



تفريغ فارما 2

Antipsychotic Drugs

محاضرة:

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الصيدلانية:



لجان الدفعات



# Antipsychotic Drugs

Pharmacology II

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الاضطرابات النفسية التي بتصيب الاشخاص وتقسم نوعين: schizophrenia (الانفصام) والنوع الثاني bipolar (ثنائي القطب) او الجنان لانه كل شوي برأي

# Psychosis and Schizophrenia

- The term “**psychosis**” denotes a variety of **mental disorders** caused by some inherent dysfunction of the brain including schizophrenia and bipolar disorder.
- **Schizophrenia** <sup>او هام</sup> is a particular type of psychosis; it is characterized by delusions (false beliefs), hallucinations (often in the form of voices), and thinking or speech disturbances. بصير عنده مشاكل بالتفكير والحكي
- Schizophrenia often initially affects people during late adolescence or early adulthood. غالباً بتصير في مرحلة البلوغ والمراهقة ( بداية العمر ) نادراً يكون شخص كبير بالعمر مصاب
- It is considered to be a neurodevelopmental disorder. This implies that structural and functional changes in the brain are present even in utero in some patients, or that they develop during childhood and adolescence, or both. Schizophrenia has a strong genetic component.

ال schizophrenia ناتجة عن مشكلة عضوية neurodevelopmental disorder بالدماغ , ممكن تكون صارت وهو جنين ، ال schizophrenia الها ارتباط جيني يعني ممكن تنتقل بالعائلة

# Schizophrenia Symptoms

- Positive symptoms:

↩ يحس انه سامع اصوات او في شخص بحكي معه  
– Hallucinations and delusions

- Negative symptoms:

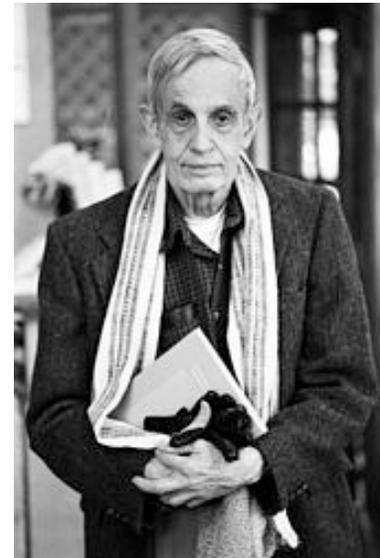
– **انعدام المتعة** Anhedonia (not getting pleasure from normally pleasurable stimuli)

– **انعدام الشغف** Apathy (lack of interest, enthusiasm or concern)

– Impaired attention **شارد الذهن**

– Cognitive impairment **بتأثر عال التفكير**

– Social isolation **ما يحب يختلط بالناس**



→ ما بتأثر على مستوى الذكاء او شغل الشخص ومثال على  
هاي الحالة john nash

John Nash, an American mathematician and joint winner of the 1994 Nobel Prize for Economics, who had schizophrenia.

# Symptoms

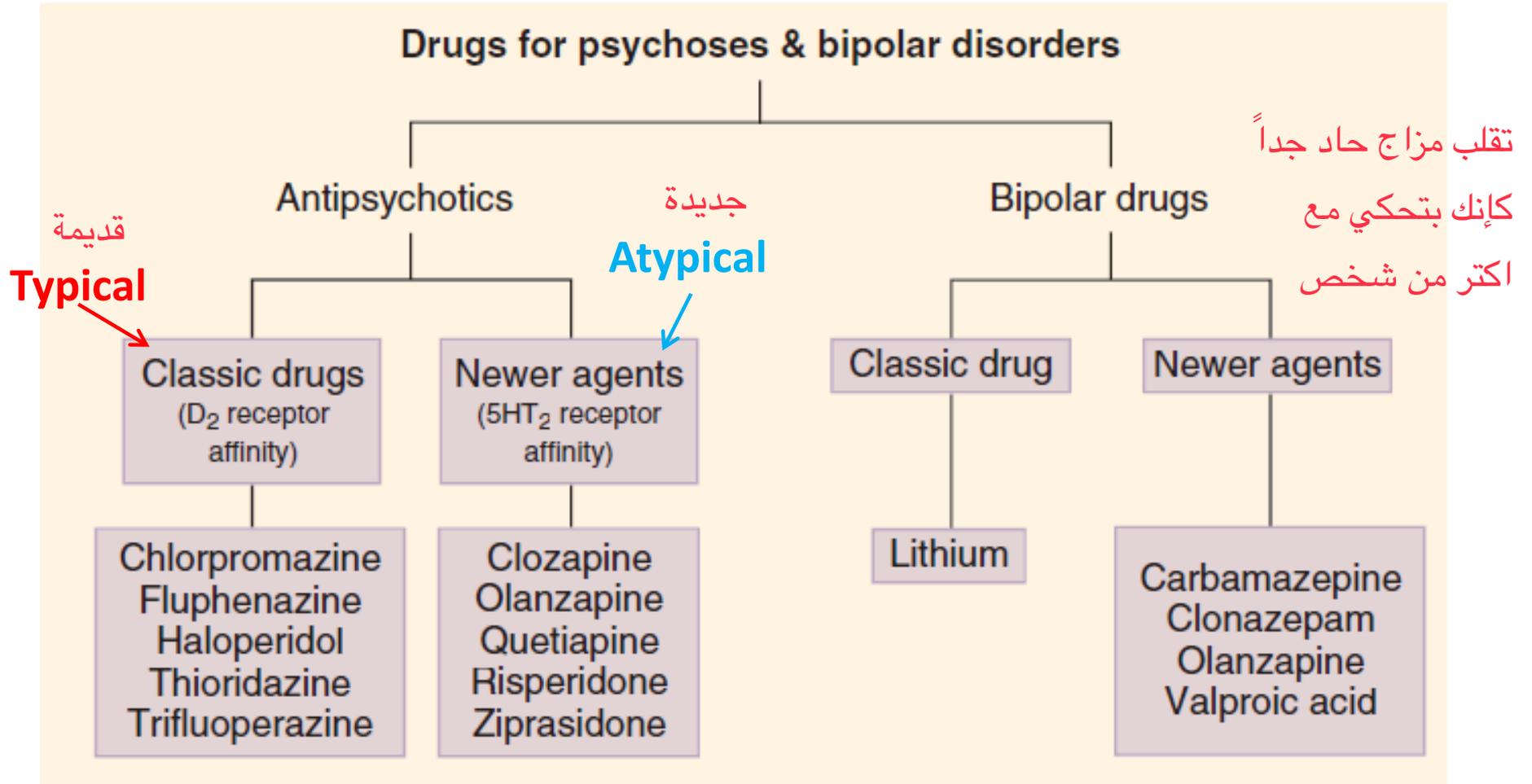
## 1-positive symptoms

اعراض واضحة للمريض ويتقدر تميزها ،  
مثلا لما تحكي معه يكون يحكي معك عن  
اشياء مش موجودة فعليا.

## 2-negative symptoms

اعراض بحس فيها المريض بس الشخص الي  
قاعد معه او الدكتور الي بعالجه صعب انه  
يكتشف المرض.

# Antipsychotic Agents



# Antipsychotic Agents

- The antipsychotic drugs are used in schizophrenia and are also effective in the treatment of other psychoses and agitated states.
  1. Older (classical or **typical**) drugs have high affinity for dopamine **D2 receptors**.
  2. Newer (**atypical**) antipsychotic drugs have greater affinity for **serotonin 5-HT2 receptors**.

- Although schizophrenia is not cured by drug therapy, the symptoms, may be ameliorated by antipsychotic drugs.

\* هاي الادوية بتخفف من الاعراض ما بتعالج الحالة \*

*older*  
\* Typical : block for dopamine receptors D2

\* *newer* Atypical : block with higher affinity for serotonin 5-HT2 receptors

\* طبعا ال newer احسن من ال older \*

\* Activation of 5-HT2 يعمل hallucination , delusions , Apathy الشعور بال

Activation of D2 يعمل hallucination

يعني لازم اعملهم block

# Typical Antipsychotics

- Typical antipsychotics are competitive inhibitors at a variety of receptors, but their antipsychotic effects reflect competitive **blocking** of D<sub>2</sub> dopamine receptors.  
هاي بتحسن الحالة بس الر receptor نفسه لما اعمله block راح يعمل مشكلة ثانية  
هيك خففت من الاعراض بس عملت مشكلة ثانية extrapyramidal symptoms  
عبارة عن حركات لا إرادية بالجسم
- They are more likely to be associated with **movement disorders** (**Extrapyramidal symptoms**), particularly for drugs that bind tightly to dopaminergic neuroreceptors, such as **haloperidol**, and less true of medications that bind weakly, such as **chlorpromazine**.

## FIRST-GENERATION ANTIPSYCHOTIC (low potency)

*Chlorpromazine* THORAZINE

*Prochlorperazine* COMPAZINE

*Thioridazine* MELLARIL

## FIRST-GENERATION ANTIPSYCHOTIC (high potency)

*Fluphenazine* PROLIXIN

*Haloperidol* HALDOL

*Pimozide* ORAP

*Thiothixene* NAVANE

# Side Effects

## 1. Reversible neurologic effects

- Dose-dependent **extrapyramidal effects** occur with chronic treatment

which include:

حركة لا إرادية بسبب استخدام الدواء ( يكون رافع ايده )

راح  
تضل  
عنده  
1. **Dystonias** (sustained contraction of muscles leading to twisting, distorted postures)

طول ما  
هو  
2. **Akathisia** (unpleasant sensations of inner restlessness that manifests itself with an inability to sit still or remain motionless)

الشخص داخلياً مش  
حاس حاله مرتاح  
نفسياً فبضل يمشي

بستخدم  
الدوا  
والدوا  
شغال  
3. **Parkinson-like symptoms** (bradykinesia, rigidity, and tremor)

بجسمه  
هاي الاعراض بتخلي استخدام الدواء ال typical محدود

مع انه فعال

اذا الدوا ال 12hr half  
life بتكون 10 ساعات هييك  
ايده



more effective on serotonin receptors ← efficacy on Dopamine receptor → Typical احسن من ال Atypical ال ليش ال  
 1-more effective  
 block لانها بتعمل  
 2 receptors  
 2- Side effects ما بشوفها عالمريض ويتكون metabolic disorder

# Atypical Antipsychotics

Block بتخل Serotonin receptors  
 كسيردلي بتكون Serotonin receptors  
 محدودين نوع واحد  
 من ال receptor

Atypical antipsychotics have fewer extrapyramidal symptoms (EPS) than the first-generation agents, but are associated with a higher risk of metabolic side effects, such as diabetes, hypercholesterolemia, and weight gain.  
 اذا الاستخدام حوالي

- They appear to owe their unique activity to blockade of both serotonin and dopamine (and, perhaps, other) receptors.
- Consistent differences in therapeutic efficacy among the individual atypical drugs have not been established.
- These **atypical** antipsychotic drugs may be somewhat more effective and less toxic than the older drugs. However, they are much more costly than standard older drugs.

↓  
 A typical

## SECOND GENERATION ANTIPSYCHOTIC

- Aripiprazole ABILIFY
- Asenapine SAPHRIS
- Clozapine CLOZARIL
- Iloperidone FANAPT
- Lurasidone LATUDA
- Olanzapine ZYPREXA
- Quetiapine SEROQUEL
- Paliperidone INVEGA
- Risperidone RISPERDAL
- Ziprasidone GEODON

# Mechanism of Action

typical

Competitive antagonist

يعتمد على التركيبة إذا المريض أخذ دواء

## 1. Dopamine receptor–blocking activity in the CNS:

- All of the **typical** and most of the **atypical** antipsychotic drugs block dopamine receptors in the brain and the periphery.

Typical drug

يزيد ال Dopamine ، ال Dopamine يتنافس على

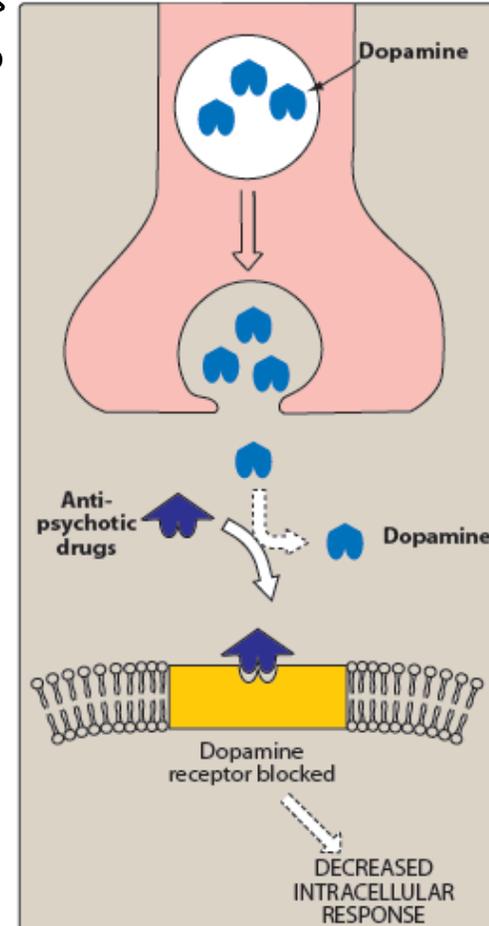
على ال Dopamine receptors ، يبعث تأثير الدواء

زيار L-Dopa ( Dopamine ) يعطل

فعالية الدواء أو الادوية التي يرتبط بها Dopamine receptors

( Dopamine receptor ) agonists

- The therapeutic efficacy of the older antipsychotic drugs correlates with their relative affinity for the D2 receptor.
- Unfortunately, there is also a correlation between blockade of D2 receptors and **extrapyramidal dysfunction**.



# Mechanism of Action

## 1. Dopamine receptor–blocking activity in the CNS:

- The actions of the antipsychotic drugs are antagonized by:
  - agents that raise synaptic dopamine concentrations (for example, levodopa and amphetamines)
  - or mimic dopamine at post-synaptic binding sites (for example, bromocriptine).



Dopamine receptor agonist

# Mechanism of Action

## 2. Serotonin receptor–blocking activity in the CNS:

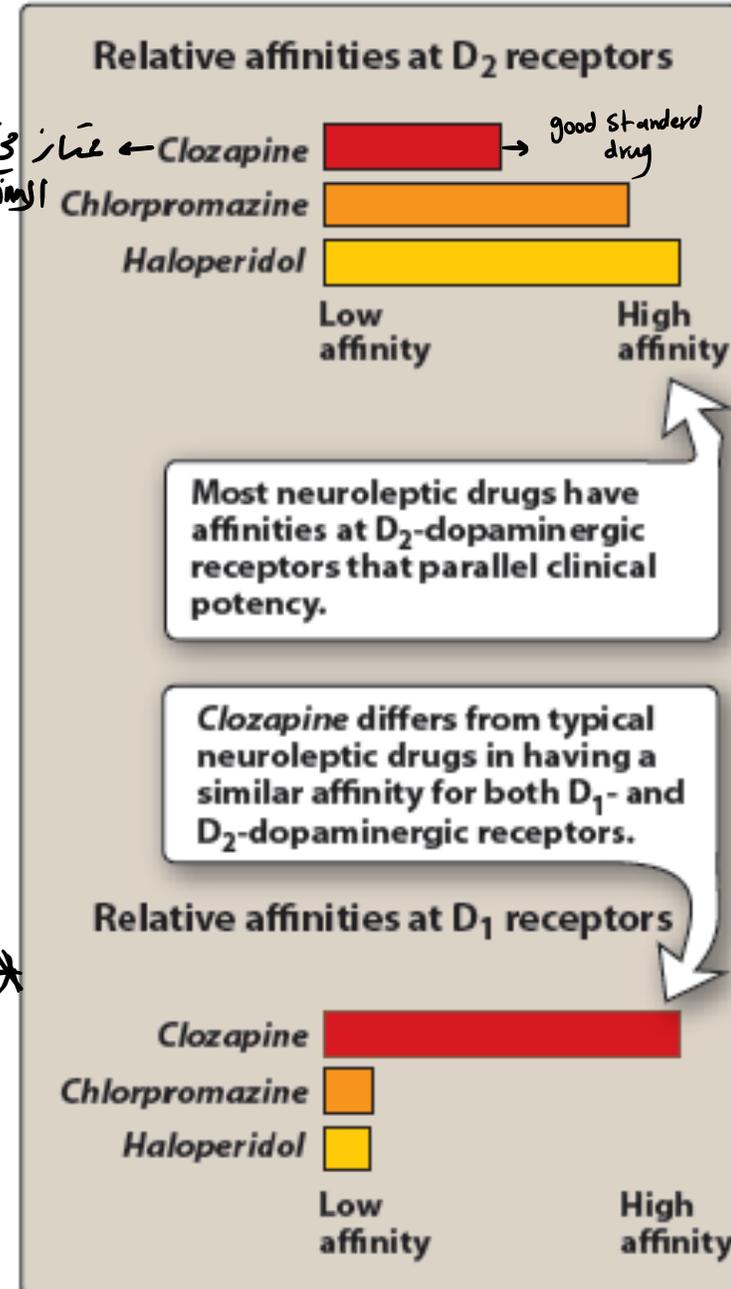
- Most of the **atypical** agents appear to exert part of their unique action through inhibition of serotonin receptors (5-HT), particularly 5-HT<sub>2A</sub> receptors.

يخترى الحتر من مفعول

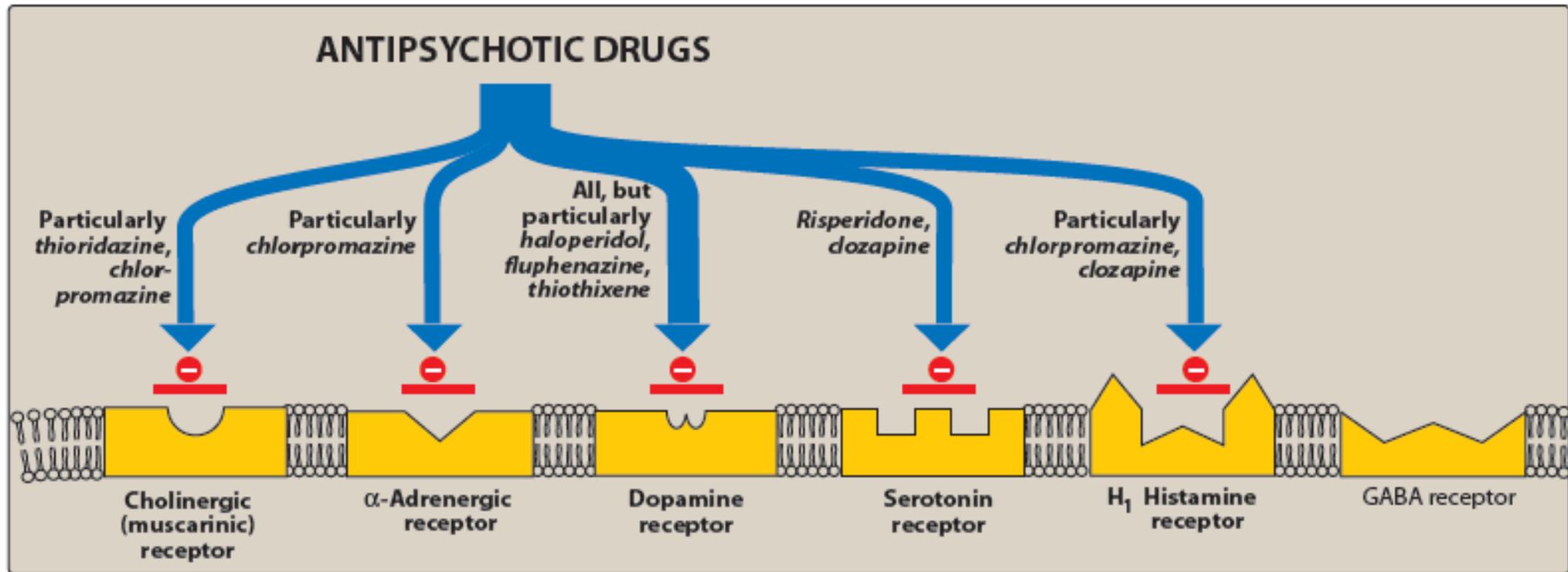
- Clozapine has high affinity for D<sub>1</sub>, D<sub>4</sub>, 5-HT<sub>2</sub>, muscarinic, and α-adrenergic receptors, but it is also a weak dopamine D<sub>2</sub>-receptor antagonist.

\* ال effect تبعه ممتاز لانه يسكر الحتر من  
نوع من ال receptors

عماز في علاج  
ال Schizophrenia



# Actions of Antipsychotic Drugs



# Absorption and Metabolism

- The antipsychotic drugs are well absorbed when given orally, and because they are lipid soluble, they readily enter the CNS and most other body tissues (have a large volume of distribution), and bind well to plasma proteins. ① lipid soluble ② orally / injection once a day

- These drugs require metabolism by liver enzymes before elimination and have long plasma half-lives that permit once-daily dosing.

الامتصاص كثير عالي وال metabolism بصير بال liver ب cyp450 effective (2-4 weeks)

IM

- **Parenteral** forms of many agents (eg, fluphenazine, haloperidol) are available for both rapid initiation of therapy and depot treatment.

بنعطييه IM وبضل تأثيرها اسبوعين فبنصير نعطييه للمريض كل اسبوعين ، وبتساعد المريض على compliance يعني التزام المريض بأخذ الدواء

# Absorption and Metabolism

ادوية ال anti psychotics وال Anti depressent ما يعطوا مفعول او تأثير من اول حبة ، بشوف التأثير بعد اسبوعين ولما اتأكد انه كان يوخذ الدوا كل يوم

Long-acting Injectable (LAI) formulation:

- Fluphenazine decanoate, haloperidol decanoate, risperidone microspheres, paliperidone palmitate, and olanzapine pamoate are long-acting injectable (LAI) formulations of antipsychotics that are administered via intramuscular injection.
- These formulations have a therapeutic duration of action of up to **2 to 4 weeks** and, therefore, are often used to treat outpatients and individuals who are noncompliant with oral medications.

الدوا ما يرجع الانسان طبيعي 100% هو كثير بخفف

سواء ال typical او atypical بخففوا الاعراض لانهم يرتبطوا على ال dopamine receptors ، بس ال negative symptoms ال typical بتخففها اقل من ال atypical

ال atypical بقلل ال positive والد negative اكثر من ال typical

← ما يزيد مرض السكرى / احنا بنحتاج انه يعمل سكري اما اذا اصلا عنده سكري  
كيف يختار الدوا typical ولا atypical ؟

عادي  
ما يزيد  
الحالة

# Clinical Uses

chronic

ما في مقارنة بينهم من حيث المفعول لانه ال atypical هو الافضل فاذا المريض كان قادر يشتري الدوا لانه غالي فببلاش معه فيه

## 1. Antipsychotic actions:

- All of the antipsychotic drugs can reduce the hallucinations and delusions associated with schizophrenia (the so-called “positive” symptoms) by blocking dopamine receptors in the mesolimbic system of the brain.
- The “**negative**” symptoms are not as responsive to therapy, particularly with the typical antipsychotics. Many second-generation (**atypical**) agents, ameliorate the negative symptoms to some extent.
- The antipsychotics are considered to be the only efficacious treatment for schizophrenia. The antipsychotic effects usually take several days to weeks to occur.
- Not all patients respond, and complete normalization of behavior is seldom achieved.

# Clinical Uses

## Drug Selection:

- Current antipsychotic therapy commonly comprises atypical agents to minimize the risk of debilitating movement disorders associated with the typical drugs that act primarily at the D<sub>2</sub> dopamine receptor.
- All of atypical antipsychotics exhibit an efficacy that is equivalent to, and occasionally exceeds, that of the typical antipsychotic agents.
- Individual patient response and comorbid conditions must often be used as a guide in drug selection.
- Further, atypical antipsychotics should not be considered interchangeable because patients may respond differently to each drug in this class.

# Clinical Uses

في ناس بسميهم refractory patients يعني ما بستجيبوا للدوا typical او ، atypical  
20% من مرضى ال schizophrenia

## Refractory patients:

- Approximately 20% of patients with schizophrenia will have an insufficient response to all typical and atypical antipsychotics.
- For these patients, **clozapine** has shown to be an effective antipsychotic with minimal risk of EPS. However, its clinical use is limited to refractory patients because of serious side effects.
- Clozapine can produce:
  - Bone marrow suppression RBCs, wBCs , platelets بقل انتاج
  - Seizures
  - Cardiovascular side effects.
  - Severe agranulocytosis which necessitates frequent monitoring of white blood cell counts.

لأنه قلت كريات الدم البيضاء مناعته كثير بتقل

\*اي دوا يشتغل عال CNS ال Side effects اله دائماً مش واضحة وقوية

\*هاي ال side effects ما بتمنعني استخدم الدوا لأنه ما بزبط اترك المريض هيك ، الفوائد اكثر من side effects

# Clinical Uses

الادوية لعلاج ال bipolar

يستخدم Li+ مع ال Atypical drugs

## 2. Other psychiatric and neurologic indications

- The newer antipsychotic drugs are often used with lithium in the initial treatment of mania.
  - **Mania:** An abnormally elevated mood state characterized by such symptoms as inappropriate elation, increased irritability, severe insomnia. أرق
- Several second generation antipsychotics are approved for maintenance treatment of **bipolar disorder**. They appear more effective in preventing mania than in preventing depression.

المريض بس تيجيه الحالة بحس حاله يا كتير مبسوط او كتير زعلان بس بطريقة عصبية فبكون زي كانه فاصل عن الواقع فهاد بضر الشخص والي حواليه لإنه اذا زعل من حدا ممكن يآذيه ما في اشئ بمنعه

مضاد للقيء لأنه ال dopamine  
receptor blocking بقلل حركة  
المعدة وال GI

# Clinical Uses

## 3. Antiemetic effects: هذول ال effects ال typical ال Atypical ما اله هاي ال effects

- Most older typical antipsychotic drugs, with the exception of thioridazine, have a strong **antiemetic** effect.
- This action is due to dopamine-receptor blockade, both centrally (in the chemoreceptor trigger zone of the medulla) and peripherally (on receptors in the stomach).
- The atypical antipsychotic drugs are not used as antiemetics.

ممکن استخدم هاي الادوية لعلاج القيء؟ لأ لأنه الها side effects عالية

# Side Effects

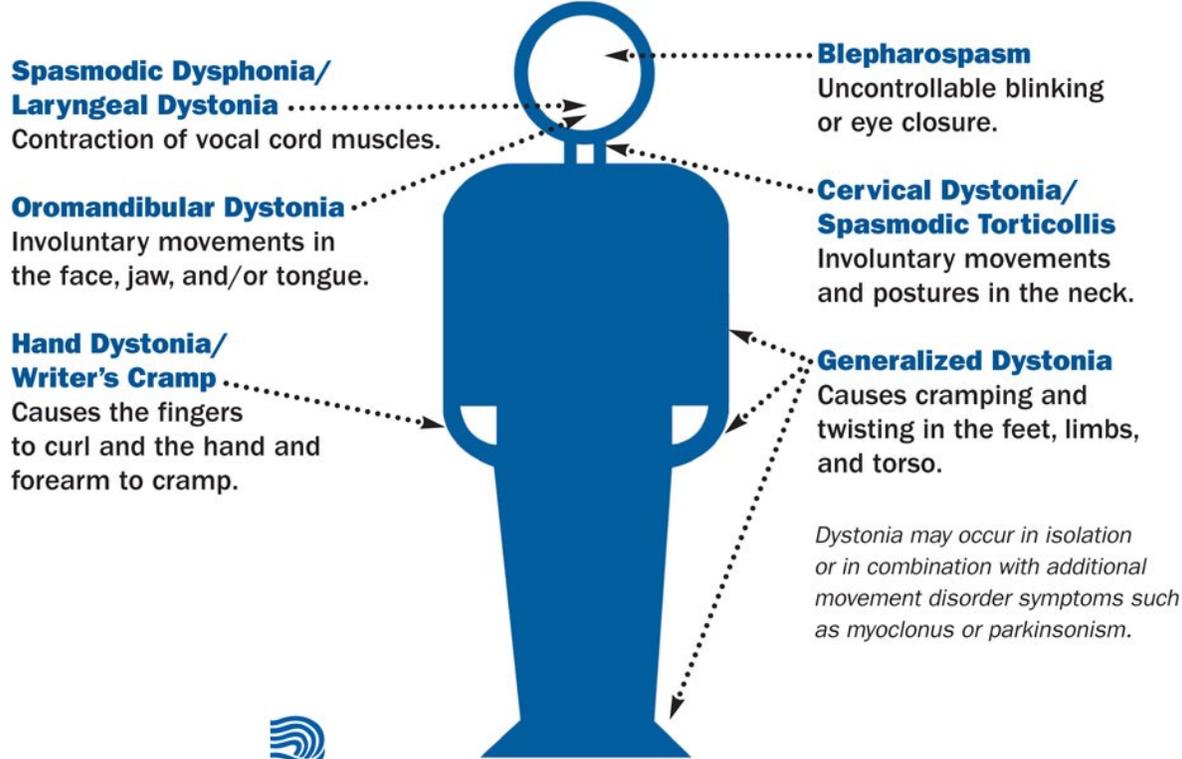
## 1. Reversible neurologic effects

- Dose-dependent **extrapyramidal effects** occur with chronic treatment which include:
  - **Dystonias** (sustained contraction of muscles leading to twisting, distorted postures)
  - **Akathisia** (unpleasant sensations of inner restlessness that manifests itself with an inability to sit still or remain motionless)
  - **Parkinson-like symptoms** (bradykinesia, rigidity, and tremor)



# Understanding Dystonia

← حركان لا اراديه  
Dystonia is a disorder that causes muscles in the body to contract and spasm involuntarily.



**DYSTONIA  
MEDICAL  
RESEARCH  
FOUNDATION**

*serving all dystonia-affected persons*

## **MORE INFORMATION:**

**Dystonia Medical Research Foundation (DMRF)**

Web: <http://www.dystonia-foundation.org>



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حكا الدكتور الي بحب يعرف شو بصير بال dystonia

# Side Effects

- The maximal risk of appearance of the movement disorders is time and dose dependent: *كل ما رفعت الجرعة الحالة بتزيد*  
*ببلش مع بداية استخدام الدوا مع اول ساعات او ايام*
  - Dystonias occur within a **few hours** to days of treatment,
  - Akathisias occurring within **days to weeks**.
  - Parkinson-like symptoms usually occur within **weeks to months** of initiating treatment.

Dopamine (دوبامين) إنتاج



- Blocking of **dopamine** receptors in the **nigrostriatal** pathway probably causes these unwanted movement symptoms.

- The atypical antipsychotics exhibit a lower incidence of these symptoms.

Atypical % Side effects  
أقل

من ناحية الفعالية ال typical وال atypical تقريبا نفس الاشي بس ال side effects ال typical اعلى زي ال extrapyramidal movements

السبب الرئيسي لها ← Side Effects → بتظهر بشكل تدريجي  
ال activation لل ach / اذا ارتفع ال ach ال Dopamine بعمه inhibition والتعكس  
اذا ال Dopamine مش موجود ال ach بزييد

- The inhibitory effects of dopaminergic neurons are normally balanced by the excitatory actions of cholinergic neurons in the striatum. Blocking dopamine receptors alters this balance, causing a relative excess of cholinergic influence, which results in extrapyramidal motor effects.
- If cholinergic activity is also blocked, a new, more nearly normal balance is restored, and extrapyramidal effects are minimized. This can be achieved by administration of an **anticholinergic drug**, such as benztropine. But this will be in exchange for the side effect of muscarinic-receptor blockade.

لازم يكون في توازن بين الدوبامين والاستيل كولين عشان يكون عندي normal movement , لما عمل block لل dopamine receptor راح تزيد ال activity لل استيل كولين ويظهر اعراض جانبية ، ممكن اخفف هاد الاشي عن طريق anti muscarinic agent بتخفف ال activity للاستيل كولين ، بس راح اشوف اعراض ال Benzotropin زي

بتخفف اعراض ال typical

Constipation

urinary retention

atropin like symptoms الي هم  
Dry mouth sweating Tachycardia

# من ضروري تظاهرة الكل Side Effects

حتى لو وقف الدواء  
المريض بعض بعض  
الحالة كما ما يبروح

## 2. Tardive dyskinesia

بمنطقة الفم

- This important toxicity includes movements of the muscles of the lips and buccal cavity and may be irreversible.

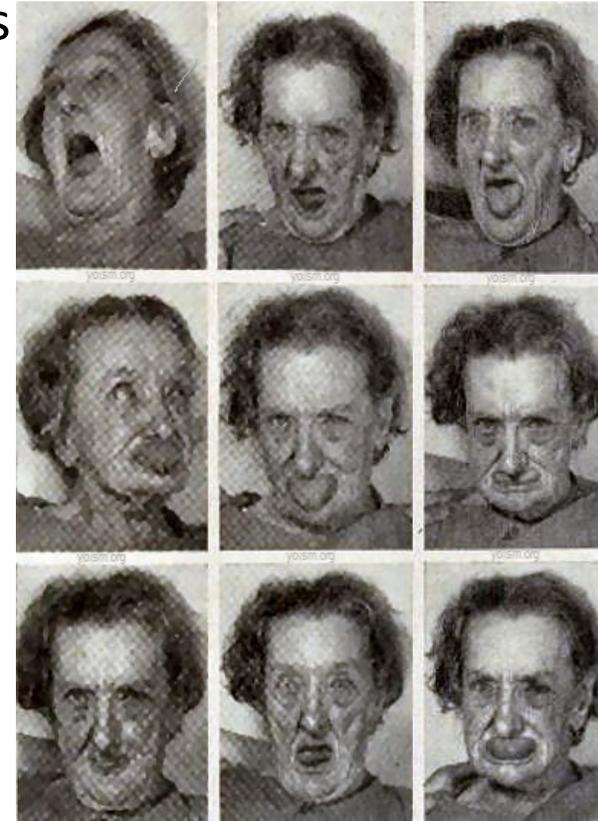
dilatation

ال buccal cavity بتطلع ل فوق او لتحت ، اذا ل فوق اللسان بضل طالع برا الفم واذا نزل لتحت بضل زي كانه فتح تمه

- Tardive dyskinesias tend to develop after several years of antipsychotic drug therapy but have appeared as early as 6 months.

بصير بعد استخدام الدواء بسنين  
بس في ناس بعد 6 شهور

- Antimuscarinic drugs** that usually ameliorate other extrapyramidal effects generally **increase** the severity of tardive dyskinesia symptoms.



# Side Effects

Extrapyramidal movement عشان اصف



## 3. Anticholinergic effects:

- Some of the antipsychotics, particularly thioridazine, and olanzapine, produce anticholinergic effects, including:
  - Blurred vision
  - Dry mouth (the exception is clozapine, which increases salivation)
  - Confusion
  - Inhibition of gastrointestinal and urinary tract smooth muscle, leading to constipation and urinary retention.
- This anticholinergic property may actually assist in reducing the risk of EPS with these agents.

# Side Effects

orthostatic hypotension  
اذا الدوا راح يعمل block لل الفا receptor زي ال clozapine بصير عندهم orthostatic hypotension

## 4. Other effects:

postural

- Blockade of  $\alpha$ -adrenergic receptors causes **orthostatic hypotension**.

لما يوقف راسه بوجعه وبوقع

- The antipsychotics also alter temperature-regulating mechanisms and can produce **poikilothermia** (condition in which body temperature varies with the environment).

في ناس جسمهم ببطل يتأقلم مع درجة الحرارة العالية او القليلة يعني ممكن الجو يكون بارد وهو حران والعكس

- In the pituitary, antipsychotics block  $D_2$  receptors, leading to an **increase in prolactin** release (dopamine is the normal inhibitory regulator of prolactin secretion). Second-generation antipsychotics are less likely to produce prolactin elevations.

صرمون الحليب

موجود اكثر عند النساء ، برضو موجود عند الرجال وبيين  
اكتر عند الرجال ف بعطيهم طابع انثوي لما يزيد  
الدوبامين بوقف شغل ال prolactin بقلل افرازه

بتزيد ال prolactin release الي هو الحديد مرتبط بالدوبامين ، يعني الدوبامين بتحكم بإفراز ال prolactin اذا زاد الدوبامين يزيد ال prolactin والعكس فلما تعمل inhibition للدوبامين ال prolactin يزيد

# Side Effects

## 4. Other effects:

- **Sedation** occurs with those drugs that are potent antagonists of the H<sub>1</sub>-histamine receptor. *بشتغل زي ادوية الحساسية شوي anti histamine ف بزيد ال sedation*

*اي شخص بستخدم هاي الادوية بصير عنده*

- Significant **weight gain** and **hyperglycemia** due to a diabetogenic action occur with several of the atypical agents, especially clozapine and olanzapine.

*وزيادة الكولسترول 3*

*الوزن بزيد بشكل واضح  
كثير بعد شهرين او 3*

**TABLE 29–2** Adverse pharmacologic effects antipsychotic drugs.

Type	Manifestations	Mechanism
Autonomic nervous system	Loss of accommodation, dry mouth, difficulty urinating, constipation Orthostatic hypotension, impotence, failure to ejaculate	Muscarinic cholinceptor blockade $\alpha$ -Adrenoceptor blockade
Central nervous system	Parkinson's syndrome, akathisia, dystonias Tardive dyskinesia Toxic-confusional state	Dopamine-receptor blockade Supersensitivity of dopamine receptors Muscarinic blockade
Endocrine system	Amenorrhea-galactorrhea, infertility, impotence	Dopamine-receptor blockade resulting in hyperprolactinemia
Other	Weight gain	Possibly combined H <sub>1</sub> and 5-HT <sub>2</sub> blockade

side effects تا حيزه ل

effect ↑ + ↑ ↑

Side effects **تأثيرات جانبية** +

# Monitoring Antipsychotics S/E

Antipsychotics	Sedation	EPS	Weight gain	Prolactin	DM	Lipid
Aripiprazole	+	+	+	+	+	+
<b>Chlorpromazine</b>	<b>++++</b>	<b>+++</b>	++	<b>+++</b>	-	-
<b>Clozapine</b>	++++	+	<b>++++</b>	+	<b>+++</b>	<b>+++</b>
<b>Fluphenazine</b>	+	<b>++++</b>	+	<b>++++</b>	-	-
<b>Haloperidol</b>	+	<b>++++</b>	+	<b>++++</b>	-	-
<b>Olanzapine</b>	++	++	<b>++++</b>	+	<b>+++</b>	<b>+++</b>
Quetiapine	++	+	++	+	+	+
Risperidone	+	++	++	++++	++	++

مخبر عالي

لازم انتبه على حد مل

# Cautions and contraindications

احاول ما استخدمها خاصة ال typical لانها  
بتزيد ال seizure

- All antipsychotics may lower the seizure threshold and should be used cautiously in patients with seizure disorders.

نقص WBCs وبتقل المناعة

- The high incidence of agranulocytosis with clozapine may limit its use to patients who are resistant to other drugs. ممكن لو المريض ما يستجيب اخاف اعطيه ال clozapine لانه بعرضه لامراض تانية
- Antipsychotics used in patients with mood disorders should also be monitored for worsening of mood and suicidal ideation or behaviors.

هاي الادوية بتخلي الشخص تيجيه  
افكار انتحارية وممكن ينتحر فلان ما  
اخليه لحاله

**TABLE 29-4** Dose relationships of antipsychotics.

	Minimum Effective Therapeutic Dose (mg)	Usual Range of Daily Doses (mg)
Chlorpromazine	100	100–1000
Thioridazine	100	100–800
Trifluoperazine	5	5–60
Perphenazine	10	8–64
Fluphenazine	2	2–60
Thiothixene	2	2–120
Haloperidol	2	2–60
Loxapine	10	20–160
Molindone	10	20–200
Clozapine	50	300–600
Olanzapine	5	10–30
Quetiapine	150	150–800
Risperidone	4	4–16
Ziprasidone	40	80–160
Aripiprazole	10	10–30

# Which of the following is true regarding the side effects of different drug classes?

اختبار سري

- Typical Antipsychotics: GI disturbances and vomiting

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- Atypical Antipsychotics: Insomnia

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- Dopaminergic Drugs: GI disturbances and vomiting treatment

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- All of the above

نسيت صيغة السؤال بس الخيارات:

Typical: side effects GI distributions

vomiting

Atypical: insomnia...

Dopaminergic drugs: GI disturbances

الجواب vomiting

All of the above

**In addition to its use in the treatment of schizophrenia, chlorpromazine is effective:**

اختبار سري

- 1. • In reducing nausea and vomiting

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- 2. As an antihypertensive medication

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- 3. As an anticonvulsant

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- 4. In the treat bipolar disease

**✘ Which of the following is incorrect regarding typical and atypical antipsychotic drugs?**

اختبار سري

- 100% **A) Typical antipsychotic drugs cause less hyperprolactinemia than atypical ones.**
- 
- 0% **B) Atypical antipsychotic drugs have a lower risk of extrapyramidal side effects than typical ones.**
- 
- 0% **C) Typical antipsychotic drugs primarily block dopamine D2 receptors**
- 
- 0% **D) Atypical antipsychotic drugs affect both dopamine and serotonin receptors.**
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Questions??

