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Improving rice for human health

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Improving rice for Human health

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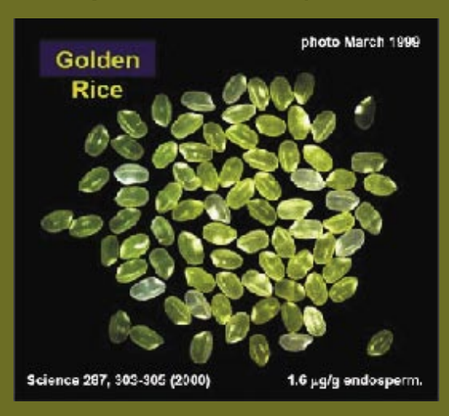
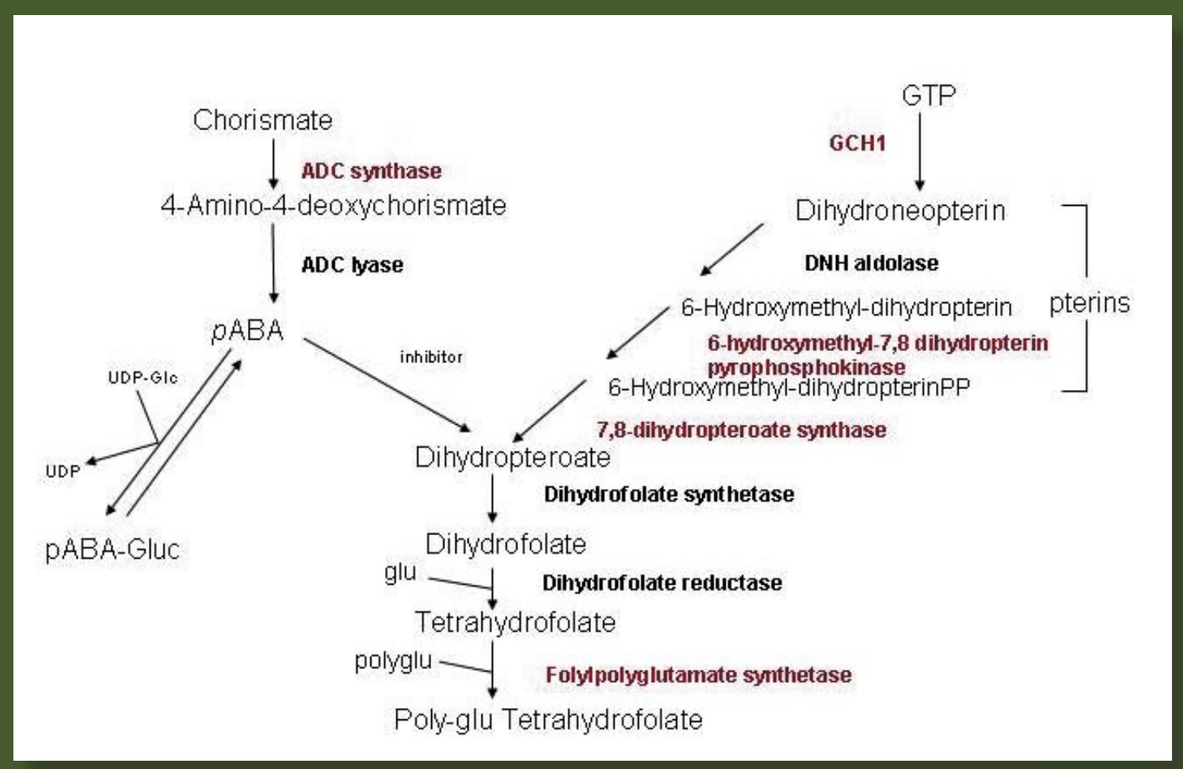
Biotechnology provides tools for production of foods with enhanced nutritional value for human diets. Golden rice is a recent example of this type of product. Consumer acceptance of these products requires they meet consumer expectations in taste, texture and appearance. Biotechnology also provides tools that can be used to improve these traits. We have been working to improve the folate content of rice for human consumption. We have also identified the key genes in rice responsible for fragrance (a major flavour trait) and gelatinization temperature (a trait determining the texture of cooked rice). Combining these traits for consumer attractiveness with traits for enhanced nutritional value provides an opportunity to improve the chance of delivering positive human health outcomes.



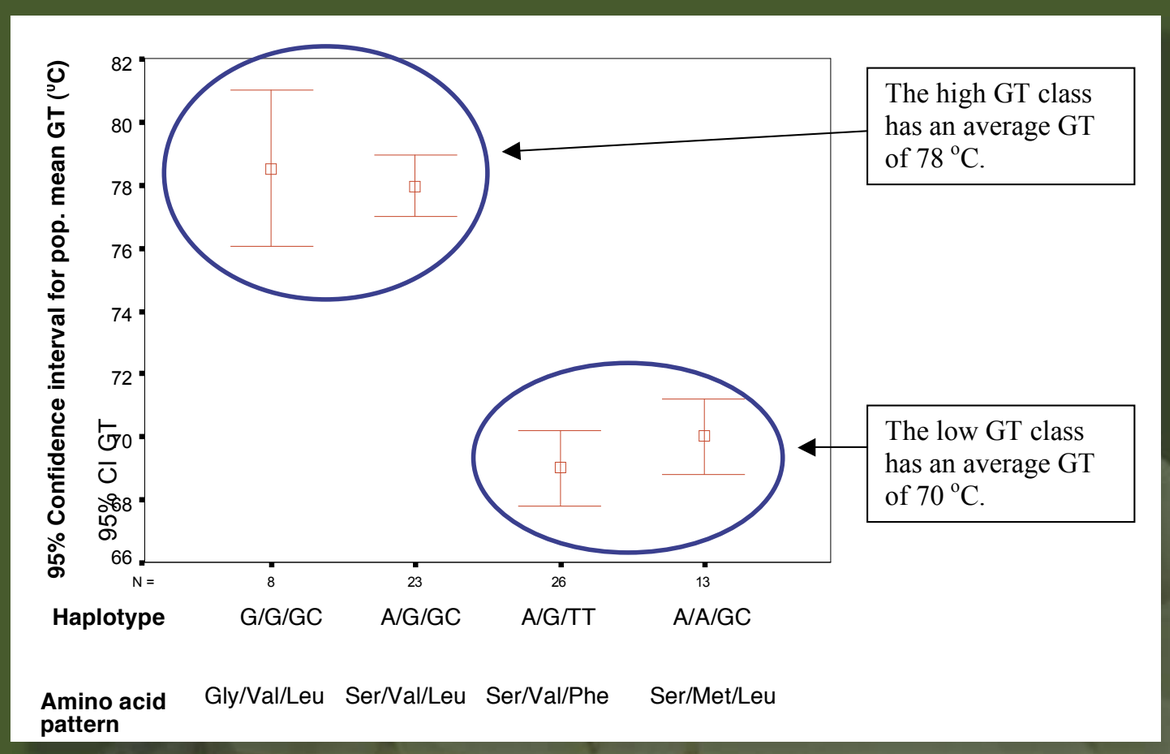
Increasing rice folate content

- Disease states which arise from inadequate folate consumption include neural tube defects, anaemia, dementia, Alzheimers, and cardiovascular disease.
- Lack of folate in rice based diets is due to partitioning of folate into rice tissue that is not consumed.
- Appropriate regulation of the folate biosynthesis pathway will result in increased levels of folate in rice endosperm which will have a positive impact on human health.



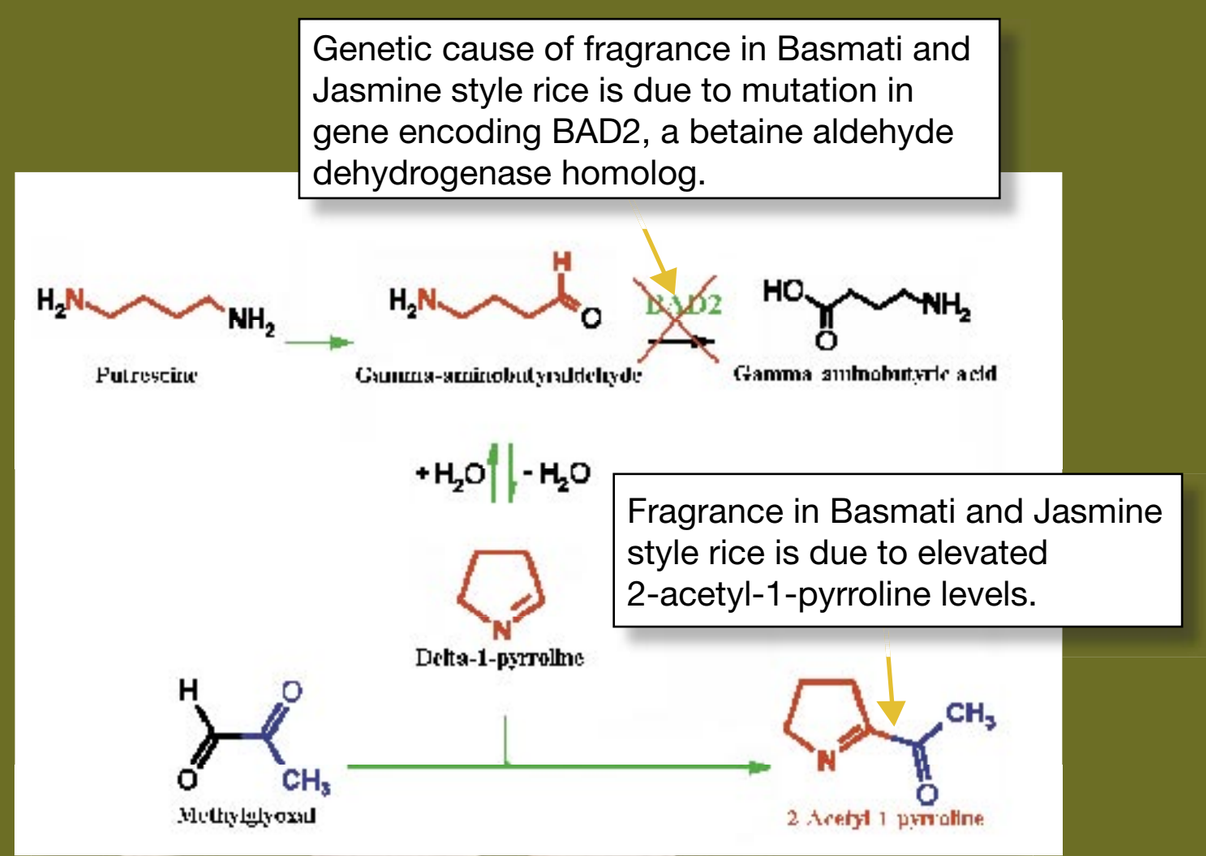
Modifying rice cooking temperature and GI

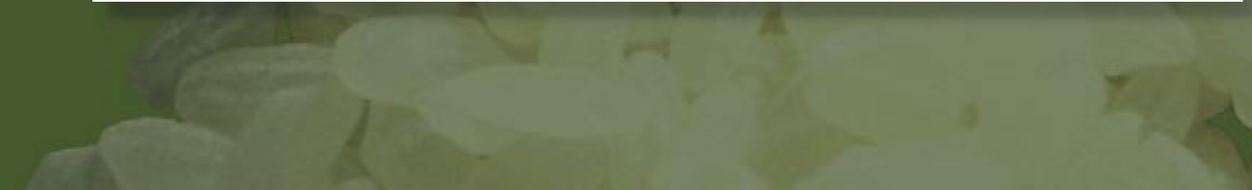
- Rice starch has a semi-crystalline structure which is disrupted by cooking, transforming the starch into a softer edible gel like material.
- The temperature at which rice starch gelatinises is an important component of rice eating quality. Starch gelatinisation properties, including gelatinisation temperature (GT), may be a predictor of glycemic index.
- Analysis of the DNA sequence of the starch synthase (SSIIa) encoding gene found nucleotide polymorphisms which allows differentiation of rice varieties into two discrete GT classes.
- Accurate selection of appropriate rice SSIIa will improve cooking qualities and may improve GI



Improving rice flavour and fragrance

- Accurate selection of appropriate rice BAD2 ensures 2-acetyl-1-pyrroline flavour and fragrance.





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