

# Premature Graying of Hair

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## Abstract

Premature Graying of hair (PGH) is a common and psychologically distressing condition of the hair. It is seen as being aggravated by various triggering factors. But the pathogenesis and the treatment options are still under study and limited. Thus, proper and extensive research seems to be needed.

**Key words:** Canities; Pigmentation; Premature Graying of Hair

## Introduction

Hair graying or 'Canities' is a manifestation of process of ageing<sup>1</sup> which normally for Whites is mid 30s, Asians late 30s and Africans mid 40s.<sup>2</sup> Premature graying of hair (PGH) is a condition where hair greying occurs before 20 years in whites, 25 years in Asians, and 30 years in Africans.<sup>3,4</sup>

## Epidemiology

PGH occurs at different ages in different ethnicities, in Japan, 30-34 years in men and 35-39 years in women; in Caucasians, mid, 30s; in Asians late -30s; in Africans mid 40s. It is seen to affect both genders equally.<sup>5</sup> PGH is also seen as an autosomal dominant disease without any underlying pathology.<sup>6</sup>

## Pathophysiology

Pigmentation of hair is hair cycle dependent and dependent on various pigmentation regulators.<sup>7</sup> During graying, the cellular composition of human hair follicles and the hair follicle pigmentary unit (HFPU) changes.<sup>7</sup>

Loss of hair pigmentation is associated with a decrease and eventual cessation of tyrosinase activity in the hair bulb. 1 Hair aging is due to the weathering of the hair shaft. 2 Hair greying is due to melanocyte stem cell (MSC) depletion and hair follicle pigmentary unit (HFPU) dysfunction.<sup>7</sup>

PGH is related to genetically altered early degenerative changes in melanocytes, as well as exogenous and endogenous factors. 5 The role of reactive oxygen species (oxidative stress) on PMGH is also extensively studied and postulated.<sup>8</sup>

## Clinical Features

PGH presents as the gradual graying or depigmentation of previously pigmented hair at a time that is deemed earlier than normal.

It is seen to be associated, very importantly, with family history or hereditary factors. Other frequent associations are with vitamin deficiency, thyroid or hormonal issues, autoimmune conditions like thyroid disorders, pernicious anemia, vitiligo and alopecia areata, and premature aging syndromes.<sup>5</sup>

It may be permanent when associated with genetic factors or chronic illnesses, but it is reversible in association with nutritional deficiencies (iron, copper, and protein), malabsorption syndromes, and medication like chloroquine, imatinib, and dithranol.<sup>9,10</sup>

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Some exogenous causes are pollution, stress, UV light, and smoking.<sup>8</sup> It is also seen to be associated with metabolic syndromes.<sup>11</sup>

### Histopathology

Histopathology of gray hair shows the pigmentary unit of the hair follicle to be unclear; the melanocytes are few and lightly pigmented with a reduced DOPA reaction.<sup>8,12</sup>

### Differential Diagnosis

PGH needs to be differentiated from other hypomelanotic hair disorders like oculocutaneous albinism, including Hermansky-Pudlak, Chiedak-Higashi syndromes and Tietz syndrome; as well as CROSS syndrome and Menke's syndrome. Metabolic syndromes like phenylketonuria, histidinemia, and homocystinuria can also present with light-colored hair. Similarly localized whitening of hair (poliosis), may be seen in vitiligo, piebaldism, Wardenburg syndrome, Woolf syndrome, Ziprkowski Margolis syndrome, and tuberous sclerosis.<sup>6</sup>

### Management

There has been extensive research on the treatment of PGH, but satisfactory outcomes have not yet been

achieved. However, patients who are prescribed nutritional supplements containing various combinations of vitamins and minerals like biotin, calcium pantothenate, zinc, copper, and selenium show some improvement.<sup>6</sup> Some other researched medications that have shown improvement are oral PABA, topical latanoprost and PUVASOL therapy.<sup>13-15</sup>

There have also been studies where topical palmitoyl tetrapeptide 20, a biomimetic biopeptide of MSH, has been effective in converting of gray hair to black hair.<sup>16</sup>

The mainstay of treatment of PGH is actually camouflaged by hair colorants. Hair colorants can be temporary textile dyes, natural dyes like henna or semipermanent hair colours.<sup>17</sup> Besides these, the recent advances have included use of topical antiaging compounds like green tea polyphenols, selenium, copper, phytoestrogens, melatonin but the future treatment options should target hair follicle melanocyte biology.<sup>17</sup>

### Conclusion

PGH is a common hair condition that also has major impacts on the psychology and social well-being of individuals. Thus, proper research about the pathophysiology and treatment options is still needed.

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