ALCOHOL METABOLISM

SIMPLY_PATHOLOGY

DR. JIBRAN AHMED

3 DISTINCT / OVERLAPPING FORMS OF ALD

1. STEATOSIS / FATTY CHANGE
2. ALCOHOLIC STEATO HEPATITIS
3. STEATO-FIBROSIS ..... CIRRHOSIS

ONLY 10-15% OF ALCOHOLICS DEVELOP CIRRHOSIS.

BLOOD ALCOHOL CONC. OF

80mg/dL → LEGAL DEFN OF DRUNK DRIVING

200mg/dL → DROWSINESS OCCURS

300mg/dL → STUPOR

AT HIGHER LEVELS → COMA & RESPIRATORY ARREST.

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✓ ETHANOL IS ABSORBED UNALTERED IN STOMACH & SMALL INTESTINE

↓

LESS THAN 10% IS EXCRETED UNCHANGED IN URINE; SWEAT & BREATH.

⇓

THE AMOUNT EXHALED IS PROPORTIONAL TO BLOOD LEVELS

⇓

Q FORMS BASIS OF ALCOHOL BREATH TEST.

✓ 80 gms / MORE PER DAY

⇓

SIGNIFICANT RISK OF SEVERE HEPATIC INJURY.

✓ 160 gms / MORE PER DAY X 10-20 YRS → FREQ. ASS. WITH SEVERE LIVER INJUR

ALCOHOL METABOLISM

3 ENZYME SYSTEMS

1. ALCOHOL DEHYDROGENASE (ADH) ⟹ CYTOSOL of HEPATOCYTES

ETHANOL ⟶ ACETALDEHYDE ⟹ MOST PREDOMINANT ROUTE OF ALCOHOL METABOLISM

2. CYTOCHROME P-450 ENZYME SYSTEM (CYP2E1) ⟹ ENDOPLASMIC RETICULUM (MICROSOMES)

ETHANOL ⟶ ACETALDEHYDE ⟹ (PLAYS AN IMPORTANT ROLE ONLY @ HIGHER BLOOD ALCOHOL LEVELS)

3. CATALASE ⟹ PEROXISOMES

ETHANOL ⟶ ACETALDEHYDE (THIS PATHWAY IS OF MINOR IMPORTANCE → ONLY 5% OF ALCOHOL METABOLISM)

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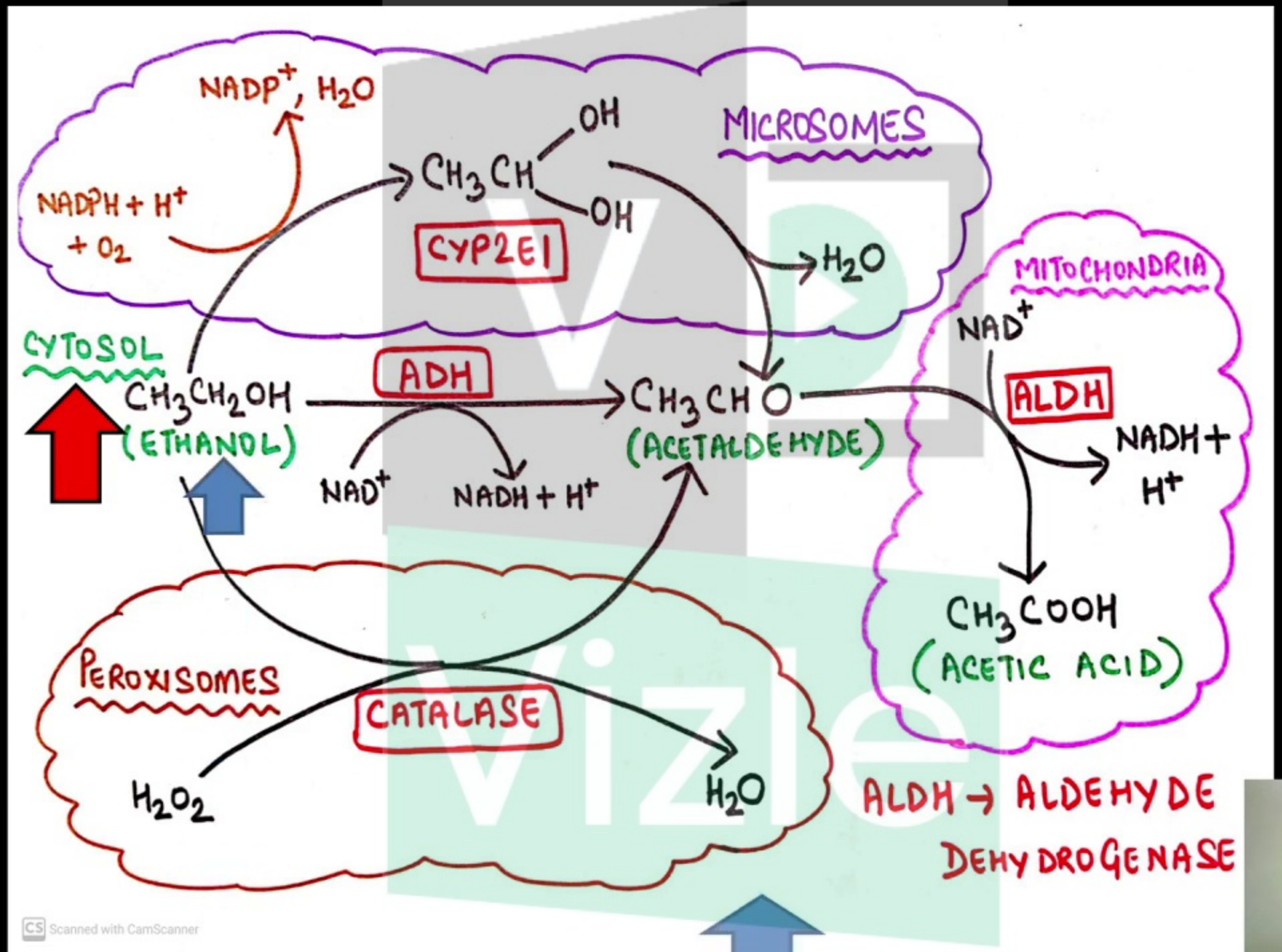
NADP+, H2O
NADPH + H+ + O2
MICROSOMES
CH3CH(OH)OH
CYP2E1
H2O
MITOCHONDRIA
NAD+
ALDH
NADH + H+
CYTOSOL
CH3CH2OH (ETHANOL)
ADH
NAD+
NADH + H+
CH3CHO (ACETALDEHYDE)
CH3COOH (ACETIC ACID)
PEROXISOMES
CATALASE
H2O2
H2O
ALDH → ALDEHYDE DEHYDROGENASE
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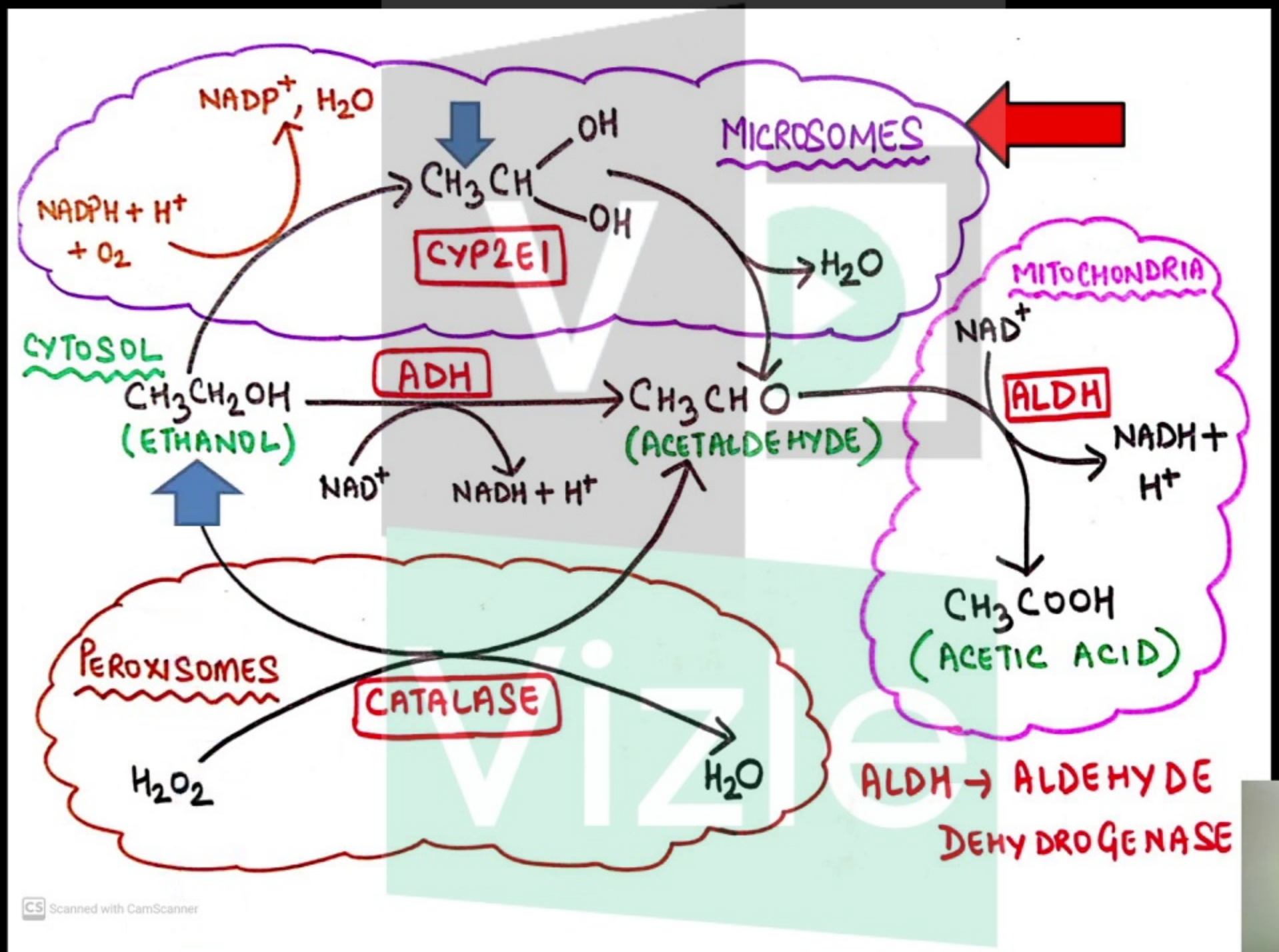
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