P3-35

E. coli Nissle reduced cardiac dysfunction by decreasing apoptotic pathway and enhancing survival pathway activities in diabetic rats

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Previous studies found that *E.coli* Nissle is a typical *E.coli* strain and non-pathogenic. It could not produce any enterotoxin or cytotoxin and no pathogenic adhesion molecule has been found. The *E. coli* Nissle has been shown its beneficial effects on human gastrointestinal tract. However, there are no reports so far to reveal the effects of *E.coli* Nissle on cardiovascular disease. To investigate whether *E. coli* Nissle has protective effects against diabetic mellitus (DM)-induced heart disease, our animal experiment was designed as follows: sixty 5-week-old male wistar rats were divided into three groups: normal control group, diabetes DM group [55mg / kgw Streptozotocin (STZ) induced DM, for Intraperitoneal injection], and DM animals with lactic acid bacteria *E.coli* Nissle (10^9cfu/ rat / day, treatment for 4 weeks).

Our data show that(1) increased blood sugar(418±126.36 V.S control 91.22±8.06) and loss body weight (268±42.07 V.S control 342±23.93) ; (2) the pro-apoptotic proteins, including Fas, FADD, caspase-8, activated-Bak, Bax, Bad, caspase-9, caspase-3 and released Cytochrome C were increased significantly in DM groups. After treatment with *E.coli* Nissle, blood sugar of DM rats returned to normal range and improved body weight markedly. Meanwhile, western blot analysis show that both death receptor-dependent and mitochondrial-dependent related pro-apoptotic proteins were decreased markedly compare to the untreated group. Furthermore, TUNEL assay show significant reduction of apoptosis level in left ventricular tissue in *E.coli* Nissle treatment group. These finding provide the evidence show that in addition to intestinal health, *E.coli* Nissle may be the potential to cure DM-induce heart disease.

Keyword: *E. coli* Nissle、 diabetes、 heart health