Joint BioEnergy Institute



Mission: to develop technologies to transform cellulosic biomass into advanced biofuels





Cane to Ethanol





Cane to Ethanol:

- Cane is a great sugar source
- Flexible infrastructure







Advanced biofuel challenges:

- Sugars in biomass are difficult to access
- Transportation infrastructure is not flexible



jbei Advanced biofuels from cellulosic biomass







Cell walls contain sugar





Cell walls contain:

- Cellulose (sugar)
- Hemicellulose (sugar)
- Lignin



JBEI uses synthetic biology to change the genetic program of the cell



jbei Increasing cellulose and decreasing lignin in the plant cell wall



Engineered plants

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Joint BioEnergy Institute Making plant cell walls easier to degrade





jbci Engineering modification of lignin structure





jbei Engineering modification of lignin structure





DM.

OM









Ethanol from sugar











Advanced fuels



Del Synthetic biology for advanced biofuels

G6P F1,6DP DHAP G3P mitochondrion PYR_{mit} PYR EtOH 🗲 - ACAL ADH ALD , $\mathsf{ACE}_{\mathsf{ext}}$ -ACE ACS ACAR_{mit} AC-CoA ACAR → AC-CoA MEV DMAPP ▶IPP ← × Ergos - FPP

Office of Science



Phase separation allows simple purification of fuel

