Developing a Case for an Analog Manuka Honey:

1. Methyglyoxal (MGO) is found in most biological systems that use sugar; it is a byproduct of sugar being metabolized. It is found in high amounts in diabetics, presumably because they have higher sugar in the bloodstream and more is available to metabolize.

2. MGO is toxic to humans if ingested. In many food products it is actively discouraged and removed if possible. In low doses, however, it is present all the time in the blood stream, and may provide some unknown protection against certain organisms, or the obverse, be problematic to patients with diabetes.

3. MGO is considered the active ingredient in Manuka honey that provides antibacterial properties beyond the usual ones associated with hydrogen peroxide found in most diluted honey. This means that MGO honey is effective against many bacterial infections, including MRSA, Staph. aureus, and others that are resistant to many antibiotics . The reputation of this honey has caused it to become a major crop in New Zealand with a high price tag. Some consequences of this are robbing and poisoning of bee hives, as well as large-scale adulteration and mislabeling. A "unique manuka factor" (UMF) badging http://www.umf.org.nz/grading-system-explained/ has been established to help protect the brand. Although used mostly externally due to MGO's toxic nature, it is widely marketed as a food, and might provide some benefits to those suffering from H. pylori and other conditions.

5. Honeys continue to be investigated for their levels of MGO around the world. In some locations Manuka shrubs are being actively planted in the hope it will provide the raw materials (nectar) for a Manuka-like honey. Chemical assays in Florida have found MGO in many honeys and other foods at low levels, but not in all sugary foods. Current research in Australia is looking at at least 80 plants in the Leptospermum genus related to Manuka to determine their levels of MGO, and to then offer these materials for sale in the rapidly growing international market. Most recently, badging has been added to New Zealand honey to distinguish it from other exported honeys labeled as produced in New Zealand but that have no indication or badging of MGO content. Export sales are booming, since antibiotic-resistant superbugs are being discovered all over the world.

7. Peter Molan has written, however, that MGO itself is not the full story. It must be present in synergy with normal components of honey (peroxides) to work, being far more effective in honey than in water. The bioactivity of Manuka honey has a lower threshold and increases with concentration, but does not continue to increase in a straight line in proportion to its MGO level. The bioactive region appears to be 200 to 700 PPM of MGO, usually measured per natural honey by comparison of zone of inhibition versus phenol in tests using several plated bacterial strains.

8. Fortunately, the basic research for such an effort as described here has been published after 2009. Methods are published for searching for MGO in honey and foods, and bioassays of various honeys against bacteria mentioned below are readily available, whether via topical or internal application.

9. The question arises whether simply adding MGO to any honey would result in Manuka-like activity. This would be expected to produce a Manuka analog type honey, which would be marketable in the same manner as the original New Zealand product. It would require a moderate research effort. MGO is cheap and readily available as is honey, so it seems possible to easily mount experiments mirroring those of Peter Molan with Manuka honey to see what the outcomes might be. It would require expertise in analytical chemistry to determine MGO levels for quality assurance, as well as

biology (bacteriology) to make these determinations using resistant bacteria such as Staph. aureus, Staph. albus, E. coli, E. faecolis, H. pylori, C. difficile, Pseudomonis aeruginosa.

10. To do this would require funding students in food science and/or bacteriology. If tests confirm activity comparable to Manuka honey, then the next step would be to look into potentially marketing a product, particularly using a locally-grown Florida honey. There might be considerable interest in doing so, given Manuka's growing popularity and the fact that bacterial resistance to antibiotics is on a dramatic rise worldwide. Possible funding agencies might be those associated with honey research (National Honey Board, http://www.honey.com/honey-industry/honey-and-bee-research/nutrition-research-information), honey bee research (Project Apis m http://projectapism.org/?page_id=814) or medical research entities like the National Institutes of Health (https://www.nih.gov/grants-funding).

11. Proposing such a medical product is difficult, and food usage is also problematic, but skin health is not so regulated. It has been suggested by the deep-wound care group that such an approach in advertising a skin cleanser product avoids mention of antibiotic properties. Recent surging popularity has led to world-wide sales of Manuka honey, which has done much of the preparative work for such a product.

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