Manosalva, P.; Park, S.; Forouhar, F.; Tong, L.; Fry, W.; and Klessig, D. 2010. *Methyl esterase 1* (*StMES1*) is required for systemic acquired resistance against *Phytophthora infestans* in potato. Phytopathology 100:S77.

In tobacco and Arabidopsis, methyl salicylate (MeSA) serves as a long-distance phloem-mobile signal that must be converted into its biologically active form, salicylic acid (SA), in the distal uninfected tissue by the esterase activity of salicylic acid-binding protein 2 (SABP2) in tobacco or members of the AtMES family in Arabidopsis. In contrast to tobacco and Arabidopsis, which have very low levels of endogenous SA, potato contains a high basal level of SA and its role in the development of systemic acquired resistance (SAR) has been controversial. In this study we identified the potato ortholog of tobacco SABP2 (StMES1) and showed that the recombinant protein shares similar biochemical properties with NtSABP2. Recombinant StMES1 converts MeSA to SA and its esterase activity is feedback inhibited by SA or its synthetic analog, 2,2,2,2'-tetra-fluoroacetophenone (tetraFA). Moreover, potato in which the distal uninfected tissue was treated with tetraFA was compromised for the development of SAR induced by arachidonic acid (AA) against *Phytophthora infestans*. Similar results were obtained via a genetic approach; *StMES1*-silenced potato displayed a defective SAR phenotype that correlated with elevated MeSA levels in the uninfected distal tissue. In addition, AA-induced *pathogenesis-related* (*PR*) gene induction was attenuated in these plants as compared with the wild type. Together these findings argue that StMES1, and MeSA are critical components for SAR in potato.