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「Inhibitory effects of South American herbal tea on two-stage carcinogenesis in mice」

マウス二段階発癌における南米産薬用飲料の抑制効果

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マウス二段階発癌実験モデルを用いて、発癌予防に有用と思われる物質のスクリーニングを巾広く行なっている。その過程で主に南米地域において古来より、飲料用として使用されている植物Tabebuia avellanedaeについて、今回は一般に服用されている方法である、その粉末を水で煎じたろ液に関し、マウスの皮膚と肺における二段階発癌抑制実験を行なった。マウス皮膚二段階発癌抑制実験はイニシエーターとしてDMBA100μgを塗布し、その1週間後よりTPA1μgをプロモーターとして、同部位に塗布、週2回の割合で20週間連続して処理した。陽性コントロール群（15匹）は通常の飲料水を、20週間続けて自由摂取する、一方、被験群（15匹）はプロモーション処理と同時に、先の50%ろ液を同様に自由摂取させ20週目において、発現されてくる腫瘍を比較したところ、発現腫瘍の数がほぼ40%の抑制率を示した。肺二段階発癌抑制試験は、イニシエーターとして4NQOを接種、プロモーターとして8%グリセロールを25週間経口投与する。被験群（15匹）は50%ろ液を加えてその影響を検討したところ、肺での発現腫瘍数は70%の抑制を示した。また各実験中に定期的にマウスの体重を測定し、陽性コントロール群と比較を行ったところ、両試験とも被験群についてはほぼ同様の体重増加を示し、投与物質による生体への他の影響の関与はないものと思われる。投与群において抑制が認められたことで、本植物の水抽出液にもまた抗発癌プロモーション作用を有するものと判断される。

【目的】
マウス二段階発癌実験モデルを用いて、発癌予防に有用と思われる物質のスクリーニングを幅広く行なっている。その過程で主に南米地域において古来より、飲料用として使用されている植物Tabebuia avellanedaeについて、今回は一般に服用されている方法である、その粉末を水で煎じたろ液に関し、マウスの皮膚と肺における二段階発癌抑制実験を行なった。

【結論】
1) 発癌予防を目的に検索を行なっているなかで、有望視されている茶類に関して、南米等で薬用または健康飲料として用いられている樹木茶の原料植物に、強い抗発癌プロモーター活性が認められた。
2) その主な活性成分として、ナフトキノン類の化合物(1)と(2)を同定した。
3) この植物の内部樹皮を煎じたろ液が、皮膚および主要臓器である肺に対して、抗発癌プロモーター活性を示した。

■English translation
We widely conducted a screening to detect substances that are potentially useful for preventing carcinogenesis, using a mouse model for two-stage carcinogenesis. In the process, using Tabebuia avellanedae, which is a plant that has been used in making beverages since ancient times mostly in South America, two-stage carcinogenesis tests of mouse skin and pulmonary tumors were conducted. For the use in these tests, a filtrate was obtained by boiling the powdered plant in water, which is the method generally used to make the tea from the plant. In the two-stage carcinogenesis on mouse skin, DMBA 100 μg was applied as the initiator. Starting from 1 week after the DMBA application, TPA 1 μg as the promoter was applied to the same site at a frequency of twice weekly for 20 consecutive weeks. The positive control group (15 animals) had free access to the ordinary drinking water for 20 consecutive weeks. On the other hand, the test treatment group (15 animals) underwent the treatment for tumor promotion, and also, at the same time, the animals were allowed to have free access to the filtrate (prepared as 50% solution). At the 20th week, tumors developed were compared between these groups. The test treatment group showed about 40% inhibition in the number of tumors developed. In the two-stage carcinogenesis test of pulmonary tumors, 4NQO was inoculated as the initiator, and 8% glycerol was orally administered as the promoter for 25 weeks. The test treatment group (15 animals) received additionally the 50% filtrate solution. The treatment group showed about 70% inhibition in the number of tumors developed in the lungs. During each experiment, the body weight of each animal was measured on a regular basis, and the treatment group was compared with the positive control group. During the both test periods, the test treatment group showed similar body weight gains. Therefore, the substance administered is considered to have no influence in the body. Since the inhibitory effect was observed in the test treatment group, the water extract of the plant also possesses an antitumor-promoting action.

[Objectives]
We widely conducted a screening to detect substances that are potentially useful for cancer prevention, using a mouse model for two-stage carcinogenesis. In the process, using Tabebuia avellanedae, which is a plant that has been used in making beverages since ancient times mostly in South America, two-stage carcinogenesis tests of mouse skin and pulmonary tumors were conducted. For use in these tests, a filtrate was obtained by boiling the powdered plant in water, which is the method generally used to make the tea from the plant.

[Conclusion]
1) In the search being conducted with the objective of carcinogenesis prevention, among the teas that are considered likely candidates, a plant used to make bark tea that is used as a health-care drink mostly in South America was found to have a potent antitumor-promoting activity.
2) As its major active components, Compound 1 and Compound 2, both of which are naphthoquinone compounds, were identified.
3) The filtrate obtained by boiling the inner bark of this plant showed an antitumor-promoting activity in skin and one of the primary organs, the lungs.