FDA OKs deoxycholic acid to zap your double chin

Jenn Gidman, M E staff 10:28 a.m. EDT April 30, 2015

(NEWSER) – About 70% of participants in a 2014 survey by the American Society for Dermatologic Surgery about cosmetic procedures pointed fingers at chin and neck fat as a "top concern," per the Washington Post. But a drug just approved by the FDA looks to banish double chins, ABC News reports. Kybella, which drug manufacturer Kythera Biopharmaceuticals says could be available by June, is a form of the naturally occurring deoxycholic acid; it's injected into the body, where it penetrates fat cells and attacks their outer membranes, causing them to burst, ABC News reports. The FDA says patients can receive up to 50 injections per session—though it emphasizes they should be administered by a "licensed health care professional"—with a cap of six sessions that are at least one month apart, the AP reports.

The injections take about five minutes in total and need just a few days to heal, ABC adds. But they're not for everyone: Side effects may include bruising, pain, swelling, numbness, and even a few short-lived swallowing episodes, NBC News reports. And the director for the Society for Aesthetic Plastic Surgery worries that "once it is approved, people will start to use it for other areas of the face or for larger volumes (of fat) in other areas" (i.e., your butt or gut, which is
(Where do chins come from, anyway?)
Deoxycholic acid

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Names

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<th>IUPAC name</th>
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<tr>
<td>(3α,5β,12α,20R)-3,12-Dihydroxycholan-24-oic acid</td>
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<td>Deoxycholic acid</td>
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Except where noted otherwise, data is given for materials in their standard state (at 25 °C (77 °F), 100 kPa)
Deoxycholic acid, also known as deoxycholate, cholanoic acid, and 3α,12α-dihydroxy-5β-cholan-24-oic acid, is a bile acid. Deoxycholic acid is one of the secondary bile acids, which are metabolic byproducts of intestinal bacteria. The two primary bile acids secreted by the liver are cholic acid and chenodeoxycholic acid. Bacteria metabolize chenodeoxycholic acid into the secondary bile acid lithocholic acid, and they metabolize cholic acid into deoxycholic acid. There are additional secondary bile acids, such as ursodeoxycholic acid. Deoxycholic acid is soluble in alcohol and acetic acid. When pure, it comes in a white to off-white crystalline powder form.

Applications

Deoxycholic acid has been used since its discovery in various fields of human medicine. In the human body deoxycholic acid is used in the emulsification of fats for the absorption in the intestine. It has, in some countries (including Switzerland) been licensed as an emulsifier in food industry,[3] but it is no longer common. Outside the body it is used in experimental basis of cholagogues and is also in use to prevent and dissolve gallstones.[4][5]

In research deoxycholic acid is used as a mild detergent for the isolation of membrane associated proteins. The critical micelle concentration for deoxycholic acid is approximately 2.4-4 mM.[6]

Sodium deoxycholate, the sodium salt of deoxycholic acid, is often used as a biological detergent to lyse cells and solubilise cellular and membrane components.[7]

Deoxycholates and bile acid derivatives in general are actively being studied as structures for incorporation in nanotechnology. They also have found application in microlithography as photoresistant components.[8][9]

Sodium deoxycholate, the sodium salt of deoxycholic acid, mixed with phosphatidylcholine, is used in mesotherapy injections to produce lipolysis, and has been used as an alternative to surgical excision in the treatment of lipomas.[11]

In the United States, deoxycholic acid, under the trade name Kybella, is approved by the Food and Drug Administration for reducing moderate-to-severe fat below the chin.[12] When injected into submental fat, deoxycholic acid helps destroy fat cells.[12]

Research in immunology

Its function as a detergent and isolating agent for membrane proteins also suits it for production of outer membrane protein (OMP) vaccines such as MenB, a Norwegian vaccine developed in the early 1990s.[13] The MeNZB vaccine was produced using the same method.[14]

Deoxycholic acid is one of the main components of the traditional Chinese medicine "Niuhuang", which means "Oxen Yellow" and is bilestone of oxen. This has been in use for two millennia in the unproven belief that it treats inflammations and enhances the immune system.[15]

Some publications point towards the effect of deoxycholic acid as an immunostimulant[16][17] of the non-specific immune system, activating its main actors, the macrophages. According to these publications, a sufficient amount of deoxycholic acid in the human body would correspond with a good immune reaction of the non-specific immune system. Clinical studies conducted in the 1970s and 1980s confirm the expectation, that deoxycholic acid is involved in the natural healing processes of local inflammations,[18][19] different types of herpes[20][21] and possibly cancer.[22][23] Due to the same acronym, DCA, as another potential cancer treatment, deoxycholic acid is often confused with dichloroacetic acid.

Research in cancer

Deoxycholate and other secondary bile acids cause DNA damage.[24] Secondary bile acids increase intracellular production of reactive oxygen and reactive nitrogen species resulting in increased
oxidative stress and DNA damage. When the level of deoxycholate-induced DNA damage is high, DNA repair enzymes that ordinarily reverse DNA damage may not be able to keep up.

DNA damage has frequently been proposed as a major cause of cancer. DNA damage can give rise to cancer by causing mutations.

When deoxycholate was added to the food of mice so that their feces contained deoxycholate at about the same level present in feces of human on a high fat diet, 45% to 56% of the mice developed colon cancer over the next 10 months. Thus, exposure of the colon to deoxycholate can cause cancer.

In humans, higher levels of colonic deoxycholate are associated with higher frequencies of colon cancer. As an example, the fecal deoxycholate concentrations in African Americans (who eat a relatively high fat diet) is more than five times higher than fecal deoxycholate of Native Africans in South Africa (who eat a low fat diet). Male African Americans have a high incidence of colon cancer of 72 per 100,000, while Native Africans in South Africa have a low incidence rate of colon cancer of less than 1 per 100,000, a more than 72-fold difference in rates of colon cancer.

**Factors affecting deoxycholate levels**

A number of factors, including diet, obesity, and exercise, affect the level of deoxycholate in the human colon. When humans were switched from their usual diet to a meat, egg and cheese based diet for five days, deoxycholate in their feces increased by factors of 2 to 10 fold. Rats, fed diets with either 30% beef tallow (high fat) or 5% beef tallow (low fat) had almost 2-fold more deoxycholate in their feces on the high fat compared to the low fat diet. In this study, adding the further dietary elements of curcumin or caffeic acid to the rats' high fat (30% beef tallow) diet reduced the deoxycholate in their feces to levels comparable to levels seen in the rats on a low fat diet. Curcumin is a component of the spice turmeric, and caffeic acid is a component high in some fruits and spices. Caffeic acid is also a digestive break-down product of chlorogenic acid, high in coffee and some fruits and vegetables.

In addition to fats, the type or amount of protein in the diet may also affect bile acid levels. Switching from a diet with protein provided by casein to a diet with protein provided by salmon protein hydrolysate led to as much as a 6-fold increase in levels of bile acids in the blood plasma of rats. In humans, adding high protein to a high fat diet raised the level of deoxycholate in the plasma by almost 50%.

Obesity has been linked to cancer, and this link is in part through deoxycholate. In obese people, the relative proportion of Firmicutes (Gram-positive bacteria) in gut microbiota is increased resulting in greater conversion of the non-genotoxic primary bile acid, cholic acid, to carcinogenic deoxycholate.

Exercise decreases deoxycholate in the colon. Humans whose level of physical activity placed them in the top third had a 17% decrease in fecal bile acid concentration compared to those whose level of physical activity placed them in the lowest third. Rats provided with an exercise wheel had a lower ratio of secondary bile acids to primary bile acids than sedentary rats in their feces. There is a positive association of exercise and physical activity with cancer prevention, tolerance to cancer-directed therapies (radiation and chemotherapy), reduction in recurrence, and improvement in survival.
References


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5. Cholecysmon, Riemser Arzneimittel AG, Riems, Germany


7. Sodium deoxycholate


14. e.g., see PR from NZ immunology group, [http://www.scoop.co.nz/stories/GE0506/S00048.htm](http://www.scoop.co.nz/stories/GE0506/S00048.htm)

15. Chen X, Mellon RD, Yang L, Dong H, Oppenheim JJ, Howard OM. (The Laboratory of Molecular Immunoregulation, Center for Cancer Research, National Cancer Institute-Frederick, Bldg. 560, Rm. 31-19, Frederick, MD 21702-1201, USA): *Regulatory effects of deoxycholic acid, a component of the anti-inflammatory traditional Chinese medicine Niuhuang, on human leukocyte response to chemoattractants*. *Biochemical Pharmacology* 2002, 63(3), 533-541.


17. Chyle M., Chyle P.: *Regulation of the immune response with DCA* (Czech, engl. summary), Sbornik lek. 84, 212-218 (1982)


Deoxycholic acid products for use

Meso Re – shape: Special reshaping formula Dissolve undesirable localized fats Vial 10 ml contains:
Phosphatidylcholine-Caffeine -deoxycholic acid -Pentoxifylline- DMAE -Vit B1,B2,B6 ** PPC
:phosphatidylcholine lipodissolving = fat solubilization in water Naturally abundant in cell membranes, this phospholipid, breaks down the fat stored in fat cells. Phosphatidylcholine Lipolytic Solution emulsifies the fat, allowing it to be [...]

P.P.C Composition: Phosphatidylcholine Deoxy cholic acid PPC: phosphatidylcholine lipodissolving = fat solubilization in water Naturally abundant in cell membranes, this phospholipid, breaks down the fat stored in fat cells. Phosphatidylcholine Lipolytic Solution emulsifies the fat, allowing it to be absorbed into the bloodstream and transported. This makes it the ideal solution for eliminating unattractive, localized [...]

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Eros lipoloss: Special reshaping formula Dissolve undesirable localized fats Vial 10 ml contains : Phosphatidylcholine-Caffeine Deoxycholic acid-Thiopromine-L.Carnitin Pentoxifylline-DMAE -Vit B1,B2,B6 ** PPC :phosphatidylcholine lipodissolving = fat solubilization in water Naturally abundant in cell membranes, this phospholipid, breaks down the fat stored in fat cells. PhosphatidylcholineLipolytic Solution emulsifies the fat, allowing it to be absorbed into [...]

Cellcure mesolipolysis mixture: Special reshaping formula Dissolve undesirable localized fats Vial 10 ml contains: Phosphatidylcholine-Caffeine Deoxycholic acid-L.Carnitin-DMAE-Vit B1,B2,B6 ** PPC: phosphatidylcholine lipodissolving = fat solubilization in water Naturally abundant in cell membranes, this phospholipid, breaks down the fat stored in fat cells. Phosphatidylcholine Lipolytic Solution emulsifies the fat, allowing it to be [...]

L-Carnitine ** L-CARNETINE: Fat Carrier Solution In its natural form in the body, L-Carnitine is responsible for metabolizing fat. After breaking down the stored fat, it mobilizes the fatty acids into the bloodstream, attaching itself to them and carrying them to the area of the cell that converts fat to energy. L-Carnitine Fat Carrier Solution [...]

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