Intrinsic Factor-y
An alternative treatment for Pernicious Anemia

Abstract
Pernicious anemia is a type of megaloblastic anemia occurs due to lack of Intrinsic Factor, which is a protein responsible for the absorption of vitamin B12. Our aim as ITU MOBIzAM iGEM Team, is to design a bacterium that is capable of surviving in small intestine and secreting Intrinsic Factor dependent on pH. Also, we design a genetic circuit for controlling the overgrowth and containment of bacteria.

Introduction
Pernicious Anemia, which is recognized as an autoimmune disorder, is caused by atrophic damage of the gastric body mucosa in which results loss of parietal cells that express a 60-kd glycoprotein called intrinsic factor (IF) (L2). Function of IF is binding and transporting vitamin B12 in small intestines (3).

Main Cause
Vitamin B12 deficiency.
• Cannot be synthesized in the human body and it must be taken by diet.
• The minimum daily requirement of vitamin B12 is about 2.2 µg (5).

Absorption of B12

Source of Vitamin B12 $\rightarrow$ Stomach $\rightarrow$ Mucosa $\rightarrow$ Revealing Vitamin B12 content $\rightarrow$ Binding with R-protein (haptocorrin)

Symptoms
General symptoms
• Weakness
• Abnormal fatigue
• Sore tongue

Effects on mainly three system
• Blood
• Gastric-intestinal tract
• Nervous system

Trypanostation
Patients with pernicious anemia require a life-long treatment.
• Obtain B12 by injection or pill

Human Practice
As we are ITU MOBIzAM, Turkey team, our one of the goals was publishing iGEM through our university, Istanbul and Turkey. For this,
• We used social networks: Twitter, Facebook, and our non iGEM website.
• We interview people with a questions: What is iGEM? and What is Synthetic Biology?
• We prepared articles in our university newspaper and journal called Science & Future.
• We designed a poster and hanged in our university.

Besides this, we appealed professionals’ and patients’ opinions about our project.

We have interviewed with Prof. Atalay Kodand (Drug Development Director of IBA and also iGEM Country Head Turkey, Middle East and North Africa).

In order to meet other iGEM teams in Turkey, we attended first National iGEM Teams Meeting in Ankara, and we hosted second National iGEM Teams Meeting in Istanbul.

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