

Permanent :. 4 Oxidative/Lift Deposit

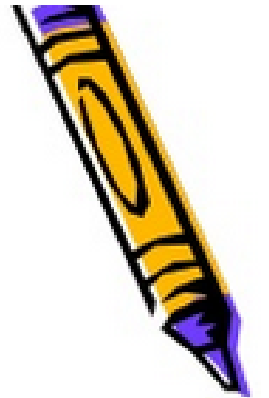
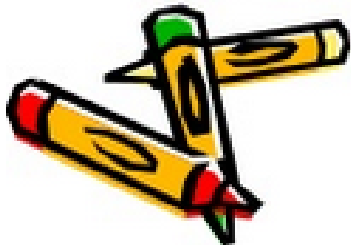
These hair colors have the smallest molecule which makes it easier for them to penetrate the hair shaft and the scalp.

- This process has the greatest impact on the hair structure, which is permanently changed, and the cuticle remains slightly shifted
- Formulas can have ranges of:
 - Phenylethylamine .08% to 6%
 - Hydrogen Peroxide 3 – 10% 20 – 40%
 - Ammonia
 - Resorcinol



2. Permanent hair colors:

- are the most popular hair dye products
- Permanent hair-coloring dyes consist of three components. They are:
- Primary intermediates & Couplers (the color)
- Oxidants (Hydrogen peroxide)
- An alkali usually ammonia



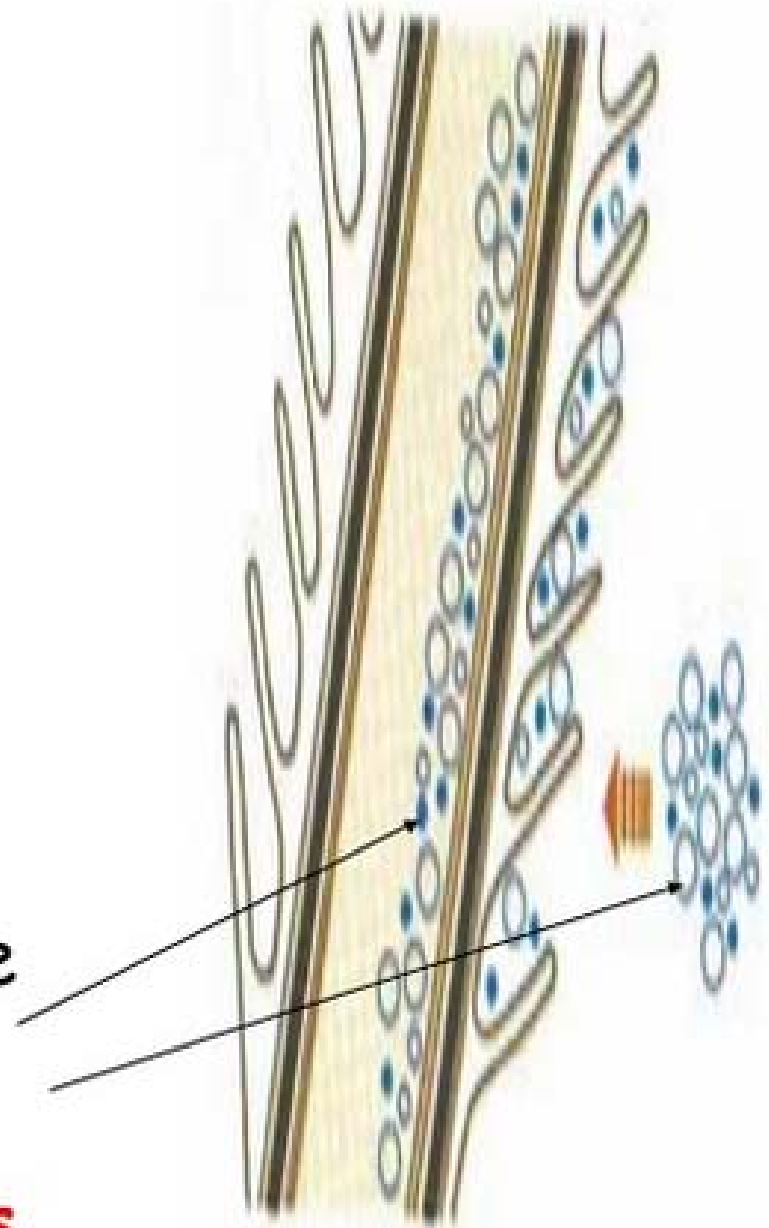
- Hydrogen peroxide diffuses the melanin, and lightens the natural color of hair

- Ammonia causes cuticle to swell and separate

- Both agents called the developer



Dye molecules



- The primary intermediates form color on oxidation.
- The modern permanent dyes consists of solutions of paraphenylenediamine (PPD), or similar “para” compounds.
- Couplers will react with the oxidized products of the primary intermediates and form dyes which are then applied to hair.
- Hydrogen peroxide is a major factor in permanent hair coloring techniques



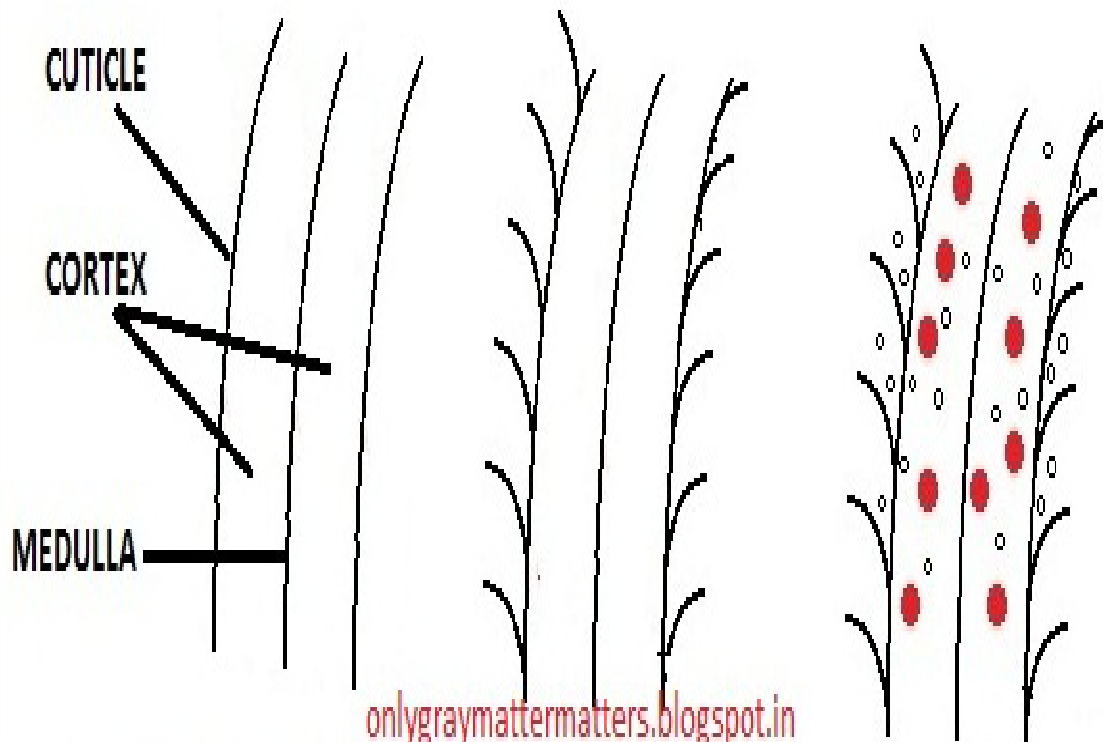
Mechanism of hair dyeing

”“Oxidative/Lift Deposit

- An alkaline reaction (most often ammonia) causes the cuticle to swell, allowing hydrogen peroxide and dye to enter.
- The hydrogen peroxide “oxidizes” (diffuses) the melanin, and “lifts” (lightens) the color.
- The hydrogen peroxide also causes the dye to “develop” and “deposit” color.
- A neutral or slightly acid after-rinse stops the alkaline reaction, allows the cuticle to close, and traps the color molecules inside



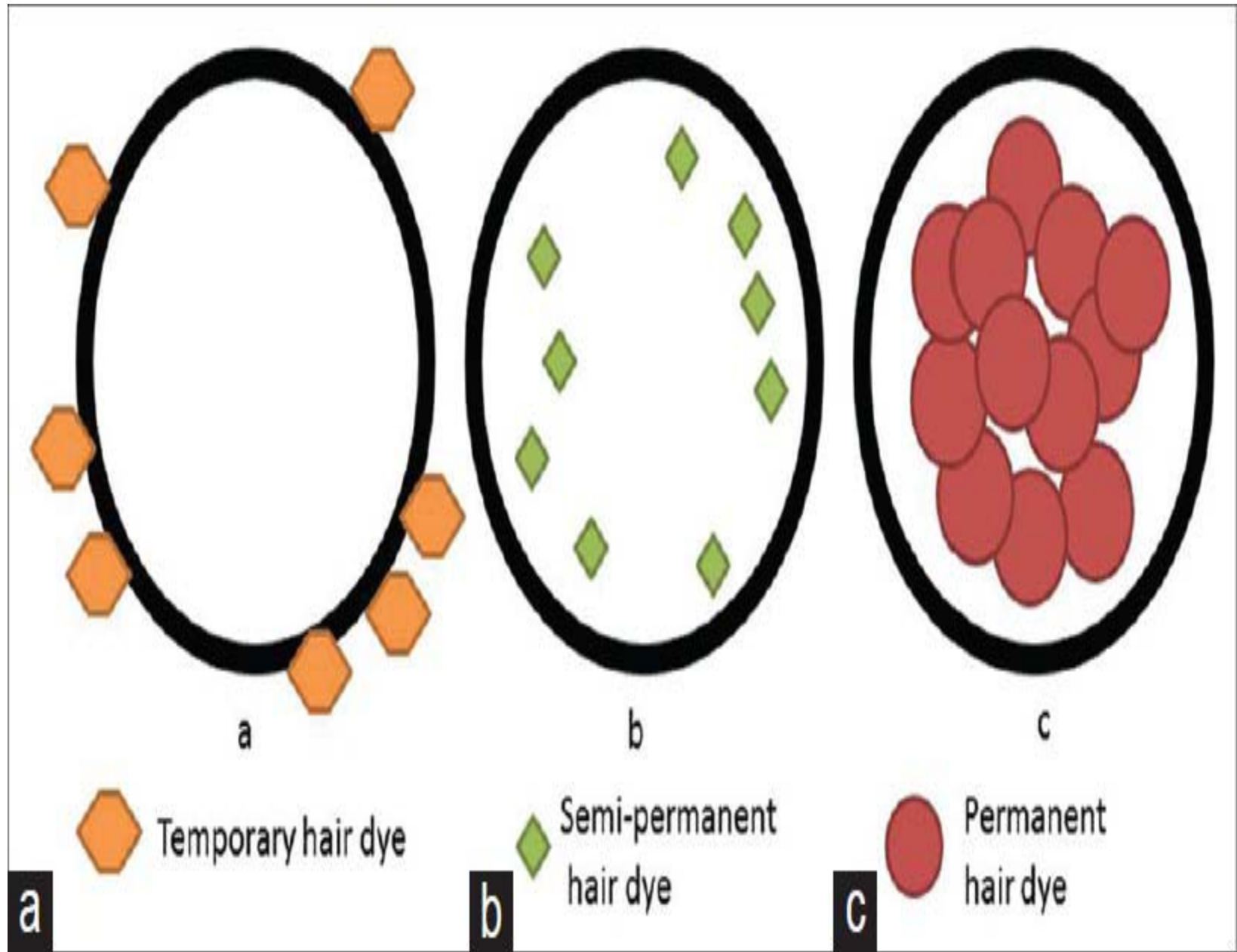
HOW PERMANENT HAIR COLORS/ HAIR DYES WORK?



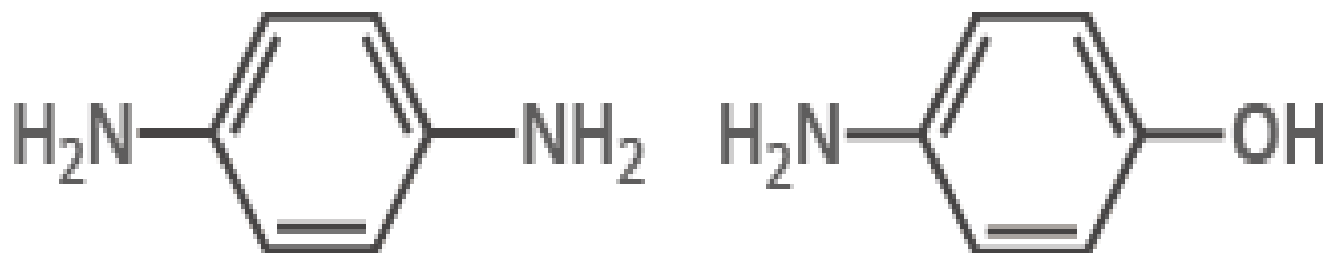
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NORMAL HAIR SHAFT AMMONIA OPENS THE CUTICLE
FOR COLOR TO ENTER

- Tiny color molecules enter the cortex through open cuticle layer
- A series of chemical reactions happen inside the cortex. An oxidizing process takes place with the help of Hydrogen Peroxide, which causes natural hair color to lighten and the dye molecules to swell up
- The swollen color molecules join together and remain in the cortex, making it impossible to escape



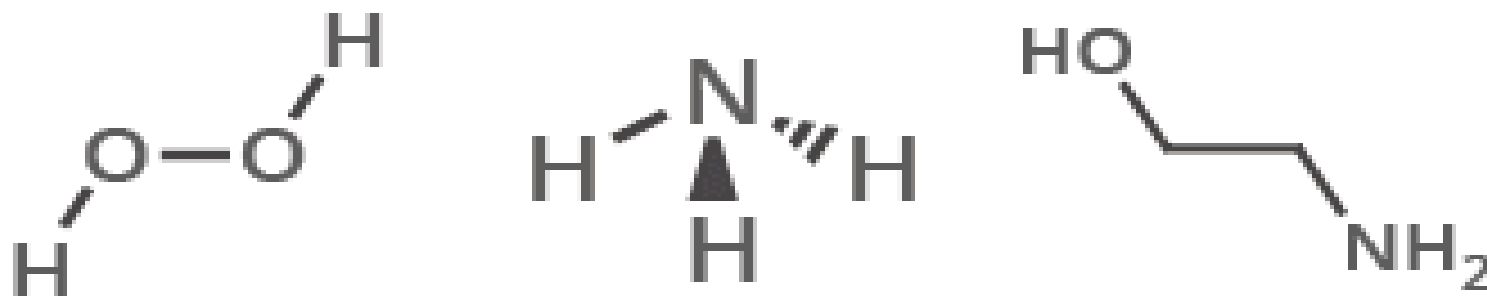
1 PRIMARY INTERMEDIATES



PARAPHENYLENEDIAMINE (PPD) & PARA-AMINOPHENOL

All permanent hair dyes contain a 'primary intermediate'; these are often p-diamines or p-aminophenols. They are oxidised by hydrogen peroxide to give reactive species which then go on to react with couplers to produce dyes. The exact structure of the reactive species produced by oxidation is still the subject of some debate.

2 OTHER COMPOUNDS



HYDROGEN PEROXIDE, AMMONIA, & ETHANOLAMINE

Hydrogen peroxide is the agent responsible for oxidation of primary intermediates, and also lightens the natural pigments present in the hair, the melanins eumelanin and pheomelanin. The dye-forming reactions are carried out at an alkaline pH, which is why ammonia is also required in the dye mixture. This raised pH causes the hair cuticle to swell, which in turn allows hydrogen peroxide and dye molecules to pass into the cortex. Ethanolamine can be used as an alternative, milder alkaline agent.

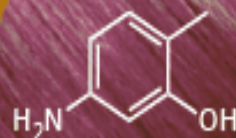
3 COUPLING AGENTS



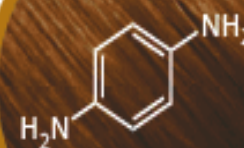
RESORCINOL
GREENISH YELLOW



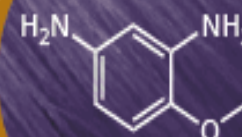
m-AMINOPHENOL
LIGHT BROWN



2-METHYL-5-AMINOPHENOL
MAGENTA



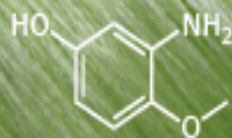
p-PHENYLENEDIAMINE
DARK BROWN



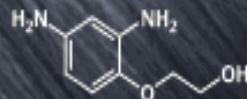
2,4-DIAMINOANISOLE
PURPLE-BLUE



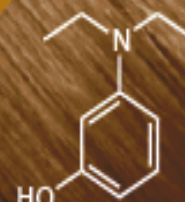
1,5-DIHYDROXYNAPHTHALENE
BLUE-VIOLET



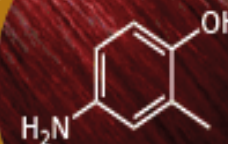
4-METHOXY-3-AMINOPHENOL
GREEN



2,4-DIAMINOPHENOXYETHANOL
DARK BLUE



m-DIETHYLAMINOPHENOL
OLIVE BROWN



p-AMINO-o-CRESOL
DARK RED

Coupling agents, also referred to as colour couplers, are the other component in the dye mixture. Independently, they contribute little in the way of colour, but they can react with primary intermediates in the presence of an oxidising agent to produce dye molecules, some examples of which are shown below. Most dyes will contain a mix of different coupling agents, rather than just one. Primary intermediates can, in some cases, couple to themselves to produce colouration. In the end, multiple different dye products are formed from a single formulation of hair dye.

Permanent: . 5 Non-Oxidative

Vegetable Tints:

- – Made from plant materials and henna
- – Builds up layers in hair shaft

Problems with Vegetable Tints:

Henna – can trigger asthma and other allergic reactions



