A Translational Medical Showcase: Exploring the Impacts of Social Determinants of Health and Proposed Synthesis of Small Molecules for Study of Chagas Disease
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A Dual Pairing of Separate Independent Projects
From the University of Washington Tacoma and the Child Family Health International Organization

GLOBAL HEALTH EXPERIENCE

MOTIVATIONS/GOALS
- Maintain a growth mindset in all encounters I may face
- Develop a better understanding of the various healthcare systems in our world
- Learn conversational Spanish

ACTIVITIES/LEARNING
- WEEK 1
  - Plataforma de Chagas
    - Clinic designed to treat acute phase and aid patients in managing symptoms in the chronic stage of Chagas disease. Shadowed physicians, nurses, and immunologists. Observed the collection of vitals and EKG procedures. Began Spanish classes.
  - NeoTor Pas
    - Clinic designed to treat women and children. Observed pregnancy appointments. Observed mobile vaccination clinic. Experienced Fiesta de San Roque.
- WEEK 2
  - San Juan de Dios
  - Centro de Salud: San Andres
    - Clinic designed for rural primary care. Observed physicians care for individuals who neglected their health. Observed encounters I may face.

PROFESSIONAL/PERSONAL GROWTH

During my time in Bolivia, I was fortunate enough to increase and refine my repertoire of interpersonal skills, Spanish, and gain exposure to a few new medical related procedures. I was also able to form connections to both the people in culture in Bolivia by attending festivals, spending time in the city center, and forming close bonds with each member of my host family.

TAKE-AWAYS

After spending a month in Bolivia my perspective on the world has shifted from a static misinterpretation to a dynamic understanding of the various ways of life in South America. I also have shifted my unintentional nationalistic bias for America to a much more nurturing appreciation for our world.

PROPOSED ORGANIC SYNTHESIS

ABSTRACT

There are currently 37 global neglected tropical diseases recognized by the World Health Organization that affect more than 1 billion people worldwide. In recent years, the country of Bolivia has maintained the highest prevalence of Chagas disease, a neglected disease spread by insects infected with the Trypanosoma cruzi parasite endemic to Latin America. There are currently no cure for Chagas disease, limited treatments are available for the acute stage of infection, but not the chronic stages. The indigenous people of Bolivia are most impacted by Chagas disease but tend to only seek treatment when their symptoms impact their day to day lives. Due to the delay in receiving treatment many unnecessarily allow the disease to progress too far and in turn develop heart and GI disease. This project combines work due to the correlation between colonization and their lingering impacts; the indigenous people of Bolivia do not seek or receive preventative care or treatment in the acute stage. Being able to treat this disease at an earlier stage would propel the process of creating a new treatment. This project would not have been possible without the support of Dr. Kim and Dr. Karina Gamarra. I would also like to thank the Child Family Health International Organization for the opportunity to work, live, and learn in Bolivia and to share all that I have learned with the University of Washington and Dr. John Marques on the importance of social determinants of health within the Bolivian healthcare system and proposing a preliminary synthetic pathway towards antiparasitic organic molecules with the potential for therapeutic development for Chagas disease.

PROPOSED SYNTHESIS

MOTIVATION

348 - Quinazolinacetamide, N-[2-(4-chlorophenyl)ethyl]-4-oxo-2-[1-piperidinyl]-quinazolineacetamide, compound 1, has shown promising activity against T. cruzi based on work by DNDi partners.

OBJECTIVE

Propose a synthetic approach toward novel quinazolinones bearing varied amine substituents with potential for antiparasitic activity toward Chagas disease.

HYPOTHESIS

Target molecule 348 - Quinazolinacetamide, N-[2-(4-chlorophenyl)ethyl]-4-oxo-2-[1-piperidinyl]-quinazolineacetamide, compound 1, can be prepared from starting materials 2-Chloro-4(3H)-quinazolinone, compound 2, and piperidine, compound 4, using nucleophilic substitution reaction followed by cross coupling reaction.

RETROSYNTHESIS

BACKGROUND ON BOLIVIA

- Landlocked south American country
- 11 million citizens
- Population made of: Indigenous, mestizos, white and non specified
- Dry and tropical climate year round
- One of the countries that is most affected by Incas and Spaniards left in country
- HDI Index of 0.693
- Currently experiencing political unrest due to dictatorship mindset by Evo Morales
- Recently switched to universal healthcare system

CHAGAS DISEASE

- Bolivia has 6.1% (approximately about more than 607,000 people) of the world’s cases related to the Chagas disease.
- Chagas disease is considered a national priority.
- About three million individuals are infected with Chagas in Bolivia. In 2014, the Ministry of Health for Bolivia calculated 17,941 new cases of Chagas. Direct correlation between Chagas disease and socioeconomic class.
- The parasite T. cruzi (the parasite that causes Chagas) thrives in warmer area regions thus making Bolivia a prime target for parasite T. cruzi that transmits Chagas.
- Bolivia’s people that live in poverty are at higher risk of getting Chagas while those of wealthier classes are at lower risk of getting Chagas.

TRANSLATIONAL MEDICINE

- Proposed Synthesis
  - Compound 1, has shown promising activity agist the T. cruzi parasite allowing it to be more effective.

WORK CITED & ACKNOWLEDGEMENTS

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