2017年第48期总56期

农业生物技术专题

本期导读

前沿资讯

1．拜耳溢价44%收购的孟山都

2．发现新型效应性Treg细胞亚群

学术文献

1．花粉管吸引肽受体的基础机构

2．以有机农业来满足全球的食物需求的可持续发展战略

3．GDSL酯酶通过脂类代谢调控水稻免疫反应

中国农业科学院农业信息研究所
联系人：邹婉侬
联系电话： 010-82109850
邮箱：agri@ckcest.cn
2017年11月27日

前沿资讯

1．拜耳溢价44%收购的孟山都

简介：拜耳2016年宣布，拜耳与孟山都董事会一致通过协议，拜耳将以每股 128 美元、总计 660 亿美元现金收购种子巨头孟山都，较曝光的收购邀约每股 122 美元、总额 620 亿美元高出 40 亿美元，与拜耳首度向孟山都提出书面建议当日收盘价相比，溢价幅度更是高达 44%。该笔收购成功将成为德国史上最大海外企业并购案。拜耳农业业务包含种子供应与农药化工产品，与孟山都联姻后也意味着农业超级巨人的诞生，英国广播公司 BBC 估计，双方合并后将掌握全球四分之一种子与农药供应。拜耳预估，合并第一年公司 EPS 将能有中个位数百分比的成长，第二年开始，EPS 将能达到双位数百分比的成长，此外，并购前三年每年更能节省下约 15 亿美元开支。

来源：基因农业网

发布日期:2017-11-27

全文链接:

http://www.agrogene.cn/info-4482.shtml

2．发现新型效应性Treg细胞亚群

简介：调节性T（Treg）细胞对维持自身免疫稳态至关重要，也是肿瘤抑制性微环境形成的重要原因。已有报道表明，Treg细胞要经历类似CD4 T细胞一样的活化过程，最终分化为效应性Treg细胞，可分泌抑制性细胞因子，行使免疫抑制功能。为了深入研究Treg细胞的抑制功能，中国科学院微生物研究所周旭宇研究员课题组利用BAC转基因技术，构建了IL-35的报告基因小鼠（Ebi3-Dre-Thy1.1小鼠），在该小鼠中可以用细胞表面Thy1.1的表达来指示细胞内IL-35的分泌情况，并可以通过注射Thy1.1抗体在体内研究IL-35分泌细胞的功能。通过报告基因的标记，课题组发现在小鼠体内存在的IL-35分泌细胞主要来源于胸腺来源的tTreg细胞。进一步通过表面分子和转录谱分析发现，分泌IL-35的IL-35-Treg和分泌IL-10的IL-10-Treg是两群完全独立的效应性Treg亚群，它们具有不同的表面标记、组织分布和转录因子的依赖性。IL-35-Treg细胞表达CCR7分子，倾向于留在T细胞区域，在抑制肿瘤免疫中发挥重要功能；IL-35-Treg并不依赖转录因子Blimp1的表达。IL-10-Treg细胞则分泌高水平IL-10和多种颗粒酶（Gzms），高表达多种趋化因子受体（如CCR5和CCR4等），倾向于迁移到外周免疫部位发生抑制功能；与IL-35-Treg不同，IL-10-Treg细胞严格依赖于转录因子Blimp1的表达。该研究证明，IL-35-Treg和IL-10-Treg具有功能的互补性，共同合作维持机体的免疫耐受。

来源：科学网

发布日期:2017-11-20

全文链接:

http://paper.sciencenet.cn//htmlpaper/201711201510189394517 2.shtm

学术文献

1．Structural basis for receptor recognition of pollen tube attraction peptides(花粉管吸引肽受体的基础机构)

简介：Transportation of the immobile sperms directed by pollen tubes to the ovule-enclosed female gametophytes is important for plant sexual reproduction. The defensin-like (DEFL) cysteine-rich peptides (CRPs) LUREs play an essential role in pollen tube attraction to the ovule, though their receptors still remain controversial. Here we provide several lines of biochemical evidence showing that the extracellular domain of the leucine-rich repeat receptor kinase (LRR-RK) PRK6 from Arabidopsis thaliana directly interacts with AtLURE1 peptides. Structural study reveals that a C-terminal loop of the LRR domain (AtPRK6LRR) is responsible for recognition of AtLURE1.2, mediated by a set of residues largely conserved among PRK6 homologs from Arabidopsis lyrata and Capsella rubella, supported by in vitro mutagenesis and semi-in-vivo pollen tube growth assays. Our study provides evidence showing that PRK6 functions as a receptor of the LURE peptides in A. thaliana and reveals a unique ligand recognition mechanism of LRR-RKs.

来源：Nature Communications期刊

发布日期:2017-11-06

全文链接:

http://agri.ckcest.cn/ass/8bff250a-0ccb-4363-8437-ae32f43e8560.pdf

2．Strategies for feeding the world more sustainably with organic agriculture（以有机农业来满足全球的食物需求的可持续发展战略）

简介：Organic agriculture is proposed as a promising approach to achieving sustainable food systems, but its feasibility is also contested. We use a food systems model that addresses agronomic characteristics of organic agriculture to analyze the role that organic agriculture could play in sustainable food systems. Here we show that a 100% conversion to organic agriculture needs more land than conventional agriculture but reduces N-surplus and pesticide use. However, in combination with reductions of food wastage and food-competing feed from arable land, with correspondingly reduced production and consumption of animal products, land use under organic agriculture remains below the reference scenario. Other indicators such as greenhouse gas emissions also improve, but adequate nitrogen supply is challenging. Besides focusing on production, sustainable food systems need to address waste, cropgrasslivestock interdependencies and human consumption. None of the corresponding strategies needs full implementation and their combined partial implementation delivers a more sustainable food future. Organic agriculture requires fewer inputs but produces lower yields than conventional farming. Here, via a modeling approach, Muller et al. predict that if food waste and meat consumption are reduced, organic agriculture could feed the world without requiring cropland expansion.

来源：Nature期刊

发布日期:2017-11-27

全文链接:

http://agri.ckcest.cn/ass/f165f4d7-011b-4413-a0aa-f30acc76f65a.pdf

3．GDSL lipases modulate immunity through lipid homeostasis in rice（GDSL酯酶通过脂类代谢调控水稻免疫反应）

简介：Lipids and lipid metabolites play important roles in plant-microbe interactions. Despite the extensive studies of lipases in lipid homeostasis and seed oil biosynthesis, the involvement of lipases in plant immunity remains largely unknown. In particular, GDSL esterases/lipases, characterized by the conserved GDSL motif, are a subfamily of lipolytic enzymes with broad substrate specificity. Here, we functionally identified two GDSL lipases, OsGLIP1 and OsGLIP2, in rice immune responses. Expression of OsGLIP1 and OsGLIP2 was suppressed by pathogen infection and salicylic acid (SA) treatment. OsGLIP1 was mainly expressed in leaf and leaf sheath, while OsGLIP2 showed high expression in elongating internodes. Biochemical assay demonstrated that OsGLIP1 and OsGLIP2 are functional lipases that could hydrolyze lipid substrates. Simultaneous down-regulation of OsGLIP1 and OsGLIP2 increased plant resistance to both bacterial and fungal pathogens, whereas disease resistance in OsGLIP1 and OsGLIP2 overexpression plants was significantly compromised, suggesting that both genes act as negative regulators of disease resistance. OsGLIP1 and OsGLIP2 proteins mainly localize to lipid droplets and the endoplasmic reticulum (ER) membrane. The proper cellular localization of OsGLIP proteins is indispensable for their functions in immunity. Comprehensive lipid profiling analysis indicated that the alteration of OsGLIP gene expression was associated with substantial changes of the levels of lipid species including monogalactosyldiacylglycerol (MGDG) and digalactosyldiacylglycerol (DGDG). We show that MGDG and DGDG feeding could attenuate disease resistance. Taken together, our study indicates that OsGLIP1 and OsGLIP2 negatively regulate rice defense by modulating lipid metabolism, thus providing new insights into the function of lipids in plant immunity.
来源：PLOS PATHOGENS期刊
发布日期:2017-11-13
全文链接:
http://agri.ckcest.cn/ass/a87516d8-b40e-43c6-802e-f88fb09f2c5b.pdf