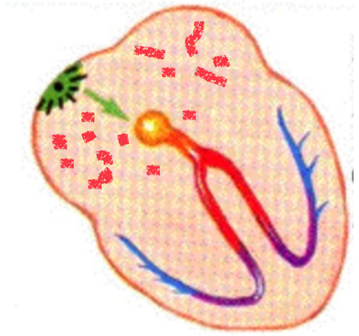
ECG Teach & Test



Save the Patient!

Pass the Boards!

New case

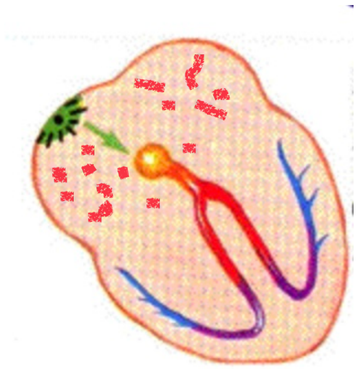
Search

Random quiz

Criteria

Approach to interp

Standardized packet



Standard images throughout

ATRIAL FIBRILLATION

Overview
- What's happening inside the heart
- How this translates to the ECG

Diagnosis
- ECG criteria
- ECG mimicks

Symptoms

Causes

Management

NSR

STACH

SBRADY

ATach

AFib

Etc

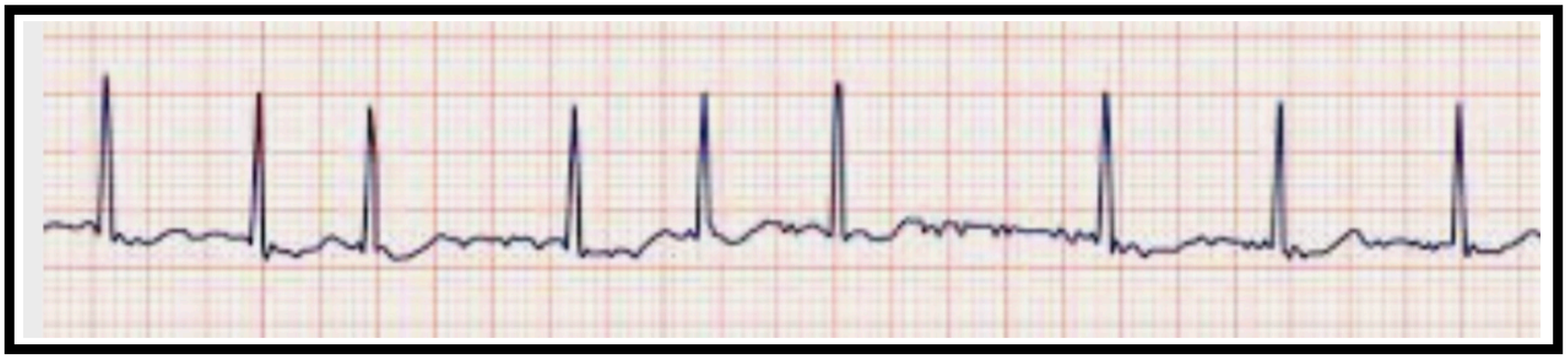
Compare & contrast

Don't be fooled

Common mistakes

Etsy notes

Case 1. 55-year-old smoker with shortness of breath



The ECG shows the presence of:

A. Sinus tachycardia
B. Atrial flutter
C. Atrial fibrillation
D. Ventricular tachycardia

Learner chooses Sinus tachycardia

Case 1. 55-year-old smoker with shortness of breath

The ECG shows the presence of:

- ✗ A. Sinus tachycardia
- B. Atrial flutter
- ✓ C. Atrial fibrillation
- D. Ventricular tachycardia

You answered SINUS TACHYCARDIA
The correct answer is ATRIAL FIBRILLATION

Let's understand the differences…

55-year-old smoker with shortness of breath

Your answer

SINUS TACHYCARDIA is a …

……xxx……

…yyy……

……zzz…

……

Correct answer

ATRIAL FIBRILLATION is a …

……xxx……

…yyy……

……zzz…

……

Let’s look at what’s happening inside the heart…

SINUS TACHYCARDIA is a …

……xxx……

Regular sinus rhythm
Originates in heart's normal pacemaker (SA node)
Follows the same normal conduction pathway as normal sinus rhythm, resulting in REGULAR ventricular contractions but at an ELEVATED.
Each atrial contraction followed by ventricular contraction

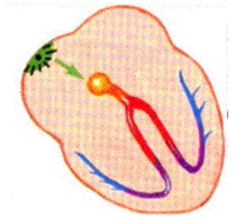
ATRIAL FIBRILLATION is a …

……xxx……

Pathological rhythm
Does NOT originate in SA node
Caused by multiple distinct irritable foci in the atria discharging in a totally erratic uncoordinated way at 350-450 per minute
Most atrial impulses never conduct to the ventricles, and those that do do so in a chaotic in predictable and irregular way, producing an irregular rhythm

Normal sinus rhythm

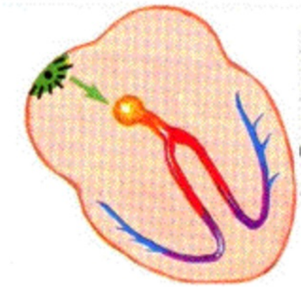
60-100 bpm



Normal rhythm of healthy heart

Sinus tachycardia

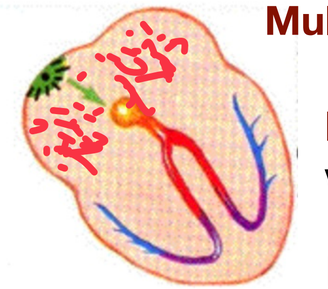
> 100 bpm



Single atrial focus (SA node)

Each atrial impulse conducting to ventricles

Regular rate of ventricular contraction



Multiple atrial foci

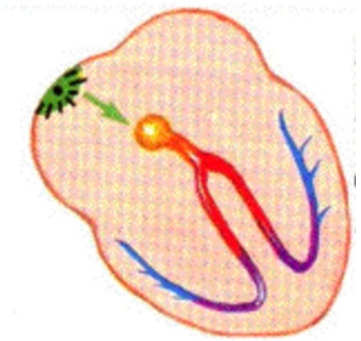
Intermittently conducting to ventricles

Irregular rate of ventricular contraction

Let's see how this translates to the ECG

↓

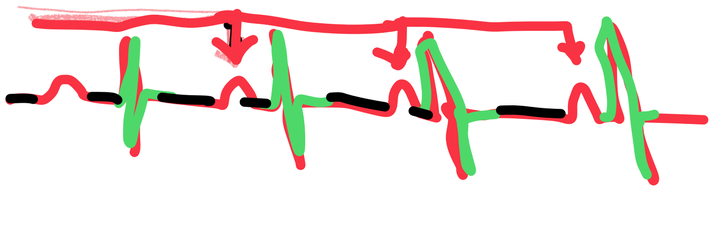
SINUS TACHYCARDIA



SINGLE atrial focus (SA node)

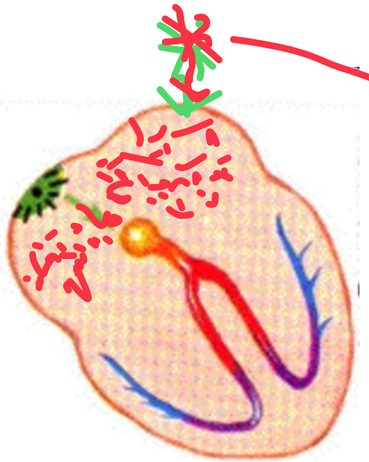
CONSISTENTLY conducts to ventricles (P:QRS = 1)

REGULAR rate of ventricular contraction at rate > 100 bpm



P wave (atrial contraction)
QRS complex (ventricular contraction)

ATRIAL FIBRILLATION



Multiple atrial foci

INTERMITTENTLY conducting to ventricles

IRREGULAR rate of ventricular contraction

Atrial activity is totally irregular and represented by fibrillatory waves of varying amplitude, duration and morphology, causing random oscillations of the baseline.

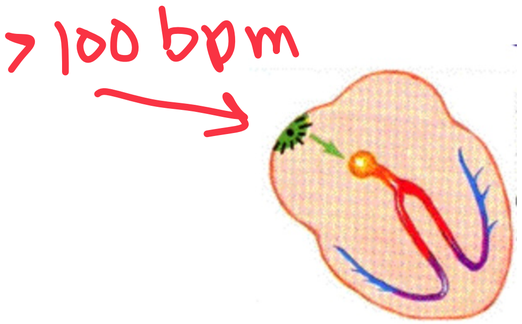
Now that you understand the differences between sinus tachycardia and atrial fibrillation, let's review the TWO key ECG criteria required for the diagnosis of atrial fibrillation

Remember: It's All In A NAME!

SINUS TACHYCARDIA

SINUS: originates in Sinus Node (heart's normal pacemaker), causes atria to contract normally (P wave)

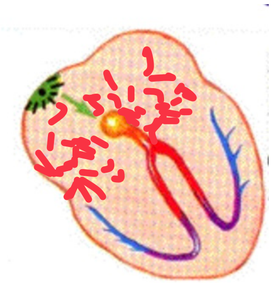
TACHYCARDIA: rate > 100



ATRIAL FIBRILLATION

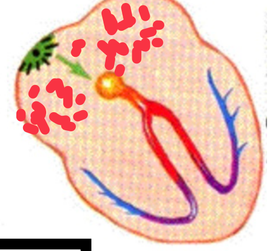
ATRIAL: originates in Atrial Tissue, <u>not</u> the sinus node

FIBRILLATION: multiple atrial foci fire at the same time, causing the atria to shiver/fibrillate. Atrial activity is totally irregular and represented by fibrillatory waves of varying amplitude, duration and morphology, causing random oscillations of the baseline.

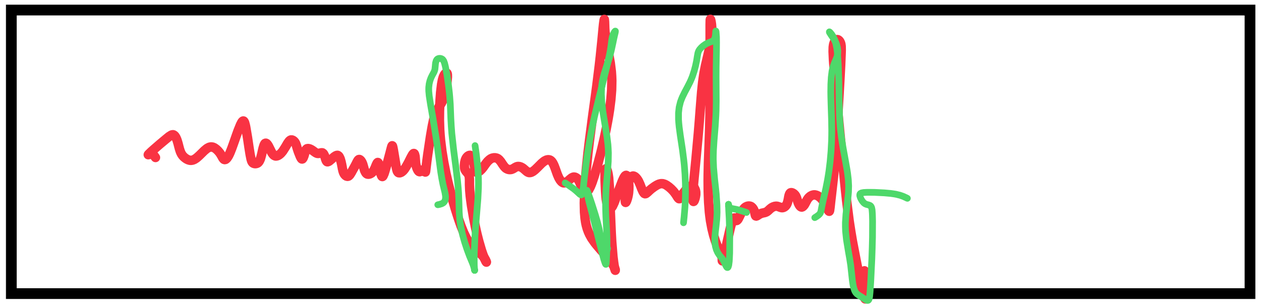


Now that you understand the differences between sinus tachycardia and atrial fibrillation, let's review the TWO key ECG criteria required for the diagnosis of atrial fibrillation

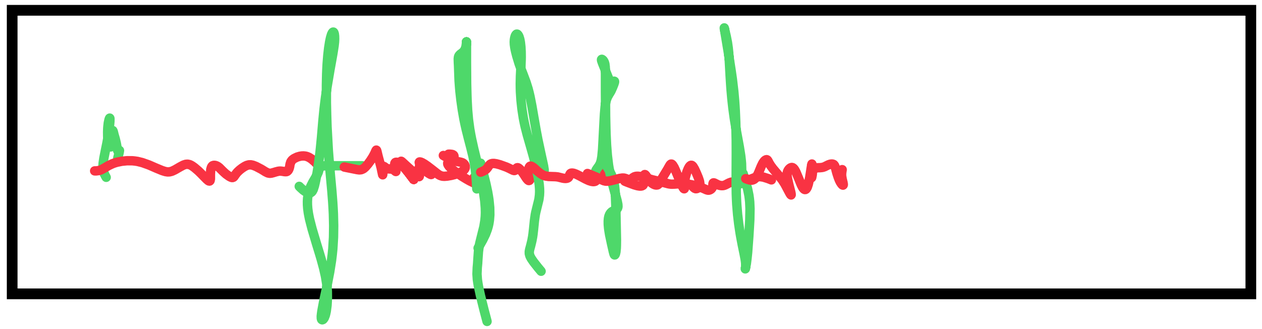
Atrial fibrillation: ECG CRITERIA



1. **No P waves.** Rapid chaotic baseline. Atrial activity is totally irregular and represented by fibrillatory waves of varying amplitude, duration and morphology, causing random oscillations of the baseline.

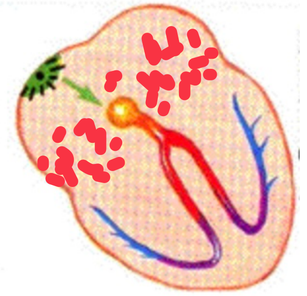


2. **Irregular ventricular rhythm.** Ventricular rate (interval between QRS complexes) is usually 100 to 180 BPM in the absence of drugs.



Now that you understand that ATRIAL FIBRILLATION is a erratic ATRIAL rhythm represented by FIBRILLATION waves on the ECG and resulting in an irregular ventricular rhythm represented by irregularly spaced QRS complexes, let's reinforce your learning through a series of quizzes. Ready? Good! Let's begin…

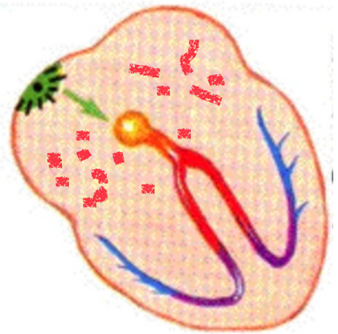
Atrial fibrillation: ECG CRITERIA QUIZ



1. P waves are (**present/absent**)
2. Atrial activity is (**regular/totally irregular**)
3. Atrial activity (**does/does not**) originate in the heart's normal pacemaker (SA node)
4. Atrial activity is represented by fibrillatory waves of varying amplitude, duration and morphology, causing (**regular/random**) oscillations of the baseline
5. Ventricular rhythm is (**regular/irregular**)
6. Ventricular rhythm manifests as (**P waves/QRS complexes**) at (**consistent/varying**) intervals from each other
7. For each P wave (atrial contraction) there is an associated QRS complex (ventricular contraction): **true/false**
8. The ventricular rate is usually (**greater than/less than**) 100 BPM

Error Pathway

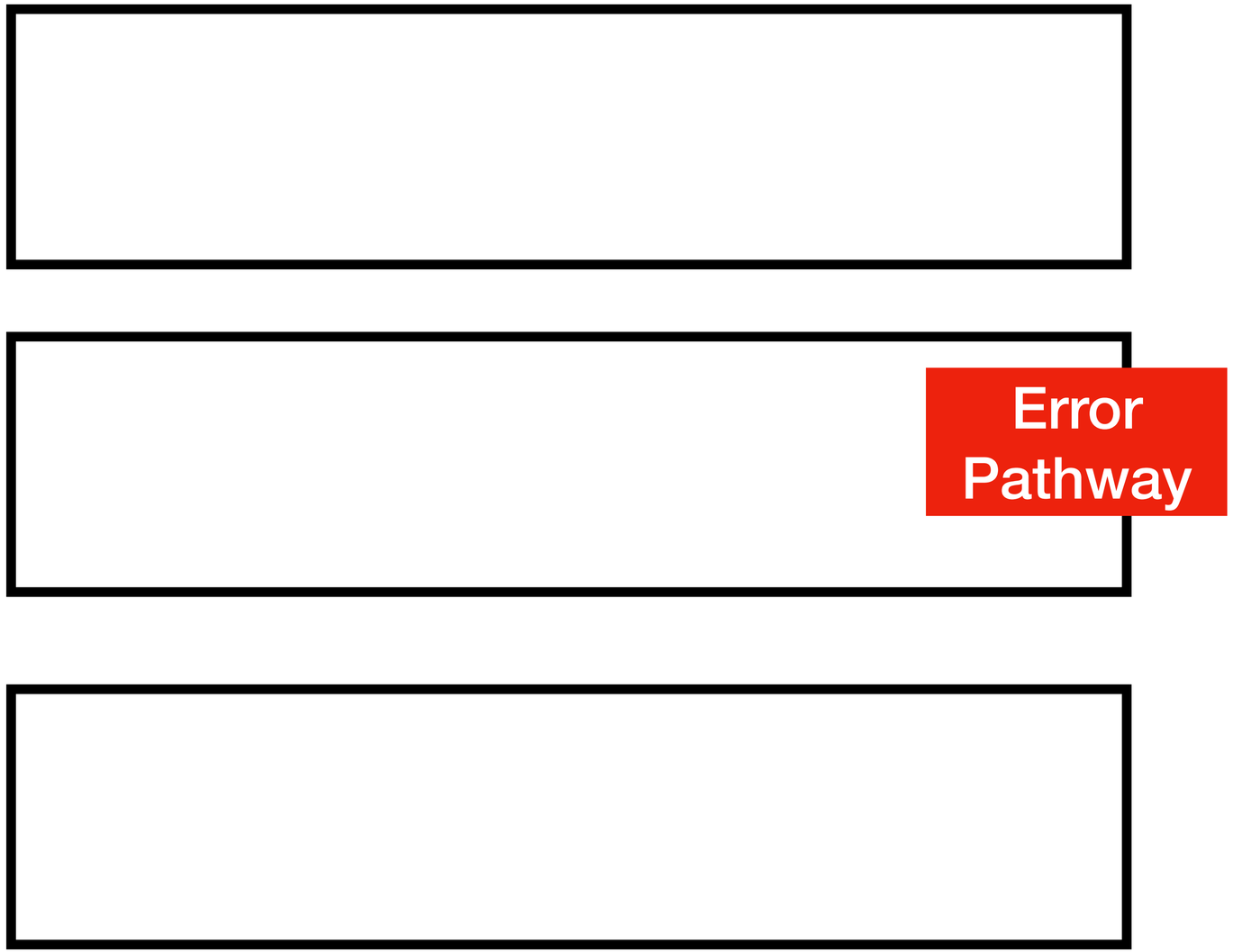
Atrial fibrillation: FIND THE MISTAKE



1. P waves are (absent)
2. Atrial activity is (regular)
3. Atrial activity is represented by fibrillatory waves of varying amplitude, duration and morphology, causing random oscillations of the baseline
4. Ventricular rhythm is irregular
5. This manifests as QRS complexes at constant intervals from each other
6. For each P wave (atrial contraction) there is an associated QRS complex (ventricular contraction)
7. The ventricular rate is usually greater than 100 BPM

Error Pathway

Atrial fibrillation: FIND THE IMPOSTER



Atrial fibrillation or Sinus tachycardia, That Is The Question

	STach	AFib
A. Originates from heart's natural pacemaker	✅	
B. Ventricular rate always > 100		❌
C. Irregular rapid oscillations of the baseline		
D. P wave followed by a QRS complex		

Explanation

Error Pathway

Atrial fibrillation or Sinus tachycardia, That Is The Question

STach or AFib

STach or AFib

STach or AFib

STach or AFib

Error Pathway

STach or AFib

STach or AFib

Atrial fibrillation: MATCHING

For each choice, choose all labeled items on the ECG that apply

1. P waves
2. Atrial activity
3. Fibrillatory waves
4. QRS complex/ventricular contraction
5. Irregular ventricular rhythm

Error Pathway

Atrial fibrillation: START & STOP

Identify each start point for sinus tachycardia and atrial fibrillation in the rhythm strip

A. Sinus tachycardia
B. Atrial fibrillation

Error Pathway

Case 1. 55-year-old smoker with shortness of breath

RETURN TO & REVIEW ORIGINAL CASE

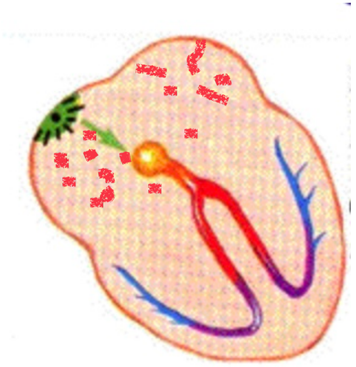
The ECG demonstrates which of the following arrhythmias:

A. Sinus tachycardia
B. Atrial flutter
C. Atrial fibrillation
D. Ventricular tachycardia

Final Review

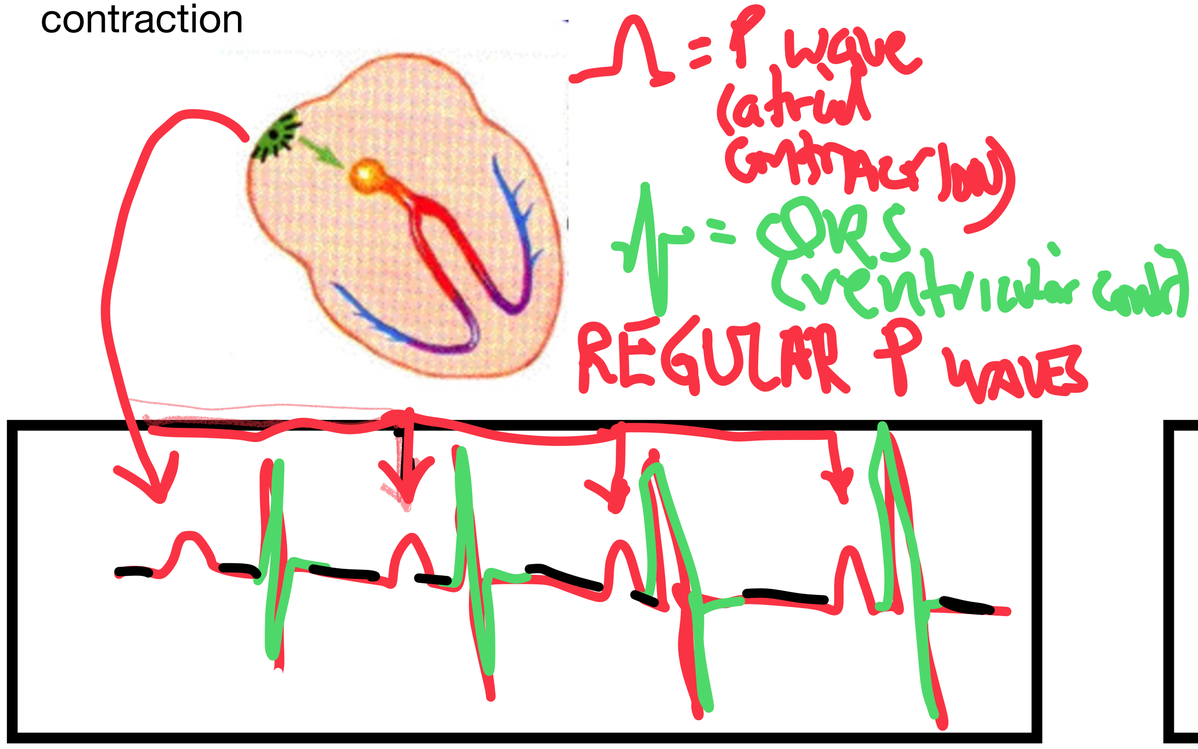
Atrial fibrillation: ADDITIONAL INFORMATION

1. Rate
2. Don’t be fooled: artifact, lead
3. Atrial flutter?
4. Dig, bundle, WPW, Ashmans

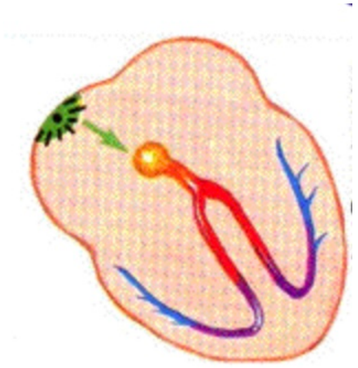


Sinus tachycardia

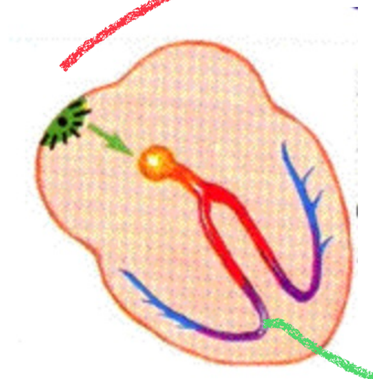
Normal rhythm of healthy heart
Regular sinus rhythm
Originates in heart's normal pacemaker (SA node)
Travels down normal conduction pathway at
REGULAR rate of 60-100 to ventricles
Each atrial contraction followed by ventricular contraction



Atrial fibrillation



Sinus tachycardia



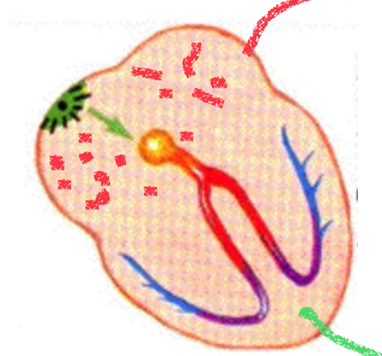
RATE > 100

REGULAR P

REGULAR QRS

EACH P FOLLOWED BY QRS

Atrial fibrillation



Let’s take a detailed look at ATRIAL FIBRILLATION by understanding the 2 ECG CRITERIA needed to make the diagnosis