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# Deep bronze skin without sun exposition in a 16-year old girl

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## INTRODUCTION

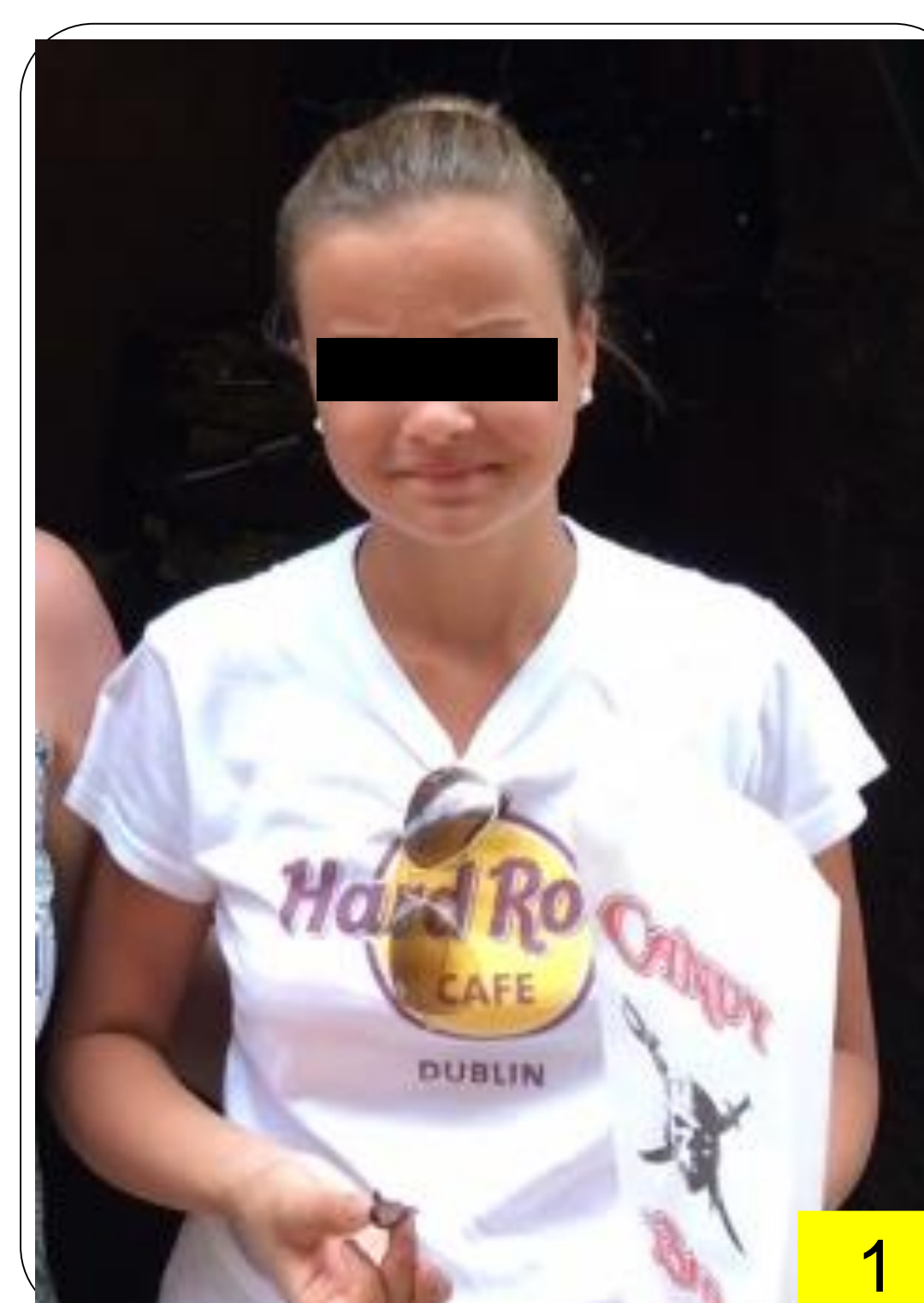
Adrenal insufficiency (AI) leads to a diminished production of steroid hormones. AI is subdivided into a primary and a secondary form.

In primary AI, the adrenal gland itself is affected, whereas in secondary AI, the cause lies in the pituitary.

In primary AI, which is also called Addison's Disease or hypocortisolism, low serum cortisol levels lead – due to negative feed-back mechanisms - to an increase in ACTH-levels. ACTH is generated by cleavage of proopiomelanocortin (POMC) into ACTH, melanocyte-stimulation hormone (MSH) and beta-lipoprotein. ACTH undergoes further cleavage to produce alpha-MSH. This is the most important MSH for skin pigmentation leading to hyperpigmentation of the skin.

## CASE HISTORY

A 16-year old girl came to our outpatient clinic because of hyperpigmentation of the skin. She reported to have a very dark skin without sun exposition for one year. Palmar creases, nipples and armpits were affected. Moreover, she reported tiredness and craving for salt. Longterm history was normal, family history showed an increase in autoimmune diseases (coeliac disease, pernicious anaemia)



Our patient in 2016 (1) and in 2017 (2) with markedly darker skin

## DIAGNOSIS

ACTH stimulation test showed an insufficient increase in cortisol, which – in combination with elevated 21-hydroxylase-antibodies – confirmed the diagnosis of Addison's Disease due to autoimmune adrenalitis.

|                               |           |       |            |
|-------------------------------|-----------|-------|------------|
| Gastro,Niere,Nebenniere - ENM |           |       |            |
| Cortisol basal                | 19.9/-    | ng/mL | 43.0-220.0 |
| Aldosteron,basal,sitzend      | <3.7      | ng/dL | 3.7-43.2   |
| Renin basal,sitzend           | 192.2/+   | µU/mL | 5.3-99.1   |
| Neuroendokrinologie - ENM     |           |       |            |
| ACTH basal                    | >1250.0/+ | pg/mL | 10.0-51.0  |

|                                |          |      |           |
|--------------------------------|----------|------|-----------|
| Hypoth.-HVL-NNR:Autoantikörper |          |      |           |
| 21- (OH)ase AK                 | 152.70/+ | U/mL | 0.08-1.00 |

|                                  |           |       |            |
|----------------------------------|-----------|-------|------------|
| Gastro,Niere,Nebenniere - ENM    |           |       |            |
| Renin basal,sitzend              | 506.5/+   | µU/mL | 5.3-99.1   |
| ACTH-Cortisol-Tagesprofil - ENM  |           |       |            |
| ACTH 1                           | >1250.0/+ | pg/mL | 10.0-51.0  |
| ACTH 2                           | >1250.0   | pg/mL | 10.0-51.0  |
| ACTH 3                           | >1250.0   | pg/mL | 10.0-51.0  |
| Synactentest für Pädiatrie - ENM |           |       |            |
| Androstendion 1                  | 1.2       | ng/mL |            |
| Androstendion 2                  | 1.3       | ng/mL |            |
| Androstendion 3                  | 1.0       | ng/mL |            |
| DHEA-S 1                         | 0.33      | µg/mL |            |
| DHEA-S 2                         | 0.33      | µg/mL |            |
| DHEA-S 3                         | 0.34      | µg/mL |            |
| Testosteron 1                    | 0.18      | ng/mL | 0.14-0.77  |
| Cortisol 1                       | 20.9/-    | ng/mL | 43.0-220.0 |
| Cortisol 2                       | 17.2      | ng/mL | 43.0-220.0 |
| Cortisol 3                       | 20.1      | ng/mL | 43.0-220.0 |
| 17a-OH-Progesteron 1             | 0.14/-    | ng/mL | 0.20-0.90  |
| 17a-OH-Progesteron 2             | 0.17      | ng/mL | 0.20-0.90  |
| 17a-OH-Progesteron 3             | 0.12      | ng/mL | 0.20-0.90  |

## GENETICS

Genetic testing of AIRE gene was negative.

## COURSE OF DISEASE

An oral therapy with hydrocortisone and fludrocortisone was started. The well-beng of the patient improved, as well as fatigue and blood pressure. Ther colour of the skin became considerably lighter.

## 3 – 6: Skin pigmentations



## CONCLUSIONS

Whereas tuberculosis used to be the most common cause for Addison's Disease in former days, autoimmune adrenalitis is the major cause nowadays. It can appear isolated or in coincidence with the APECED Syndrome (Autoimmune Polyendocrinopathy-Candidiasis-Ectodermal Dystrophy). It is associated with mutations in the AIRE gene which plays an important role in immune tolerance.