



Effect of Commonly Administered Medical Drugs on the Death Rate of Bifidobacterium Microbiota

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Abstract

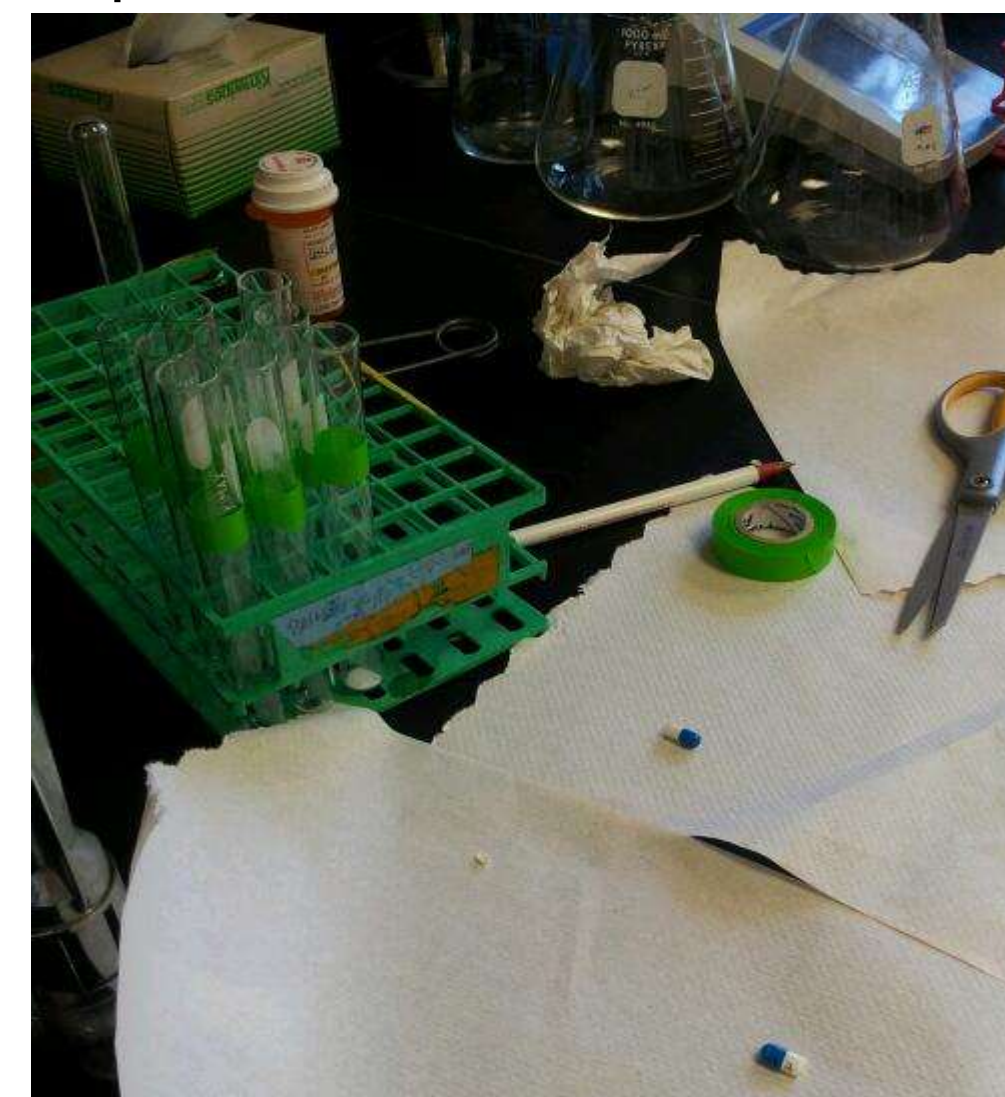
Probiotics are live organism that is primarily used to improve gastrointestinal disorder such as constipation, lactose intolerance and to inhibit the excessive proliferation of pathogenic intestinal bacteria. Age- related changes in the gut microflora appear to involve a reduction in the numbers of beneficial bacteria such as *Lactobacilli* and *Bifidobacteria*, which leads to increase in numbers of potentially harmful bacteria species. Most elderly person uses one form of prescription medication such as Hydrochlorothiazide and metoprolol to name a few. To determine the effects of medication on the population on *Bifidobacterium longum*, one tablet of metoprolol was dissolved in 9ml of freshly prepared MRS , vortex and strain of *Bifidobacterium longum* was added. Samples were incubated at 37°C with constant shaking for 120 minutes. Bacteria populations were determine on MRS agar plate at 37°C for 48hours. The aim of this study is to determine the effects of this medication on the growth of *Bifidobacterium* strains. The result shows a decrease in the growth of *Bifidobacterium* strains by $3\log_{10}$ when treated with Hydrochlorothiazide and metoprolol.

Introduction

According to the U.S Bureau of census, population Division latest report, the growth of the elderly population (65 and over) is expected to accelerate rapidly. In the North Carolina the increasing expectation will be from 12.5 percent in 1995 to 21.5 percent in 2025(U.S Bureau of census, 2011). The increase in the elderly population will subsequently increase the health care costs significantly in the North Carolina and throughout the nation (Baker et al 2009). Age could have major effects on human intestinal microflora.(Zhao,Xu,Ibrahim Jiang et al 2011).which could impact the whole body system. A lifestyle modification including changing in nutritional habits has been shown to improve health condition of the elderly with Diabetes. (Crandall, Fowler et al 2006). Bacterial species play an important role in host health and help in combating through their involvement in digestion, pathogenesis, and immunity improvement.(Tiihonen et al, 2010). Probiotics such as Bifidobacteria and lactic acid bacteria can prevent and treat some infectious diseases, correcting inflammatory condition in elderly and positively modify the gut microbial population in elderly. (Zhang, et al 2009). There are several concern regarding the inappropriate use of antibiotics, poor compliance and increasing rates of disease of disease related to antibiotics use. More than 75% of aged 65 or older takes one prescription medication which might have adverse effects on their body (Linda 2005). The objective of the work is to investigate exposure effect of commonly administered medical drugs of elderly persons over 65 years old on the death rate of Bifidobacterium microbiota.

Method/Procedure

- one tablet of metoprolol (25mg)was crushed
- Emptied into a sterile test tube
- 100ul of methanol was added ,Sample was constantly vortex
- Nine milliliter of freshly prepared sterilized MRS broth was added to the tube with the medication
- The mixture was vortex till all particles of the tablet dissolved
- Overnight cultures of each strain was serially diluted in 0.1% peptone water
- Add 200ul of serially diluted strain of *Bifidobacterium longum* into the tube containing the medication Vortex constantly
- Exposed the strain to the medication for 0 time and 2hr respectively in MRS broth.
- Incubate the MRS broth with the sample in a constant shaking at incubator
- Plate 100ul of the sample at the end of 2hr exposure Incubate at 370C for 48 hours
- Determine the colony forming unit of the *Bifidobacterium* species.



Crushing of medication.



Serial dilution and addition of strains



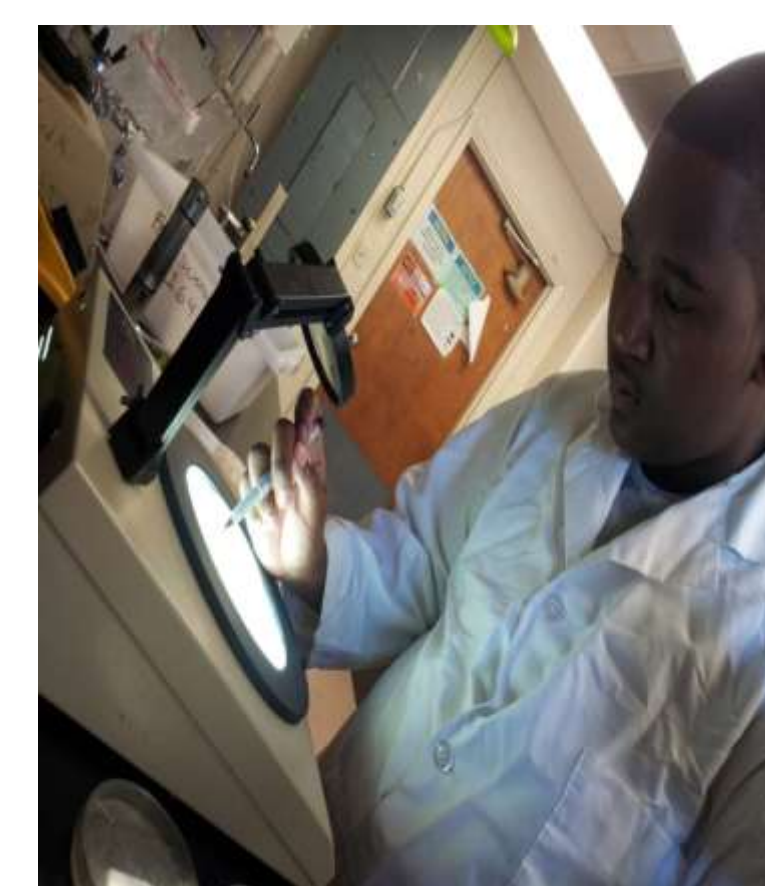
Incubation at 0 time



Exposure of strains to medication for 2 hours



Plating after 2 hours

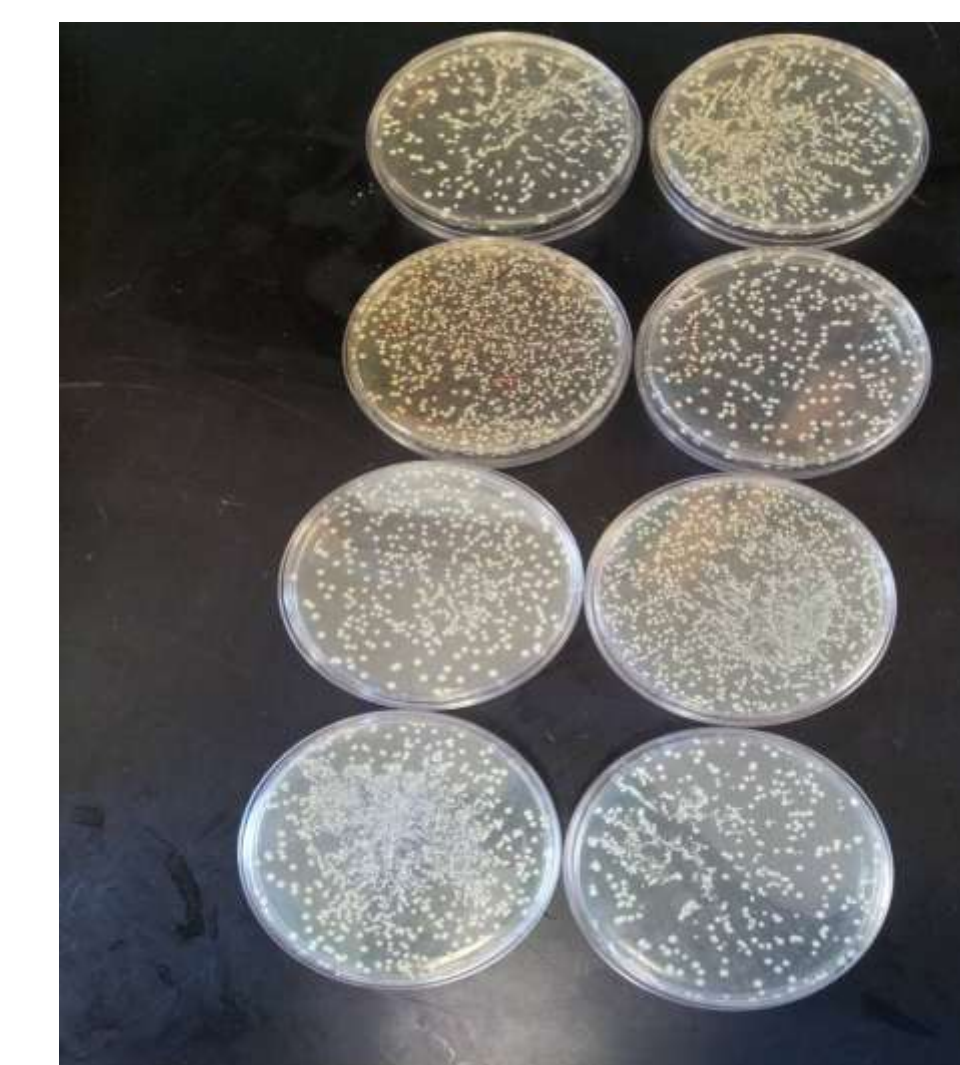


Colony counting

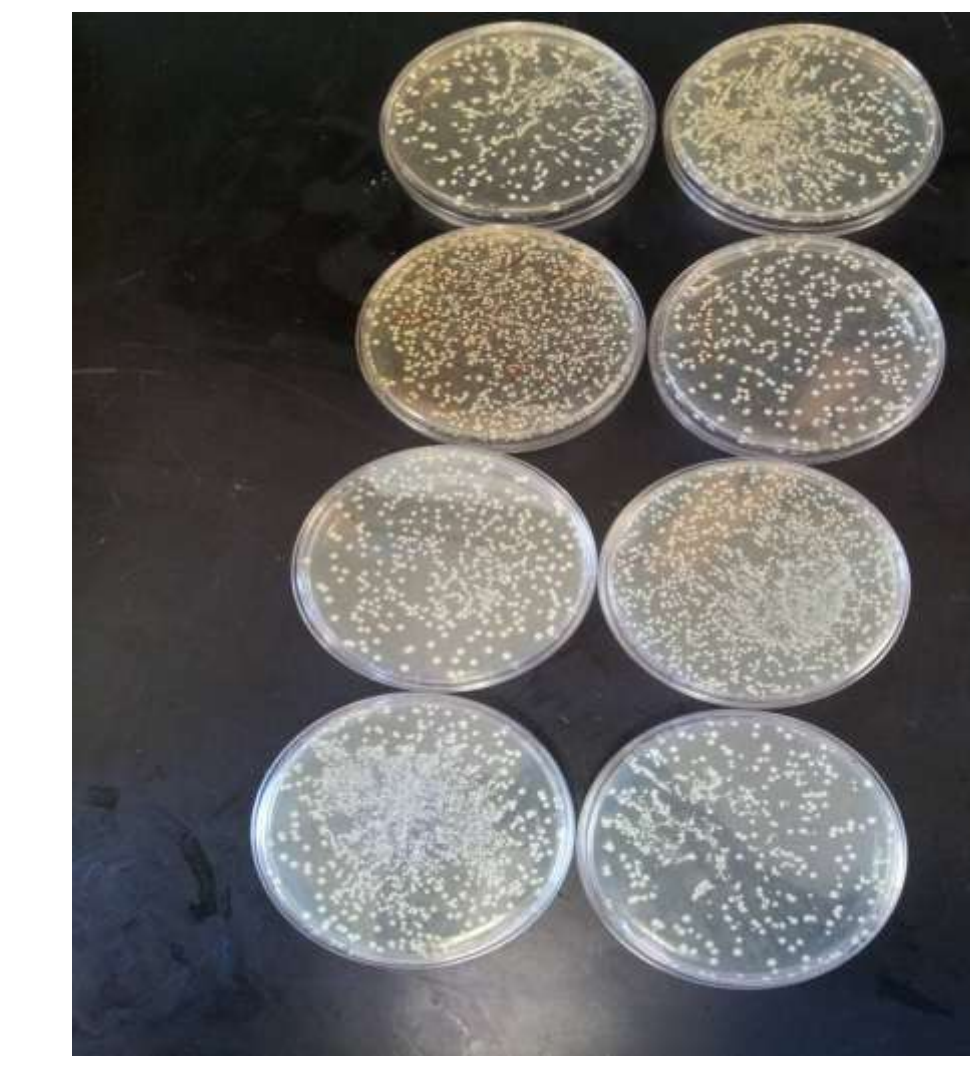
Results

Table 1: Effect of commonly administered medications on the population of *Bifidobacterium longum* ATCC 15708

Time (mins)	Control log cfu/ml (A)	Metoprolol log cfu/ml (B)	Hydrochlorothiazide log cfu/ml (C)	A-B (log cfu/ml)	A-C (log cfu/ml)
0	10.01	6.57	6.69	3.44	3.32
120	10.02	6.66	6.65	3.36	3.35



Control



Control



Hydrochlorothiazide 12.5mg



Metoprolol 25mg



Treatment with hydrochlorothiazide



Treatment with metoprolol



Colony counting



Bifidobacteria

Conclusion

- The population of *Bifidobacterium longum* was reduced by $3\log_{10}$ cfu/ml when exposed with both hydrochlorothiazide and metoprolol.
- The difference between exposure time of 0-120mins does not have effect on the population of *bifidobacterium*.
- Further works need to be done to determine the effect of hydrochlorothiazide and metoprolol on morphology changes during exposure to *Bifidobacterium longum*

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