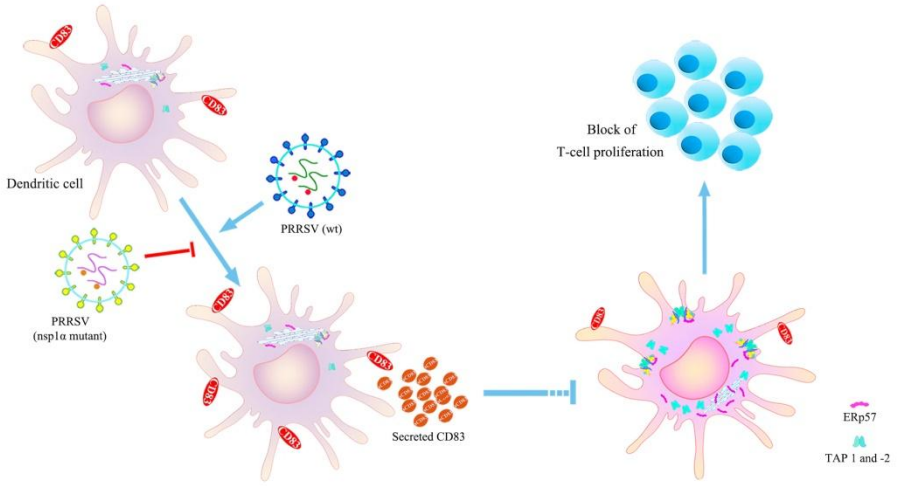
# 南京农业大学姜平教授团队进一步阐明猪繁殖与呼吸综合征病毒免疫抑制的新机制

2018 年 5 月底，国际病毒学顶级期刊《Journal of Virology》在线发表了南京农业大学动物医学学院姜平教授团队陈曦博士在猪繁殖与呼吸综合征病毒（PRRSV）领域所取得的突破性成果“Nsp1α of PRRSV strain BB0907 impairs the function of monocyte-derived dendritic cells via the release of soluble CD83”。

PRRSV 是一种严重并持续危害全球养猪业的重要病原，致病机制尚不十分清楚。该团队在国家自然科学基金重点项目等资助下，博士研究生陈曦发现了 PRRSV 感染猪单核细胞衍生的树突细胞（MoDCs）通过诱导分泌 CD83 蛋白(sCD83)，显著抑制 MoDCs 抗原提呈及其介导的 T 淋巴细胞增殖反应。首次阐明了 PRRSV Nsp1α 的锌指结构域与激活 CD83 作用密切相关，是该病毒通过诱导 MoDCs 分泌 sCD83 抑制其免疫抑制的关键功能区域，进一步丰富了 PRRSV 免疫抑制的理论基础，对该病新型疫苗研究具有重要指导意义。此前，该团队陈曦博士研究生发现并揭示了 PRRSV N 和 Nsp10 蛋白通过 SP1 和 NF-κB 信号通路诱导 sCD83 表达和分泌，发表于《Journal of Virology》。目前，该团队已经发表 PRRSV 相关研究论文 110 余篇，其中 SCI 论文 41 篇，研制的 PRRSV 活疫苗（R98 株）实现了产业化生产，为我国该病防控发挥了重要作用。




PRRSV 通过 sCD83 介导免疫抑制的机制模式图

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**Abstract：** Porcine reproductive and respiratory syndrome virus (PRRSV), a virulent pathogen of swine, suppresses the innate immune response and induces persistent infection. One mechanism used by viruses to evade the immune system is to cripple the antigen processing machinery in monocyte-derived dendritic cells(MoDCs). In this study, we show that MoDCs infected by PRRSV express lower levels of the MHC-peptide complex proteins TAP1 and ERp57, are impaired in their ability to stimulate T cell proliferation, and increase their production of CD83.Neutralization of sCD83 removes the inhibitory effects of PRRSV on MoDCs. When MoDCs are incubated with exogenously added sCD83 protein, TAP1 and ERp57 expression decreases and T lymphocyte activation is impaired.PRRSV non-structural protein 1α (Nsp1α) enhances CD83 promoter activity. Mutations in the ZF domain of Nsp1α abolish its ability to activate the CD83 promoter. We generated recombinant PRRSVs with mutations in Nsp1α and the corresponding repaired PRRSVs. Viruses with Nsp1α mutations did not decrease levels of TAP1 and ERp57, impair the ability of MoDCs to stimulate T cell proliferation, or increase levels of sCD83. We show that the ZF domain of Nsp1α stimulates the secretion of CD83, which in turn inhibitsMoDC function. Our study provides new insights into the mechanisms of immune suppression by PRRSV.