



# MenTAUR Biotechnologies Business Plan

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## 1 Executive Summary

Stress is a universal human experience, a leading cause of many mental health disorders. iGEM NCKU Tainan 2021 aim to break the cycle of stress transforming into mental health issues (e.g. depression) by developing an innovative solution – Menbles, a product that can decrease the stress levels with taurine autoregulation function. According to a paper<sup>[1]</sup>, taurine was found to inhibit the decrease of sucrose consumption and prevent the deficiency of spatial memory and anxiety in rats exposed to CUMS, suggesting a preventive effect of taurine on depression-like behavior.

Our company use engineered *Escherichia coli* 1917 to deliver the system in the guts while sensing the biomarkers and taking in the L-cysteine to release an appropriate amount of taurine. The autoregulation depends on each consumer's real-time condition, ensuring the release is fitting for every individual. The system is later wrapped inside a bubble made from sodium alginate.

With this, our company hope the number of people suffering from stress-induced depression will decrease. Furthermore, making great strides in elevating Taiwanese Bubble Tea to the world while providing an opportunity for traditional bubble industry to step up the game.

## 2 Business

### 2.1 Company Description

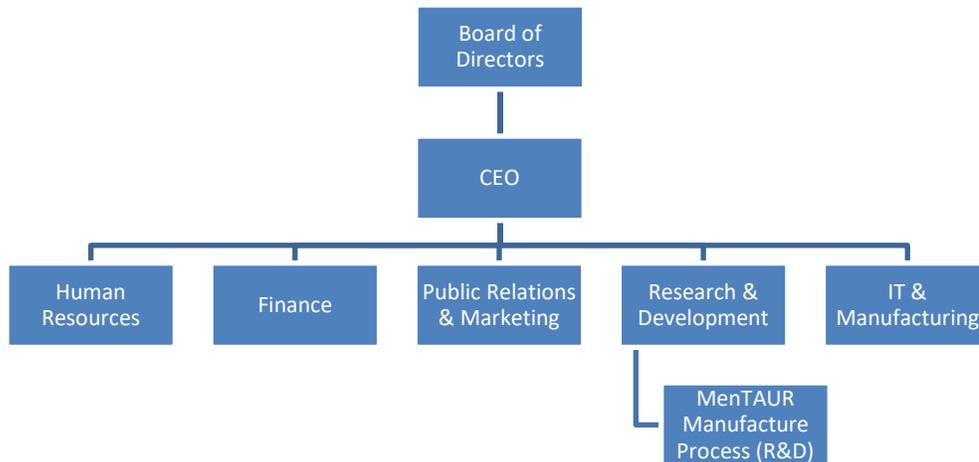
Through the International Genetically Engineered Machine (iGEM) competition founded by the Massachusetts Institute of Technology (MIT), 15 individuals enrolled in National Cheng Kung University (NCKU) gathered and came up with the project – MenTAUR, aiming for a less stressed world by synthetic biology application. The MenTAUR project will represent the core asset of this start-up company, MenTAUR Biotechnologies.

### 2.2 Mission Statement

MenTAUR Biotechnologies' mission is to develop an affordable and accessible supplemental product with high effectiveness in de-stressing for every consumer, reducing the risk of stress-induced mental disorders by implementing our idea in a Taiwanese signature – Bubble Tea. In this form, supplying the product to the public is considerably facile.

### 2.3 Business Structure and Organization Structure

MenTAUR Biotechnologies will be a spin off from the National Cheng Kung University (NCKU) and the 2021 iGEM NCKU Team who is the research team will be led by the principal investigator of the 2021 iGEM NCKU Team. The board of directors will consist of the acting principal of NCKU, investors and the 2021 iGEM NCKU Team.



## 2.4 Location

The headquarters and research center of MenTAUR Biotechnologies will be located in Tainan, Taiwan.

## 2.5 Products & Services

Currently, there are no specific medications for reducing stress levels although various medications for mental health disorder are available in the market, e.g., common antidepressant drugs also known as Selective Serotonin Reuptake Inhibitors (SSRIs) by increasing the levels of serotonin in the brain. Thus, MenTAUR Biotechnologies designed a novel solution for combating stress by fusing science and food. Bubble tea is a popular beverage worldwide from Taiwan, with a massive global market size.

Menbles is a bubble containing our engineered *E. coli* Nissle 1917 which aims to alleviate chronic stress-induced depression by producing taurine when it senses a high concentration of IFN- $\gamma$  and oxidative stress. Menbles is constructed with alginate which is able to survive degradation from low pH conditions of the stomach gastric acid<sup>[2][3]</sup>.

- Approval of Science

Laboratory experiment has been ongoing since April 2021 under the supervision of the principal investigators of 2021 iGEM NCKU Team and are supported financially by the Twist Bioscience and the university. In order to make our biotherapeutic safe for human consumption, we used *E. coli* Nissle 1917 as our chassis. *Escherichia coli* Nissle 1917 is a nonpathogenic *E. coli* strain isolated by Alfred Nissle in 1917. It is one of the best examined probiotic strains, used in many gastrointestinal disorders including diarrhea, uncomplicated diverticular disease, and ulcerative colitis (UC)<sup>[4]</sup>. It has been proven to have an intestinal anti-inflammatory effect without major immunotoxin

properties<sup>[5][6]</sup>. A clinical study to evaluate the clearance of *E. coli* Nissle has proven that all subjects cleared *E. coli* Nissle with a median clearance of 1 week making it beneficial for therapeutic probiotics because it is not expected to colonize the gut for a long time<sup>[7]</sup>. The safety, tolerability, and efficacy of consuming *E. coli* Nissle have also been evaluated and research has shown that daily treatment with *E. coli* Nissle for chronic disorders is feasible.

- **Methods of Action**

MenTAUR Biotechnologies will be the party taking over the preclinical testing after all the construction along with preliminary functional test is completed and the iGEM 2021 competition ended. The party will also proceed to animal testing in a designated laboratory space within the university campus and partner with a biotechnologies company based in Taiwan to start the production of Menbles bubble tea.

- **Proof of Scalability and Safety**

To determine the scalability of our products, manufacturing process development will be carried out after the first phase of clinical trials are completed and be supported financially by funding phase II. MenTAUR Biotechnologies will also seek to expand the product uses for pet food, as we found out taurine could decrease aging health risks in pets.

For the safety part, concerns related to large scale industrial fabrication of the products will be regulated according to the safety standards established by the relevant government authorities. The most important one will be the biosafety. Since our product is marketed as functional food, we could not control all sold bubbles wrapped with bacteria under a lab-controlled environment. Therefore, for the safety of our customers and environmental protection, we have chosen a fitting solution – the removal of antibiotics resistance genes in our engineered *E. coli* Nissle 1917 .

While it is simple to remove antibiotics resistance genes, plasmid stability is crucial for our product’s production and quality control. To address both concerns, we have chosen an *E. coli* Nissle wild-type plasmid named pMUT1<sup>[8]</sup> to evaluate its plasmid stability without antibiotics resistance genes.

- **Customer Services**

MenTAUR Biotechnologies provide 24-hour social media customer services, so the clients can contact us immediately. We will also collaborate with bubble tea stores as our intermediate between us and clients.

## 2.6 Patents & Trademarks

The names: MenTAUR (Group name) and Menbles (Our product) mentioned in this file will be protected by trademarks as soon as we apply for the registration. MenTAUR is a name with the meaning “MenTAUR, your life’s mentor”. Besides, Menbles is the product we plan to present to the public with Taiwanese’s popular beverage additives- bubbles.

We combine our topic with the local culture and hope we can truly help people who suffer from chronic stress.

## 2.7 Law

Menbles, an edible bubble that is composed of engineered *E. coli* Nissle 1917 and the alginate gel is the product we want to promote for those who suffer from chronic stress-induced depression. After consulting with experts and collaborators, we understood that our bubble belongs to genetically modified organisms. Consequently, we should take Investigational New Drug (IND) into deeper consideration<sup>[9]</sup>. In addition, *E. coli* Nissle 1917 is yet completely acceptable in Taiwan's regulation although there is a product named Mutaflor that exists on the market abroad<sup>[10]</sup>. As a result, we will also take notes on the application of drug permit licenses.

For the definition of Menbles, because we will claim its efficacy to the consumers, we classify Menbles as one of the functional food. According to the Ministry of Health and Welfare in Taiwan, products that successfully go through a series of safety evaluations, functional tests, scientific evidence, and so on can just be categorized as a kind of functional food<sup>[11]</sup>. For us, it is undoubtedly one of the necessary work that we have to accomplish before launching it into the market.

With these procedures, we will do our best to reach the goals and popularize our mind-caring products to those who are in need. Finally, we are sure to improve our safety inspection and quality management keeping up with the times.

## 2.8 Unique Selling Proposition

MenTAUR is a revolutionary bubble tea with de-stressing benefit for consumers. Bubble tea has always been popular among people, especially in younger generations. Not to mention, stress level in younger generation kept increasing over the years. By integrating Taurine autoregulation system by *E. coli* inside the bubble would keep the system safer while attract more potential consumers. Not to mention, up until now there are yet any product targeting stress.

Since MenTAUR is a health food that utilizes engineered bacteria, it can not be classified as minimum viable product until clinical trials are completed, proven, and approved by the FDA. Our company has been researching the biosafety and law in Taiwan and other countries.

## 2.9 SWOT Analysis

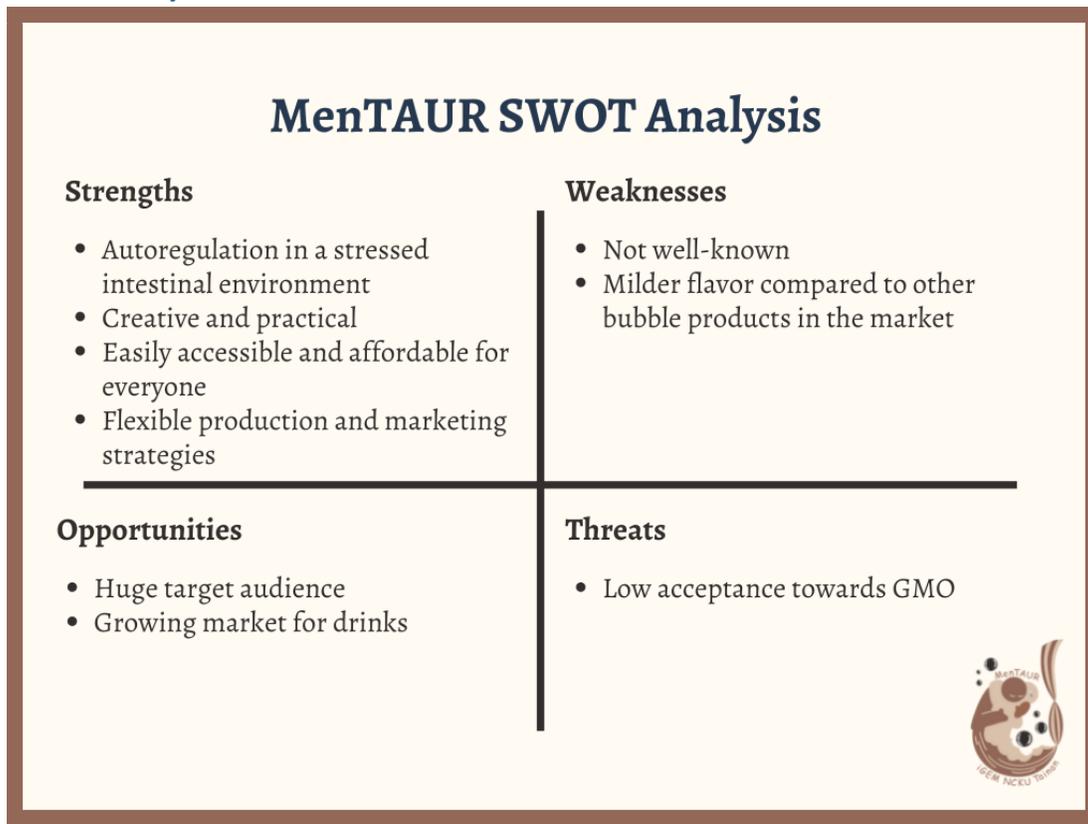


Figure 1. MenTAUR SWOT Analysis

## 2.10 Risk Assessment

External factors	The risk and the likeliness (1-10)	How to avoid the risk?
<b>Economic factors</b>	6	Competitive pricing for MenTAUR can be implemented to embrace the different economical background of our customers.
<b>Political factors</b>	8	Government approvals are influential and adherence to regulations to meet or exceed the standards / requirements are essentials to have the approvals of US FDA and other similar government entities worldwide.
<b>Social factors</b>	9	Education towards the society about GMO and synthetic biology is important to gain the trust of consumers and build consumer confidence in such products.
<b>Technological factors</b>	7	All of the team will always have seminars and chances given to learn new inventions so we will not be left out.
<b>Development of the industry</b>	8	Optimizing the customer feedback routes by having various methods to allow customers to engage with the manufacturer as well as

		providing their feedback or experiences while using the products. Collaborating with traditional bubble industry and offer them an opportunity to upgrade their product.
<b>The market &amp; customers</b>	6	A full understanding of consumer needs and comprehensive market analysis have been carried out before the initiation of Project MenTAUR. The company, MenTAUR Biotechnologies will be the entity taking over the MenTAUR project and will carry out further research and expansion to other global markets. We will work together with bubble tea shops in order to reach our target audiences.
<b>Competition</b>	5	Currently there are no specific market targeted for stress. Although there is a team from Yang Ming who is also producing supplement which could boost our happiness, but we believe our have better advantages.

<b>Internal factors</b>	<b>The risk and the likeliness (1-10)</b>	<b>How to avoid the risk?</b>
<b>Organization &amp; human resources</b>	5	Participation in team building seminars and company leadership boot camps may be essential for a startup company to foster healthy relationships and gain crucial skills and knowledge into the operation of a company. Personnels and employees will be provided a rest lounge as rest is important in building up morale and productivity.
<b>Production</b>	6	The production / manufacturing MenTAUR bubble will be initially outsourced to trusted manufacturers. The quality control will be handled by the manufacturers as well as MenTAUR Biotechnologies. The company will also invest in manufacturing R&D to ensure that production can be as efficient and cost effective, as well as having the capability to ramp-up production when necessary, without sacrificing quality.
<b>Finances</b>	6	Investment funding from investors will be distributed carefully into essential materials and tools at a reasonable pricing. Positive cash flow generated will be reinvested into improving and optimizing MenTAUR as well as to reduce debt that would have been accumulated during the development phase. The company structure will be streamlined to minimize operational cost.

*Table 1. Risk Assessment*

### 3 Market Analysis

#### 3.1 Market Segmentation

MenTAUR Biotechnologies plans to market MenTAUR Bubble in Taiwan as a test bed before entering other countries' markets with higher stress level like Greece, Philippines, and United States. But our company would like to establish a strong market position in Asia region before expanding to other regions.

Currently, there are no specific products for combating stress level. Although team Yang Ming from Taiwan launched InSeed, a happy probiotic, which could be considered as one of our company's potential competitors. Menbles is an innovative bubble that provides not only destressing effects, but is also proven to benefit in other aspects, such as inflammatory system and prevent decreased spatial memory.

#### 3.2 Customers

The targeted customers for MenTAUR Bubble are mainly regular people (especially young adults) with high stress levels with the aim of autoregulating the taurine production in body and reduce the stress levels. Our product is categorized as probiotic, a type of functional food. Menbles will mainly be marketed and distributed by trusted distributor and will be made available in bubble tea shops and distributors around the world.

##### 1. Demographic Information

Younger adults are more likely to suffer from higher stress levels than older generations<sup>[12]</sup>. While they also are more likely than older generations to report engaging in stress relief activities, they are most likely to say they do not feel they are doing enough to manage their stress.

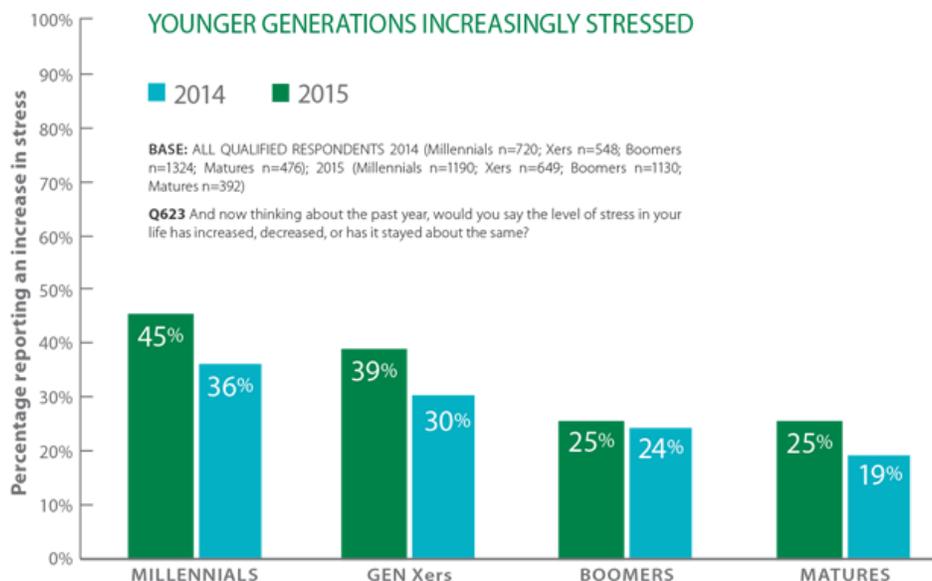


Figure 2. Stress level comparison between generations

2. In geographical terms, statistics have shown pre-Covid and post-Covid has caused at least 7 times of depression cases increment for the world, while each region has shown significant increases in stress. The pricing and accessibility of Menbles will play a major role in determining its retail performance in countries with fewer bubble tea consumers countries.
3. The social and economic status of people will not be a major factor since the mission of MenTAUR Biotechnologies is to have Menbles be affordable and effective for the people who need them regardless of their financial capabilities.

### 3.3 Stakeholder Analysis

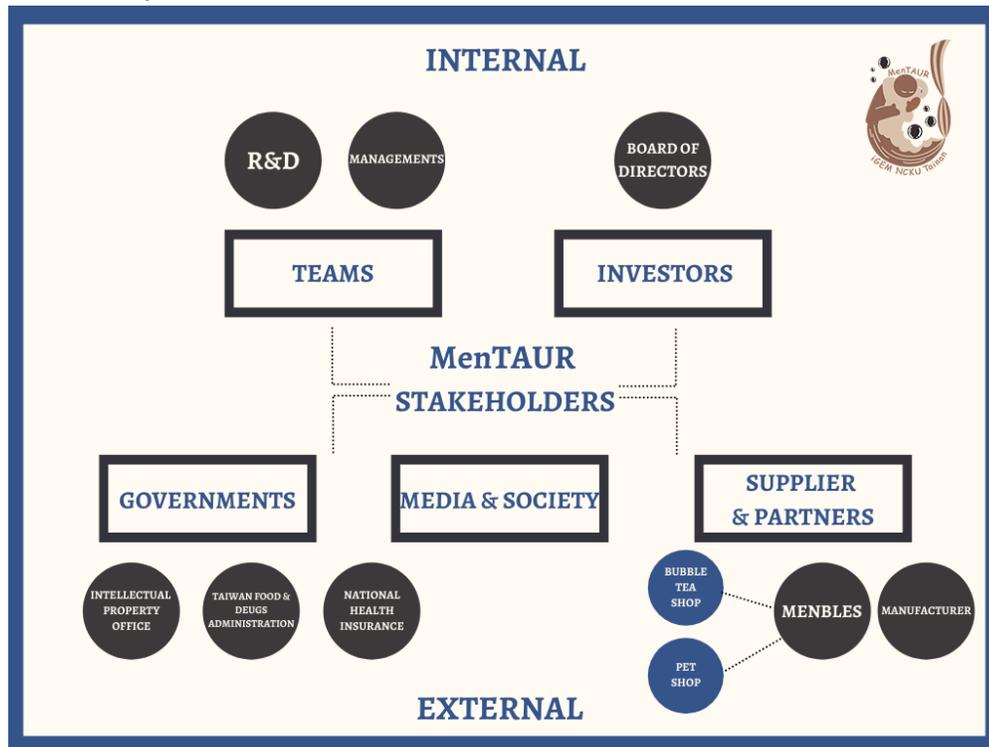


Figure 3. MenTAUR Stakeholders

To establish MenTAUR Biotechnologies without compromising Menbles development, the team will start to connect with all external stakeholders and investors to further achieve MenTAUR's goals and visions in the future. With a vision to provide affordable prices to engage with anyone in need of de-stressors, it is essential to ensure efficiency of manufacturing, lowering costs of production and preparation for ramp-up production. To enter the products in the market, trial phases needed to be achieved through government help and inspection. While the trial is ongoing, we will connect with all distributing companies.

Stakeholders	Interests
Team	Training is needed to expand the capabilities of team and target to be reached.
Owners (stockholders)	Manage the project progress, arrange all of the future planning for company and services, contact with investors and reduce liabilities cost.
Investors	Funding the project, provide new market expansion.

*Table 2. MenTAUR Stakeholders' interests*

### 3.4 Competitors

To ensure that MenTAUR can compete in the commercial market for depression medication, we carried out a market analysis to identify potential competitors for our product.

The most common treatment of depression includes a series of antidepressants, sedatives, beta-blockers, and nutritional supplements. These treatments usually require a prescription from a medical professional. Considering that many people who suffer from depression do not seek medical help, these medications might not reach the target patients they intended. We noticed that patients with the motive of depression do not usually seek healthcare professionals as they fear the expenses, the stigmatization, or the side effects between the transition period. Even with a medical prescription, drug adherence is still low due to physical exhaustion. Hospitals have prescribed many antidepressants brand names in Taiwan, but most fall into selective serotonin reuptake inhibitors (SSRIs) and selective norepinephrine reuptake inhibitors (SNRIs). We took one brand example from each category, Prozac (SSRI) and Cymbalta (SNRI). Due to these drugs having strong side effects such as impotence and can be misused, these medications can only be obtained by a doctor's prescription and have lots of precautions when taking these drugs.

Moreover, there is a probiotic and dietary supplement approach developed by long-standing American chemical company DuPont; they are also looking to improve brain health, focusing mainly on stress by studying the correlations between gut microbiota and the gut-brain axis. The probiotic is named HOWARU Calm.

Name	Year founded	Product description	Areas served	Product price	Strengths	Weaknesses
Prozac	1988	A type of selective serotonin reuptake inhibitor (SSRI) antidepressant that affects certain neurotransmitters and blocks serotonin reuptake.	Global market	\$535.36 for 30 capsules (20 mg per capsule)	Can effectively inhibit neurotransmitters in a longer time and can also treat bulimia nervosa (eating disorder) and obsessive-compulsive disorder (OCD). It is also used with Zyprexa to treat manic depression caused by bipolar disorder.	The side effects of Prozac include impaired judgement, thinking, motor skills, blurred vision, and in worse cases impotence.
Cymbalta	1993	A type of selective norepinephrine reuptake inhibitor (SNRI) antidepressant that affects certain neurotransmitters and blocks norepinephrine reuptake.	Global market	\$243.73 for 21 capsules (30 mg per capsule)	Can effectively inhibit neurotransmitters in a longer time, and can also treat anxiety disorder, treat nerve pain caused by diabetes or chronic muscle or joint pain (such as low back pain).	Cymbalta can cause liver problems, low blood sodium, and manic episodes. Side effects also include impotence.

DuPont HOWARU Calm	2021	Probiotic aimed to help dietary supplement manufacturers decrease consumer stress by using <i>L. paracasei</i> Lpc-37.	-	-	Can be added to existing supplement products or be added to food and beverage products. They have conducted a clinical study and results show that people who took <i>L. paracasei</i> Lpc-37 daily for 5 weeks reported improved mood.	These might be unable to release drugs accordingly to a certain biomarker, so it may require regular consumption by the consumer. (For example in their trial the probiotic is taken daily)
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Table 3. List of possible competitors for Menbles

### 3.5 Supply Chain

Currently, Menbles has not been approved by the Food and Drugs Administration since it contains Genetic Modified Organisms (GMO) which is a major challenge for the team. MenTAUR Biotechnologies will file for patent protection to ensure our assets are being protected from plagiarism and obtain the required safety approval for usage and sales in the market simultaneously.

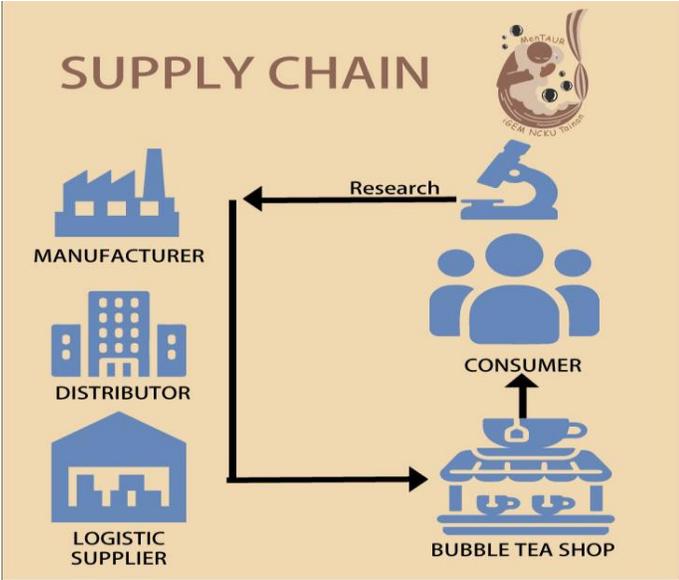


Figure 4. MenTAUR Supply Chain

### 3.5.1 Marketing

For Menbles, it is planned to collaborate with multiple trustworthy and experienced bubble tea distributors to aggressively push Menbles into the market at a compelling price point. In this collaboration, MenTAUR Biotechnologies aims to harness the experience of marketing professionals in the distributor companies to gain reputation and market share with the probiotic product across multiple markets of different countries. Promotion periods and bulk purchase discounts are options that can be negotiated to achieve brand and product recognition during the early phase of product introduction. Moreover, by outsourcing the product marketing, the company can save cost on employing marketing experts and advertising, as well as the time needed to build relationships with crucial customers, like bubble tea shops and consumers.

Apart from that, MenTAUR Biotechnologies. will attempt to get coverage from major healthcare insurance providers, albeit national or private, around the world for the consumption of Menbles.

### 3.5.2 Packaging

During the earlier stage, MenTAUR Biotechnologies will collaborate with bubble tea shops and distributors. The packaging should be following the brands we are having collaboration with. It will be within a cup that look like a usual bubble tea cup packaging. But we hope to make use of recyclable and environmental-friendly materials in the packaging design.

### 3.5.3 Distribution

MenTAUR will be distributed by collaborating distributors from bubble factories to bubble tea shops in markets across the world where usage and sales are approved. Since our product is considered as chilled ready-to-eat (RTE) food, the purchase could be done by the consumers directly without prescription.

As for the logistical requirements for the products, temperature and humidity control will be key to the wellbeing of the products, with the temperature tolerating range pre-notified to the distributors and couriers as well as being listed on the respective packaging. The tolerable temperature range of the products are expected to be at around 4°C and room temperature, while the humidity range will be determined during the testing phase.

## 4 Finances

### 4.1 Product Cost and Retail

Aligning with our company's mission, Menbles is targeted to be an affordable de-stressors probiotic which could reduce the risk of higher stress levels among high-risk group. As the Menbles, its related manufacturing process and supply chain do not have a definite cost being quoted as of today, hence the following prices listed below will be rough estimates, by just

considering the projected profit margin of 50% for the first 5 years of sales. The profit margin may be adjusted accordingly, if necessary, within the projected product lifespan.

<b>Title</b>	<b>Amount</b>
Est. Product Cost	TWD 20-30
Profit Margin	50%
Est. Retail Price	TWD 30-45

*Table 4. Menbles Retail Price Estimation*

## 4.2 Funding

<b>Funding Phase</b>	<b>A</b>	<b>B</b>	<b>C</b>
R&D Division	\$18,000,000	\$20,000,000	
Manufacturing Process R&D Division	\$3,500,000	\$10,000,000	
Marketing & Advertising			\$12,000,000
Patent Application & Maintenance	\$5,000,000		
Operating Cost & Paychecks	\$7,000,000	\$7,000,000	\$7,500,000
<b>Total</b>	<b>\$33,500,000</b>	<b>\$37,000,000</b>	<b>\$19,500,000</b>

*Table 5. Funding Phase and Amount Distribution*

NOTE: The stated costs above are an estimation based on the data we have collected, it may vary or change in the future. The currency used is the United States Dollar.

### 4.2.1 R&D Division

The funding for therapeutic R&D division will be used to acquire common lab equipment and apparatus (i.e. tips, eppendorf, etc.).

### 4.2.2 Product Manufacturing Process R&D Division

The funding for this division will mainly be used to improve the efficiency of therapeutic product manufacturing in order to lower the cost of production and have the ability to mass produce as well as ramp-up production when needed.

## 5 Milestones

In the 15-year patent licensing period, trials will be carried out under the guidelines of the Taiwanese United States Food and Drug Administration (TFDA), while optimizing our products. We will conduct research on how to upgrade our product to using *Lactobacillus*. Also, education about GMOs and the importance of mental health issues to make the public knows and aware of GMO uses and mental health. While 3 years after our start-up company began, we will be starting to expand our markets overseas. Last 5 years of the licensing patent, we will attempt to get coverage from major healthcare insurance providers, albeit national or private, around the world for the consumption of MenTAUR.

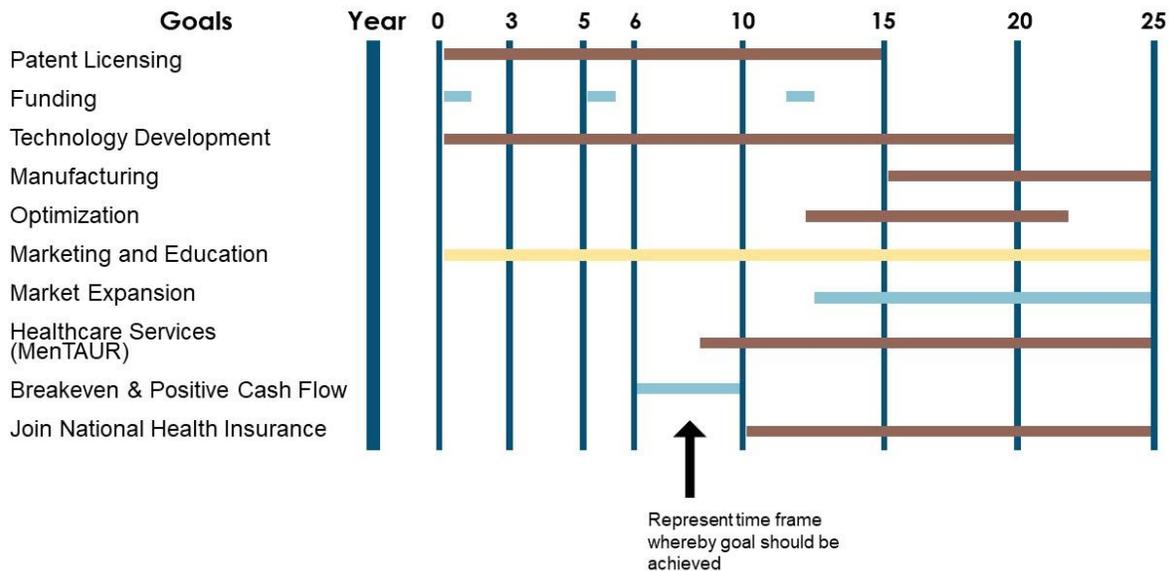


Figure 5. MenTAUR Milestones

## 6 Futures

### 6.1 Expansion

The company will focus on improving our product and expanding the business to both human and pet markets. The product shall be divided into three generations, so we can continuously provide better and improved formula to satisfy the needs of customer.

Apart from that, we would like to apply the autoregulation system to produce other kind of enzymes as it is very beneficial and helpful to future pharmaceutical contributions. This could deal with low drug compliance rate of patients when it came to taking medicine regularly.

MenTAUR Biotechnologies aims to expand the area served to cover most of the countries around the world. We would also like to expand to other countries' market, especially those who are in a higher stress risk and developing countries. One of our missions is building job fields for more people who are in need.

### 6.2 Vision Statement

Our vision is to become a focal company leading the modernized bubble industry possessing health-beneficial functional products. We aspire to change the public's perspective towards GMOs and genetic engineering, meanwhile offering Taiwan's national drink, bubble tea, as an affordable solution to provide de-stressing benefits.

### 6.3 Business Goals

The short-term goal for Project MenTAUR is to successfully accomplish trials and have the patents granted as soon as possible. After which, product marketing can be carried out to build a customer base and the brand itself. MenTAUR Biotechnologies will also be actively taking part in conventions, seminars, and conferences to improve brand recognition as well as charity programmes to improve brand reputation. The company will take on a public engagement and education role to promote the use of GMOs and increase the knowledge and confidence of the public on the idea of synthetic biology and genetic modified organisms as a whole.

The long-term goal is to expand our business all over the world and become a trusted, reputational brand welcomed by everyone. We would like to expand our business into other larger markets, as well as adapting the technologies and frameworks established into treating other types of depression causes.

As for the financial aspect, MenTAUR Biotechnologies aims to break even after 6 years of product introduction to the market and will start to reinvest in improving the products, develop and market the new base ideas of the biosensing system. The company intends to be debt free in 20 years upon the company's establishment by allocating a huge portion of the net profit into debt repayment and further R&D cost will be funded internally forward there on.

## 7 References

1. Wu, Gao-Feng & Ren, Shuang & Tang, Ri-Yi & Xu, Chang & Zhou, Jia-Qi & Lin, Shu-Mei & Feng, Ying & Yang, Qun-Hui & Hu, Jian-Min & Yang, Jian-Cheng. (2017). Antidepressant effect of taurine in chronic unpredictable mild stress-induced depressive rats. *Scientific Reports*. 7. 10.1038/s41598-017-05051-3.
2. Chuang J-J, Huang Y-Y, Lo S-H, et al. Effects of pH on the Shape of Alginate Particles and Its Release Behavior. *International Journal of Polymer Science*. 2017;2017:1-9. doi:10.1155/2017/3902704
3. Guo L, Goff HD, Xu F, et al. The effect of sodium alginate on nutrient digestion and metabolic responses during both in vitro and in vivo digestion process. *Food Hydrocolloids*. 2020;107:105304. doi:10.1016/j.foodhyd.2019.105304
4. Saito, Y., Sato, T., Nomoto, K., & Tsuji, H. (2018). Identification of phenol- and p-Cresol-producing intestinal bacteria by using media supplemented with tyrosine and its metabolites. *FEMS Microbiology Ecology*, 94(9).
5. Zhang, G., Brox, S., & Weiner, J. H. (2005). Extracellular accumulation of recombinant proteins fused to the carrier protein YebF in *Escherichia coli*. *Nature Biotechnology*, 24(1), 100–104.
6. Passmore, I. J., Letertre, M., Preston, M. D., Bianconi, I., Harrison, M. A., Nasher, F., ... Dawson, L. F. (2018). Para-cresol production by *Clostridium difficile* affects microbial diversity and membrane integrity of Gram-negative bacteria. *PLoS pathogens*, 14(9), e1007191.

7. InterPro EMBL-EBI. “4-Hydroxy-Tetrahydrodipicolinate Synthase, DapA (IPR005263) < InterPro < EMBL-EBI.” Ebi.Ac.Uk, 2019, [www.ebi.ac.uk/interpro/entry/IPR005263](http://www.ebi.ac.uk/interpro/entry/IPR005263). Accessed 22 Aug 2021.
8. Lan Y-J, Tan S-I, Cheng S-Y, et al. Development of Escherichia coli Nissle 1917 derivative by CRISPR/Cas9 and application for gamma-aminobutyric acid (GABA) production in antibiotic-free system. Biochemical Engineering Journal. 2021;168:107952. doi:10.1016/j.bej.2021.107952
9. 財團法人醫藥品查驗中心. Investigational New Drug (IND). Cde.org.tw. Published 2019. Accessed October 17, 2021. [https://www.cde.org.tw/drugs/med\\_explain?id=34](https://www.cde.org.tw/drugs/med_explain?id=34)
10. Mutaflor® Australia. Mutaflor Australia | Mutaflor® the probiotic for life! Published January 22, 2016. Accessed October 17, 2021. <https://www.mutaflor.com.au/>
11. 食品藥物管理署. 什麼是「健康食品」？讓食品藥物管理署來告訴您! Published July 24, 2014. Accessed October 17, 2021. <https://www.mohw.gov.tw/cp-3203-21850-1.html>
12. America. 2015 Stress in America Snapshot. <https://www.apa.org>. Published 2015. Accessed October 17, 2021. <https://www.apa.org/news/press/releases/stress/2015/snapshot>