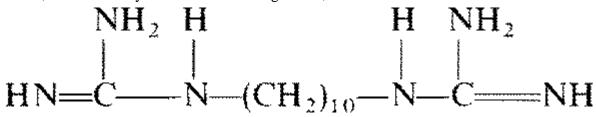
Synthalin, the decamethylene derivative of diguanide,



has been used in the treatment of diabetes for several years. However, its use has been limited due to its liver toxicity. The present study was devoted to biochemical studies in an attempt to reveal some fundamental effects on isolated mammalian heart mitochondria. Isotopic studies demonstrated that synthalin uptake results in inhibition of respiration and that the process is energy-dependent. The uptake is not carrier-mediated, since no evidence of saturation was observed, as would have been expected for a carrier-mediated process. It has also been established that, when present in reaction medium, synthalin prevented energy-dependent Ca²⁺ uptake and addition of Ca²⁺ failed to stimulate proton ejection into the suspending medium. In the presence of synthalin at a concentration of 2 g/mg of mitochondrial protein, lysocephalin and lysolecithin spots were not detected on the chromatogram.