産官学連携本
Enterprise Partnerships Divisi
バイオメディカルメ
オープンイノ
Biomedical Membrane Rese
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BOULDER COLORADO

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History of collaboration
• 2012 Joint application of the A3 project
• 2012-2014 Research exchange project on y
and stress tolerance supported by NSFC
• 2022-2025 Research collaborative project s
Ministry of Science and Technology (MOST
• 2026-? New collaboration project
2014

Program for Forming Japan's Peak Research Universities (J-PEAKS)

Waste Biomass Valorization
Biotechnology
Biofuel/Biochemical/Biomaterial
Waste Biomass
Low-quality biomass with complex composition
agricultural straw, etc.
Sugar platform
Hydrolysis · Fermentation
Wastes
Anaerobic Digestion
Solid residues
Aerobic Fermentation
Fuel ethanol
Biogas
Fertilizer
Hydrogen
Bioplastic
Platform chemicals
Organic acids
Biolipid
short-chain alcohols, carboxylic acids, etc.
(C2–C6)
Basic research
Technology development
Pilot test
Application

Bioproduction of various valuable compounds
Primary metabolites
DC
AAD
DC
AO
ADH
Amine
Amino acid
α-Ketoacid
Aldehyde
Carboxylic acid
Alcohol
ADH
ADO
Alkane
DH
DC
α-hydroxy acid
α,β-Unsaturated carboxylic acid
Alkene
ADH: Alcohol dehydrogenase
ADO: Aldehyde deformylating oxygenase
AO: Aldehyde oxidase
DC: Decarboxylase
DH: Dehydratase
AAD: Amino acid deaminase
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Background
Biomass is an alternative to fossil resources
Energy security
Oil consumption 693 Mt
Import 73%
Pollution
CO_2 emission 10.2 Bt
Biomass
Sugar
Cell
Biochemicals
gricultural residue ~1 Bt/y
Sugar production 400~500 Mt/y
Microbial conversion
Replacing fossil fuel ~200 Mt/y
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