Pharmacological effects of acetylsalicylic acid have been known for a long time. Recently, new therapeutic uses of aspirin were discovered, and investigated, e.g. prevention of colon cancer or treatment of dementia. This promotes a detailed screening for new physical (polymorphs) and chemical (salts, co-crystals) forms of aspirin. An improved dissolution rate of the forms is a desirable property in order to decrease stomach wall damage.

Many patents are focused on the preparation of the sodium aspirin. Surprisingly, no structure of sodium aspirin has been solved yet. The sodium salt can be prepared by the reaction of acetylsalicylic acid with sodium bicarbonate. Both known and patented forms arise under very similar conditions - sodium acetylsalicylate dihydrate and anhydrate. Their preparation is very difficult and the reproducibility is fairly low due to ester hydrolysis. Therefore a new structure of anhydrate has not been solved yet.

The preparation of sodium acetylsalicylate dihydrate was successful, the structure was determined by single-crystal X-ray diffraction. The dihydrate form was later dehydrated to sodium acetylsalicylate anhydrate. Their preparation is very difficult and the reproducibility is fairly low due to ester hydrolysis. Therefore a new structure of anhydrate has not been solved yet.

Further, a new form of sodium aspirin was discovered - sodium acetylsalicylate monohydrate. Its structure was determined by single-crystal X-ray diffraction. Unluckily, no attempts to reproduce the monohydrate form were successful.

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