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Linckelmann cohomology for a block  $B$  of a finite group  $G$  is a subring of certain stable elements of  $H^*(P)$ , where  $P$  is a defect group of  $B$ . It injects into the Hochschild cohomology ring of the block ideal. We show that these two cohomology rings are isomorphic, modulo their radicals, in the cases (1)  $P$  is cyclic, and (2)  $G$  is a Frobenius group (under some assumptions on the characteristic). We give some more general results for cohomology rings of a block whose defect group is a Sylow subgroup, including a local description of a quotient of the Hochschild cohomology ring. In case  $P$  is elementary abelian, this quotient is isomorphic, modulo radicals, to the Linckelmann cohomology of  $B$ . (Received September 29, 2000)