

Partial ALDH inhibition to facilitate controlled drinking rather than abstinence has already been tried and it works

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Following animal studies, Guillot et al. (1) suggest that partial inhibition of aldehyde dehydrogenase (ALDH) might prove useful in alcoholism treatment aimed at moderating drinking, rather than preventing it, but their paper does not recognize that this approach has already been shown to be effective in humans. Apart from the well-documented reduction of alcoholism in Japanese who are heterozygotic for “inefficient” ALDH and its almost complete absence in homozygotes (2, 3), partial ALDH inhibition was deliberately induced with individually tailored doses of cyanamide to reduce excessive drinking nearly 60 y ago (4, 5). The technique translates as “temperance therapy.”

A better-documented variant of this approach is the intermittent use of disulfiram (with or without third-party supervision) to protect patients against temptation for

short periods in high-risk situations while allowing them to drink normally at other times (6, 7). The real possibility of gene therapy for alcoholism that simulates the effects of “inefficient” ALDH homozygosity, or of disulfiram, already demonstrated in alcohol-preferring rats (8), might also include varying degrees of ALDH inhibition that could facilitate controlled drinking as well as abstinence.

However, for the many alcoholic patients for whom lasting moderation has repeatedly proved unachievable, supervised disulfiram is more effective than any other current medication and can be easily combined with network or family therapies. It is also the medication of choice when one more alcoholic episode in the next few months means a high risk of losing job, spouse, home, liberty, or liver.

- 1 A. Guillot et al., Targeting liver aldehyde dehydrogenase-2 prevents heavy but not moderate alcohol drinking. *Proc. Natl. Acad. Sci. U.S.A.* **116**, 25974–25981 (2019).
- 2 F. Sun, I. Tsuritani, Y. Yamada, Contribution of genetic polymorphisms in ethanol-metabolizing enzymes to problem drinking behavior in middle-aged Japanese men. *Behav. Genet.* **32**, 229–236 (2002).
- 3 Y.-C. Chen et al., Alcohol metabolism and cardiovascular response in an alcoholic patient homozygous for the ALDH2*2 variant gene allele. *Alcohol. Clin. Exp. Res.* **23**, 1853–1860 (1999).
- 4 H. Mukasa, T. Ichihara, A. Eto, A new treatment of alcoholism with cyanamide. *Kurume Med. J.* **11**, 96–101 (1964).
- 5 H. Mukasa, K. Arikawa, A new double medication method for the treatment of alcoholism using the drug cyanamide. *Kurume Med. J.* **15**, 137–143 (1968).
- 6 A. Öjehagen, M. Berglund, To keep the alcoholic in out-patient treatment. A differentiated approach through treatment contracts. *Acta Psychiatr. Scand.* **73**, 68–75 (1986).
- 7 C. Brewer, “A counter-intuitive application: Using disulfiram in controlled drinking programmes” in *Antabuse Treatment for Alcoholism: An Evidence-Based Handbook for Medical and Non-medical Clinicians*, C. Brewer, M. Streeb, Eds. (CreateSpace IPP, North Charleston, SC, 2018), pp. 149–158.
- 8 M. Rivera-Meza, M. E. Quintanilla, L. Tampier, Reduction of ethanol consumption in alcohol-preferring rats by dual expression gene transfer. *Alcohol Alcohol.* **47**, 102–108 (2012).

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