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On the existence of mock injective modules for algebraic groups.

Let G be an affine algebraic group scheme over an algebraically closed field k of characteristic $p > 0$, and let G_r denote the r -th Frobenius kernel of G . Motivated by recent work of Friedlander, we investigate the class of mock injective G -modules, which are defined to be those rational G -modules that are injective on restriction to G_r for all $r \geq 1$. In this talk we provide necessary and sufficient conditions for the existence of non-injective mock injective G -modules, thereby answering a question raised by Friedlander. Furthermore, we investigate the existence of non-injective mock injectives with simple socles. Interesting cases are discovered that show that this can occur for reductive groups, but will not occur for their Borel subgroups. (Received September 14, 2016)