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Let  $M$  be a compact 3-manifold that supports a partially hyperbolic and dynamically coherent diffeomorphism. We use the rich theory of codimension-one foliations to show that the universal cover of  $M$  is  $R^3$ . Furthermore, there exist infinitely many hyperbolic 3-manifolds that do not support partially hyperbolic dynamically coherent diffeomorphisms. In particular,  $M$  is not homeomorphic to the Weeks manifold. (Received September 28, 2005)