperature for 20 minutes, stir occasionally
 - Bring to a boil
 - Stir regularly
 - Boil for 30 minutes



Example Process

- Meanwhile, mash remaining malt with water
 - Optional: mash this at low end of saccharification temperature (145° to 150°) if you would like to do a step mash
- Combine the mashes:
 - After cereal mash is complete, combine with normal mash, targeting upper end of mash temperatures 155° to 160°
 - Hold that for 30 to 60 minutes or until conversion is complete
- Drain, sparge and boil as normal



And If I Don't ???

- Loss of yield, miss target OG
- Release of starch molecules into wort
- Cloudy beer?
- Infection?
- Human sacrifice
- Dogs and cats living together
- Mass hysteria



Cheers !

