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RESEARCH ON NATURAL REMEDIES OF TUBERCULOSIS AND IDENITIFY NEW SYMPTOMS, TREATMENT REGIMENS, DIAGNOSTIC EVALUATION

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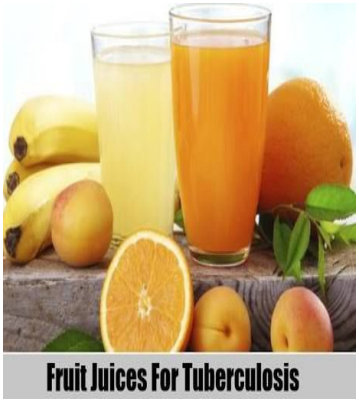
Drug resistance Mycobacterium tuberculosis, medicinal plants, treatment, symptoms, types, mechanism, disease progression, stages DEFINATION, etiology, diagnosis, prevention .

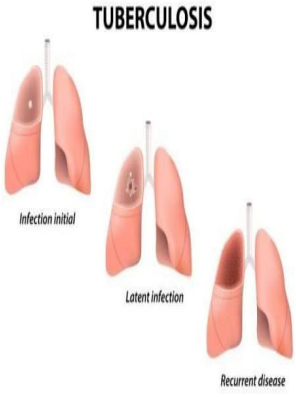
Abstract

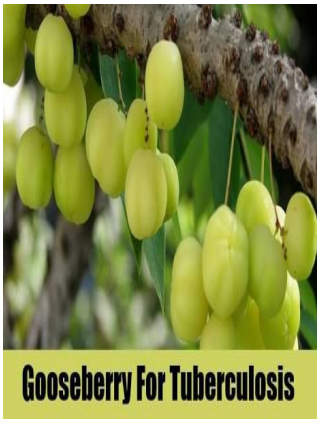
Tuberculosis is caused by the Mycobacterium tuberculosis is an infection deadly disease and the treatment of which is one of the most important severe challenges at the global level currently more than a 20 chemicals medications are described for the treatment of tuberculosis. Regardless of availability of several drugs to treat TB. The cause agent Mycobacterium tuberculosis is now a days getting resistant towards the convenient drugs and leading to condition known as the multi drugs resistant tuberculosis. Medicinal plants have been used to cure different common as well as lethal diseases by ancient civilization due to the virtue of the variety of chemical compounds which may have some important remedies properties. The aim of the present research is to focus the anti tubercular medicinal plants native to india as well as plants.

INTRODUCTION

Tuberculosis is a disease caused by tiny germs that enter your lungs when you breathe them in; It is called “TB” for shortTB germs are most commonly found in the lungs, but sometimes they can move to other parts of the bodyWhen you have TB disease of the lungs, you can spread it to other peopleTuberculosis is a disease caused by tiny germs that enter your lungs when you breathe them inTB germs are most commonly found in the lungs, but sometimes they can move to other parts of the bodyWhen you have TB disease of the lungs, you can spread it to other people







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HOW ARE THE TB GERMS SPREAD ?

TB germs are passed through the air when a person who is sick with TB disease coughs, sings, sneezes, or laughsTo become infected with TB germs, a person usually needs to share air space with someone sick with TB disease (e.g., live, work, or play together)The amount of time, the environment, and how sick the person is all contribute to whether or not you get infectedIn most cases, your body is able to fight off the germs

"Tuberculosis is defined as an infectious disease caused by a bacterium; that most commonly affects the lungs."It can also be a crippling and deadly disease, and is on the rise in both developed and developing worlds. Globally, it is the leading cause of deaths resulting from a single infectious disease. Currently, it kills "three million people" a year and could claim up to 30 million lives if not controlled. Naturally ventilated, windows closed - 97%Mechanically ventilated with neg pressure (ACH 12) - 39%Naturally ventilation, windows and doors fully open:Modern (1970-1990) - 33%Old-fashioned (pre-1950) - 11%

PERSONAL RESPIRATORY PROTECTION

Respirators:Can protect HCWsShould be encouraged in high-risk settingsMay be unavailable in low-resource settingsFace/surgical masks:Act as a barrier to prevent infectious patients from expelling dropletsDo not protect against inhalation of microscopic TB particlesAristotle was the first to say that tuberculosis is an airborne disease able to be passed from one person to another. Although his theory was correct scientists continued to search for different causes and treatment of TB. In 1865 Jean Antoine Villemin, put out the idea that TB was genetically inherited. This gave a sound piece of mind for all, until 1882 when Robert Koch proved her wrong by discovering a round shaped bacterium that was the cause of the disease. This excited the scientific world as it brought the possibility to "cure humanity's deadliest enemy.

NATURAL REMEDIES OF TUBERCULOSIS

Withenia sominifera - solenacea family mainly used fresh leaves roots

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Datura metal - solenacea family and mainly used leaf

Allium sativum - bulb

Pipernigurum - piperacea - seeds

Citrus essential oils

Alovera - alocea - pure gel

If you test positive for talent TB infection. Your doctor my advice you to take medications to reduce your risk of developing active tuberculosis

Protect your family and friends, stay home ventilate the room, cover your mouth wear mask, vaccination

Apricot seed

Dalchini

Apricot americana

Armenian plum

Ashwagandha is a plant the root and berry are used to make medicine

Aroda, avarda, Indian ginseng, winter cherry , withenia sominifera

Bitter almond - familiar type of nut it can be used sweet or bitter

Amanda, Amara, bitter mendel foxglove

Guava,

Lady fern is a plant the root and root like stem are used to make medicine

Pine - mainly used sprouts, needles and bark to make medicines

Raddish - root is used as food and as medicine

Tolu balsm - sap like substances that comes from the myroxylon balsam tree

White mustard - it is an herb the seeds are used to make medicine

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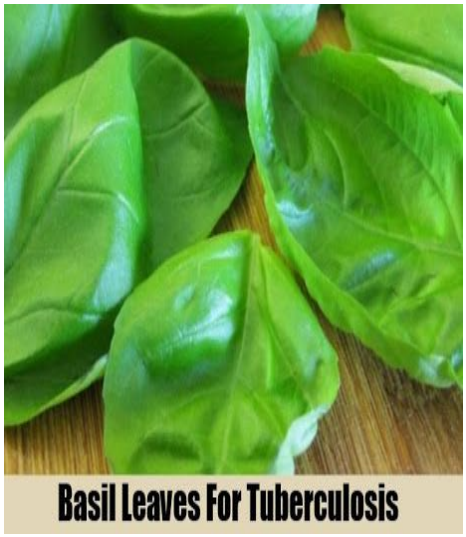

EPIDEMIOLOGY

Estimated that 1/3 of the world population is infectedEstimated that 10,000,000 in this country are infectedIn the US 16,377 cases were reported in 2000, 12,904 cases were reported in 2008, 11,545 cases were reported in 2009 (119 cases in IN), and 11,182 (90 in IN) cases were reported in 2010 (provisional)and 9000 cases were reported in 2015 and 2016. In this country most cases occur in the those infected with HIV, the urban poor, alcoholics, iv drug users, the homeless, migrant farm workers, immigrants, and prison inmatesDisease in the elderly usually represents reactivation of a previous infectionDisease in children often represents active transmission within the community or family (they get it from someone else!)

TB Infection vs. TB Disease

There is a difference between TB “infection” and TB “disease”TB infection: TB germs stay in your lungs, but they do not multiply or make you sickYou cannot pass TB germs to othersTB disease: TB germs stay in your lungs or move to other parts of your body, multiply, and make you sickYou can pass the TB germs to other people

Treatment for TB Infection

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TB infection is treated with medicine, usually for 4-9 months If TB infection is not treated, it can turn into TB diseaseIt is important to take all your medicine, even though you don't feel sick

ETIOLOGY

M. Tuberculosis is a rod shaped, non spore forming, thin aerobic bacteriumObligate aerobe and a very slow grower (growth on solid culture takes 3-8 weeks)Typically neutral on gram's staining, however, once stained, the bacilli cannot be decolorized by acid alcoholAcid fastness is due to organism's high content of mycolic acid, long-chain cross linking fatty acids, and other lipidsLipoarabinomannan, cord factor, and arabinogalactan are proinflammatory, cytotoxic, inhibit chemotaxis, and inhibit the fusion of lysosomes with phagosomesFacultative intracellular pathogen which grows in unactivated macropages and type II pneumocytesPathology is determined by the amount of antigen (number of bugs) and the extent of the individual's hypersensitive reaction to the antigenTwo major forms of infections occur: primary TB (pulmonary TB) and secondary (latent reactivation) TBLocalized, progressive, and disseminated disease may occur in both forms


HOW ARE TB GERMS NOT SPREAD?

Through quick, casual contact, like passing someone on the streetBy sharing utensils or foodBy sharing cigarettes or drinking containersBy exchanging saliva or other body fluidsBy shaking handsUsing public telephonesThrough quick, casual contact, like passing someone on the streetBy sharing utensils or foodBy sharing cigarettes or drinking containersBy exchanging saliva or other body fluidsBy shaking handsUsing public telephonesThrough quick, casual contact, like passing someone on the streetBy sharing utensils or foodBy sharing cigarettes or drinking containersBy exchanging saliva or other body fluidsBy shaking handsUsing public telephonesThrough quick, casual contact, like passing someone on the streetBy sharing utensils or foodBy sharing cigarettes or drinking containersBy exchanging saliva or other body fluidsBy shaking handsUsing public telephonesThrough quick, casual contact, like passing someone on the streetBy sharing utensils or foodBy sharing cigarettes or drinking containersBy exchanging saliva or other body fluidsBy shaking handsUsing public telephonesThrough quick, casual contact, like passing someone on the streetBy sharing utensils or foodBy sharing cigarettes or drinking containersBy exchanging saliva or other body fluidsBy shaking handsUsing public telephones

WHAT IS MDR-TB ?

It is a mutated form of the TB microbe that is extremely resistant to at least the two most powerful anti-TB drugs - isoniazid and rifampicin.People infected with TB that is resistant to first-line TB drugs will confer this resistant form of TB to people they infect. MDR-TB is treatable but requires treatment for up to 2 years. MDR-TB is rapidly beco a problem in Russia, Central Asia, China, and India.

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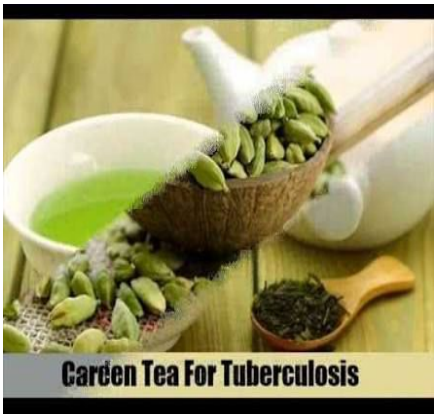
ANTIBIOTIC MECHANISMS

Inhibition of mRNA translation and translational accuracy (Streptomycin and derivatives)RNA polymerase inhibition (rifampicin) – inhibition of transcript elongation Gyrase inhibition in DNA synthesis (fluoroquinolone)



Antibiotic Mechanism II

Inhibition of mycolic acid synthesis for cellular wall (isoniazid)Inhibition of arabinogalactan synthesis for cellular wall synthesis (ethambutol)Sterilization – by lowering pH (pyrazinamide)

1.Resistance Mechanisms of TB

TB inactivates drug by acetylation – effective on aminoglycoside antibiotics (streptomycin)Also, thru attenuation of catalase activity, in this way TB has developed resistance against certain drugs (asonizid)TB microbe has accumulated mutations that resist antibiotic binding (rifampicin and derivatives)

Reasons for Fear

Drug resistant strains of Mycobacterium tuberculosis have developedUnderdeveloped countries are the most affected by TB95% of reported cases come from underdeveloped countriesHigh HIV rates in those areas contribute to the contraction of TBThe caseous centers of the tubercles liquefy.This liquid is very crucial for the growth of TB, and therefore it multiplies rapidly (extracellularly).This later becomes a large antigen load, causing the walls of nearby bronchi to become necrotic and rupture.This results in cavity formation and allows TB to spread rapidly into other airways and to other parts of the lung.

2.Virulent Mechanisms of TB

TB mechanism for cell entryThe tubercle bacillus can bind directly to mannose receptors on macrophages via the cell wall-associated mannosylated glycolipid (LAM)TB can grow intracellularly Effective means of evading the immune systemOnce TB is phagocytosed, it can inhibit phagosome-lysosome fusionTB can remain in the phagosome or escape from the phagosome (Either case is a protected environment for growth in macrophages)

STATISTICS

#1 on the list of lethal infectious diseases2 million deaths worldwide annuallyEvery year 8 million cases reported annuallyDeath rate after contracting the disease, if untreated, is the same as flipping a coin

History

TB has been known as Pthisis, King's Evil, Pott's disease, consumption, and the White Plague.Egyptian mummies from 3500 BCE have the presence of Mycobacterium tuberculosis

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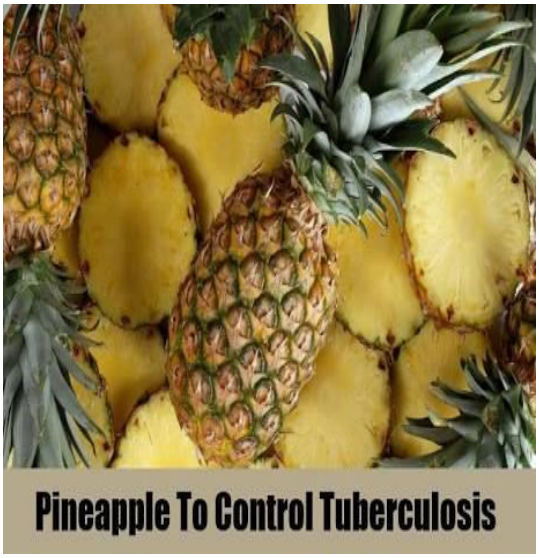

1.Disease progression- Stage 1

Stage 1Droplet nuclei are inhaled, and are generated by talking, coughing and sneezing.Once nuclei are inhaled, the bacteria are non-specifically taken up by alveolar macrophages. The macrophages will not be activated, therefore unable to destroy the intracellular organism.The large droplet nuclei reaches upper respiratory tract, and the small droplet nuclei reaches air sacs of the lung (alveoli) where infection begins.Disease onset when droplet nuclei reaches the alveoli.

2.Disease Progression- Stage 2

Begins after 7-21 days after initial infection.TB multiplies within the inactivated macrophages until macrophages burst. Other macrophages diffuse from peripheral blood, phagocytose TB and are inactivated, rendering them unable to destroy TB.

3.Disease Progression- Stage 3

Lymphocytes, specifically T-cells recognize TB antigen. This results in T-cell activation and the release of Cytokines, including interferon (IFN). The release of IFN causes the activation of macrophages, which can release lytic enzymes and reactive intermediates that facilitates immune pathology.Tubercle forms, which contains a semi-solid or “cheesy” consistency. TB cannot multiply within tubercles due to low PH and anoxic environment, but TB can persist within these tubercles for extended periods.

4.Disease Progression- Stage 4

Although many activated macrophages surround the tubercles, many other macrophages are inactivated or poorly activated. TB uses these macrophages to replicate causing the tubercle to grow.The growing tubercle may invade a bronchus, causing an infection which may spread to other parts of the lungs. Tubercle may also invade artery or other blood supply.Spreading of TB may cause milliary tuberculosis, which can cause secondary lesions.Secondary lesions occur in bones, joints, lymph nodes, genitourinary system and peritoneum. Slow generation timeImmune system cannot recognize TB, or cannot be triggered to eliminate TBHigh lipid concentration in cell wallaccounts for impermeability and resistance to antimicrobial agentsAccounts for resistance to killing by acidic and alkaline

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compounds in both the inracellular and extracelluar environmentAlso accounts for resistance to osmotic lysis via complement depostion and attack by lysozyme

Virulent Factors of TB

Antigen 85 complexIt is composed of proteins secreted by TB that can bind to fibronectin. These proteins can aid in walling off the bacteria from the immune systemCord factorAssociated with virulent strains of TBToxic to mammalian cells

PATHOGENSIS

Pathogenesis of tuberculosisInfection versus diseaseHost factorsPathogen factors

Host factors includeSocial e.g.PovertyalcoholismAge e.g.BabyTeenage girlOld ageImmunity e.g. HIVGamma interferonSCID

Organism factors e.g.Virulence factors [Drug resistance]

MTB into lungs (or to cervical nodes or abdo. nodes)Replication of organismsPrimary complex (lung and mediastinal lymph nodes)Mycobacteraemia with potential for 'seeding'Consequence of tuberculous infectionSymptomatic illness – disease (minority) immunological control (majority) with Ghon focus on Xray. Infection is 'contained' by granuloma but not eliminated. Tuberculous disease is a consequence of:Primary infection e.g. in babyReactivation 'natural' Associated with immunosupressionRe infection

WHAT ARE THE TYPES

Mycobacterium which is carried by humans. Mycobacterium T.B. can present it self in the human body in different forms effecting any where from "the intestines, bones, joints, skin, and the genitourinary, lymphatic, and nervous systems."

1.Avian Tuberculosis

transmitted by ingestion and inhalation of aerosolized infectious organisms from feces. Oral ingestion of food and water contaminated with feces is the most common method of infection. Once ingested, the organism spreads throughout the bird's body and is shed in large numbers in the feces. If the bacterium is inhaled, pulmonary lesions and skin invasions may occur transmission of avian TB is from bird to human not from human to human.

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2.Milliary tuberculosis

Uncontrolled haematogenous disseminationProgressive primary or reactivationRequires impaired immunity thus 50% in infants, elderly and HIV+Clinical course variable; fuminant to subacuteNon specific presentation; failure to thrive, aesthenia, night sweats, pyrexia, ARDSDifficult to diagnose, 20% post mortemHepatomegaly, ascites, deranged liver functionMeningeal disease in 15 – 20%

3.Bovine Tuberculosis

people contract Bovine TB today,by eating food that has been contaminated by the bacteria or from drinking un-pasteurized milk from cows that are infected with the virus. Bovine TB is most likely going to effect the joints and bones.

TB Prevention & Control in the Community: MO Role

Begin TB treatment as soon as possible Screen other people in the householdEnsure that TB patients complete treatmentMinimise crowding in congregate settings.

4.Primary tuberculosis

Primary complex + lesion + draining glandusually asymptomaticSkin test conversion- Post primary pulmonary tuberculosesLocal spread – PneumoniaHaematogenous spread – MilliarySpread to bones and jointsSpread to kidneysReactivationExogenous re-infection

IDENTIFY NEW SYMPTOMS OF TB DISEASE

Cough (2-3 weeks or more)Coughing up bloodChest painsFeverNight sweatsFeeling weak and tiredLosing weight without trying Decreased or no appetiteIf you have TB outside the lungs, you may have other symptoms

TREATMENT FOR TB DISEASE

TB disease is treated with medicine to kill the TB germsUsually, the treatment will last for 6-9 monthsTB disease can be cured if the medicine is taken as prescribed, even after you no longer feel sickTB disease is treated with medicine to kill the TB germsUsually, the treatment will last for 6-9 monthsTB disease can be cured if the medicine is taken as prescribed, even after you no longer feel sickTB disease is treated with medicine to kill the TB germsUsually, the treatment will last for 6-9 monthsTB disease can be cured if the medicine is taken as prescribed, even after you no longer feel sickTB disease is treated with medicine to kill the TB germsUsually, the treatment will last for 6-9 monthsTB disease can be cured if the medicine is taken as prescribed, even after you no longer feel sickTB disease is treated with medicine to kill the TB germsUsually, the treatment will last for 6-9 monthsTB disease can be cured if the medicine is taken as prescribed, even after you no longer feel sick

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The primary stage of the disease may be symptom-free, or the individual may experience a flu-like illness.This is called the "inactive stage." Within the active stage of the disease, there might be a slight fever, night sweats, weight loss, fatigue.The symptoms my vary depending on what type of tuberculosis you contract. Primary TBMost individuals (~75%) are asymptomatic or have flu-like symptoms along with fever and chest pain Around 3 weeks after infection, they become PPD+ (skin test, see "Diagnosis")For most, the lesions eventually heal with fibrosis and calcificationDormant lesions that still contain bugs may reactivate to yield secondary TB.

Progressive Primary TBSome individuals (5-15%) don't contain the primary infection and develop a progressive disease that resembles a necrotizing bacterial pneumoniaThis presents with fever, productive cough, and chest pain Coughing aerosolizes secretions and distributes them throughout the lungThere are expanding areas of caseating necrosis with irregular cavity formation along with erosion of blood vessels resulting in hemoptysisLesions will usually heal by fibrosis with adequate treatment Secondary TBPattern of disease that arises in a previously infected and sensitized patientThe lesions typically localize to the apex of the upper lobesThere is rapid tissue response (Th1) because of previous sensitizationCavitary formation is very likelySymptoms include low grade fever, night sweats, and weight lossWithout therapy, miliary TB may develop. Miliary TBThis refers to the uncontrolled hematogenous dissemination of M. tuberculosisInfection may involve any organ and the course is usually rapid when it occurs with primary or secondary progressive diseaseMultiorgan failure, septic shock, and respiratory distress, followed by death, may occurChestPulmonary PleuralMediastinal nodespericardiumExtra pulmonaryskin and soft tissues (including lymph nodes)BoneAbdominalIntra cranial other. usually 'chronic' rather than acuteFeverSweats Weight lossFocal symptoms. ChestSputum – if productiveInduced sputumBronchoscopic alveolar lavage (BAL)Pleural biopsyPleural fluidOtherE.g. Lymph node, aspiration of abscess, mesenteric biopsy, stool, bone marrow etc.What about EMSU? - should be done selectively where it is likely to be helpful. Cough (2-3 weeks or more) Coughing up bloodChest painsFeverNight sweatsFeeling weak and tiredLosing weight without trying Decreased or no appetiteIf you have TB outside the lungs, you may have other symptoms

DIAGNOSIS

Ziell Neilsen (acid fast) or Auramine stain.OthersLowenstien Jensen culture Automated test - Radiometric culture C14 PCR and other nucleic acid amplification testsNucleic acid probes for various Mycobacterial. TB is a notifiable diseaseContact tracing-Who was the source?- Has the current patient been a source? - Outcomes- Not infected…….discharge- Seroconversion but no clinical disease ……..chemo-prophylaxis- Active disease……..treatment

Administering the TST

Use Mantoux tuberculin skin test 0.1 mL of 5-TU of purified protein derivative (PPD) solution injected intradermallyUse a 27 gauge needleProduce a wheal that is 6-10mm in diameter

1.TB TEST - 1

Two types of tests can be used to see if a person has TB:A TB skin testA TB blood testA trained nurse will give you the TB testThe TB test is simple and safeThe TB test is mandatory, and will help us protect your health and the health of others

2.The TB Test - 2

A negative test most likely means have not been infected with TB germsA second TB test might be required in 8-10 weeks to ensure you have not been infected with TB germsA positive test means you have probably been infected with TB germs, but it does not mean you have TB diseaseOther tests (like a chest x-ray) will be needed to see if you have TB disease

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When someone comes into contact with tuberculosis or feels as if they become infected by tuberculosis, they should call a doctor and order a skin test. The doctor will inject a small amount of tuberculin under the skin. If a person has been exposed to tuberculosis a swelling will develop around the spot where the skin test is given.

3.The TB Test - 3

If the health department finds that you have TB infection, you will be offered treatment to keep you from getting TB diseaseTreatment for TB infection is voluntary, but taking it will help protect your healthYour name and the results of your TB test will be kept confidentialIf the health department finds that you have TB infection, you will be offered treatment to keep you from getting TB diseaseTreatment for TB infection is voluntary, but taking it will help protect your healthYour name and the results of your TB test will be kept confidentialIf the health department finds that you have TB infection, you will be offered treatment to keep you from getting TB diseaseTreatment for TB infection is voluntary, but taking it will help protect your healthYour name and the results of your TB test will be kept confidentialTuberculin test (intradermal PPD)XraySputum acid fast stainCulture rRNA or DNA in sputum by nucleic acid amplification (results in 2-7 hours, but does NOT replace culture)Tuberculin skin testInduration measured after 48-72 hoursInduration >5mm is considered positive for recent TB contacts or immunosuppressedInduration >10mm is positive for arrivals from high-prevalence countries, IV drug users, lab personnel, residents and employees in high-risk settings (e.g. health care facilities, jails)Induration >15mm is positive for persons with no risks. Hypertonic saline nebuliser in negative pressure room with HEPA filter and well trained physiotherapistStudy of 27 confirmed positive patients13 +ve induced sputum only1 +ve bronchoscopy only13 +ve induced sputum and brocospasm. Criteria for procedurePast history TB or contact with TB in last yearRespiratory symptoms of one or more of:Non-productive coughFever, Night sweats, weight lossHaemoptysis114 procedures, 12 positive for TBCohort followed up for 12 months, no cases missed.

TREATMENT

If your T.B skin test comes back positive your doctor will take one of several treatments to treat you. Your doctor may prescribe a medicine called isoniazid to prevent the tuberculosis infection from developing into the active disease and making you feel sick. If you contract TB of the abdominal or of the extra- pulmonary you may have the choice of a mainstay therapy that takes a course of 9-12 months in order to complete. Surgery is generally reserved for patients with obstruction of vital organs. No treatment at all since most people develop an immune response and warts go away by themselves. If your warts don't disappear, or if uncomfortable, first-choice remedy should be over-the-counter medication in liquid, gel, pad or ointment form. If over-the-counter treatment fails, your doctor can remove a wart by: “freezing it with liquid nitrogen, burning it off with electricity or a laser, excising it (a minor surgical procedure), dissolving it by wrapping it in a plaster patch impregnated with salicylic acid.” The identification and diagnosis of persons who may have come into contact with an infected person An important element to infection prevention and control. Identify and evaluate contacts of persons with smear positive pulmonary TB within 3 days of new case discoveryAll close contacts should be evaluatedParticular attention give to children under 5If index case is a child, source of disease will be a person with PTBIf source unknown, ask household contacts for symptoms and investigate any contact with symptoms of Public. Generally done by FWE or nurseNot necessary for smear-negative PTB or EPTB, unless index case is a childContact examination form completed for each confirmed case’s contactsSuspects should be entered into the “Suspect and Sputum Dispatch Register” and evaluate appropriately. Nurses can give INH to child contacts <5 who have been screened and are asymptomaticTreatment lasts 6 months, but a monthly supply is handed outPyridoxine is not routinely indicated for childrenNurses can give INH to child contacts <5 who have been screened and are asymptomaticTreatment lasts 6 months, but a monthly supply is handed outPyridoxine is not routinely indicated for childrenNurses can give INH to child contacts <5 who have been screened and are asymptomaticTreatment lasts 6 months, but a monthly supply is handed outPyridoxine is not routinely indicated for children. There are currently 10 drugs used for active TB diseaseThe first lines drugs are isoniazid, rifampin, ethambutol, pyrazinamidePreferred regimen is the aforementioned drugs for 8 weeksAfterward, maintenance therapy includes daily isoniazid and rifampin for 18

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weeks IMPORTANT STEP 1 INFORMATION ABOUT TB DRUGS!Rifampin turns urine red, be sure to tell patient to expect it!Isoniazid can cause peripheral neuropathy, be sure to pretreat with B6

1.Take-home Message - 1

The health department will decide if you need to have a TB testThe TB test is mandatory, but is simple and safeThe health department will keep all information about you confidentialThe purpose of giving you the TB test and offering you treatment is to protect your health and the health of othersThe health department will decide if you need to have a TB testThe TB test is mandatory, but is simple and safeThe health department will keep all information about you confidentialThe purpose of giving you the TB test and offering you treatment is to protect your health and the health of othersThe health department will decide if you need to have a TB testThe TB test is mandatory, but is simple and safeThe health department will keep all information about you confidentialThe purpose of giving you the TB test and offering you treatment is to protect your health and the health of othersThe health department will decide if you need to have a TB testThe TB test is mandatory, but is simple and safeThe health department will keep all information about you confidentialThe purpose of giving you the TB test and offering you treatment is to protect your health and the health of others

2.Take-home Message - 2

TB infection is not the same as TB diseaseIt is not easy to spread TB germs to othersUsually, you have to be around a person with TB disease for a period of time to become infected If you have been infected with TB germs:Taking medicine will keep you from getting sick with TB diseaseTB can be prevented, treated and cured. Include four 1st-line drugs in initial regimenIsoniazid (INH)Rifampin (RIF)Pyrazinamide (PZA)Ethambutol (EMB)Adjust regimen when drug susceptibility results become available or if patient has difficulty with any of the medicationsNever add a single drug to a failing regimenPromote adherence and ensure treatment completion

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DIRECTLY OBSERVED THERAPY

Health care worker watches patient swallow each dose of medicationDOT is the best way to ensure adherenceShould be used with all intermittent regimensReduces relapse of TB disease and acquired drug resistanceHealth care worker watches patient swallow each dose of medicationDOT is the best way to ensure adherenceShould be used with all intermittent regimensReduces relapse of TB disease and acquired drug resistanceHealth care worker watches patient swallow each dose of medicationDOT is the best way to ensure adherenceShould be used with all intermittent regimensReduces relapse of TB disease and acquired drug resistanceHealth care worker watches patient swallow each dose of medicationDOT is the best way to ensure adherenceShould be used with all intermittent regimensReduces relapse of TB disease and acquired drug resistance. Most TB is curable, but…Four or more drugs required for the simplest regimen6-9 or more months of treatment requiredPerson must be isolated until non-infectiousDirectly observed therapy to assure adherence/completion recommendedSide effects and toxicity commonMay prolong treatmentMay prolong infectiousnessOther medical and psychosocial conditions complicate therapyTB may be more severeDrug-drug interactions common

Core activitiesIdentification and treatment of TB casesIdentification, evaluation and treatment of high risk close contacts of casesSurveillance/case reportingTB laboratory servicesTargeted testing and LTBI treatment for high risk populations Training/continuing education for health care providersProgram evaluation. BTS guidelines – 1999 Thorax 2000: 55; 210-218NICE guidelines – 2006Sensitive TB – 4 drugs for 2 months 2 drugs for 4 monthsResistant TB - 6 drugs for 24 months (second line drugs are not so effective)[Eng, Wales & NI 2004, 6.8% Isoniazid resistant, 1% MDR TB (R to Isoniazid and rifampicin)]

PATIENT COMPLIANCE

Treatment will not work if not takenDOTS (Directly Observed Therapy) if:Likely poor complianceMDRTB

Patient non complianceDeliberateFailure to understand e.g. language, cultureSocial e.g. alcoholPatient movement e.g. ‘lost to follow up’Lack of medical/nursing support others.

- Respiratory TB2 months Rifampicin, Isoniazid, Pyrazinamide, Ethambutol4 months Rifampicin, IsoniazidPyridoxine- Now given as combination drugsRifater Rifinah- Sensitivity patterns important. - No increased risk of TB- Women with TB should be advised against becoming pregnant until Rx completed- Low dose combined OCP is less effective (RMP enhances metabolism of oestrogen)- Rifampicin, Isoniazid, Pyrazinamide, Ethambutol – standard dose- Streptomycin (8th nerve) and Ethionamide - avoid.

PREVENTION OF THE DISEASE

At the end of this unit, participants will be able to:

Identify the goals of infection prevention

Identify 3 levels of prevention

Identify infection control strategies to prevent the transmission of TB in the healthcare setting

Explain the importance of contact tracing

Prevention efforts focus on the following three goals:Primary prevention – preventing TB infectionSecondary prevention – preventing TB diseaseTertiary prevention – preventing TB morbidity and mortality. Prevention efforts focus on the following three goals:Primary prevention – preventing TB infectionSecondary prevention – preventing TB diseaseTertiary prevention – preventing TB morbidity and mortality

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Administrative controlsReduce risk of exposure, infection and disease thru policy and practiceEnvironmental (engineering) controlsReduce concentration of infectious bacilli in air in areas where air contamination is likelyPersonal respiratory protection Protect personnel who must work in environments with contaminated air. Develop and implement written policies and protocols to ensure:Rapid identification of TB cases (e.g., improving the turn-around time for obtaining sputum results)Isolation of patients with PTBRapid diagnostic evaluationRapid initiation treatmentEducate, train, and counsel HCWs about TBTo the extent possible, avoid mixing TB patients and HIV patients in the hospital or clinic setting. Ventilation is the movement of airShould be done in a controlled mannerTypesNaturalLocalGeneralSimple measures can be effective. Teach members of the community to:Recognize the early symptoms of TBMinimise crowded living conditionsAllow natural light into buildings and rooms as ultra-violet rays quickly kill TB bacilliOpen windows to air out rooms to dilute the load of infectious TB bacilli

Patient should maintain a well-balanced diet to keep the immune system strongPatient should TB patient to stop smoking and minimize intake of alcoholPatient should hold a cloth or handkerchief over mouth when coughingPatient should not spit on the floor but in a container (preferably disposable) and dispose of properly. Prisons and Police Holding CellsScreen all prisonersTreat & isolate Implement strict DOT during entire treatmentRefer all released prisoners under treatment to nearest healthcare facility. BarracksEducate all personnelScreen all recruits Start treatment & organise workplace DOTIdentify & screen all close contactsAdvise TB patients to have an HIV test

Not Everyone Exposed Becomes Infected

Probability of transmission depends on: Infectiousness Type of environment Length of exposure 10% of infected persons will develop TB disease at some point in their lives 5% within 1-2 years 5% at some point in their lives

Persons at Risk for Developing TB Disease

Persons at high risk for developing TB disease fall into 2 categoriesThose who have been recently infectedThose with clinical conditions that increase their risk of progressing from LTBI to TB disease

RECENT INFECTION AS A RISK FACTOR

Persons more likely to have been recently infected includeClose contacts to persons with infectious TBSkin test converters (within past 2 years)Recent immigrants from TB-endemic areas (within 5 years of arrival to the U.S.)Children ≤ 5 years with a positive TSTResidents and employees of high-risk congregate settings (e.g. correctional facilities, homeless shelters, healthcare facilities)

INCREASES RISK FOR PROGESSION TO TB DISEASE

Persons more likely to progress from LTBI to TB disease includeHIV infected personsThose with history of prior, untreated TBUnderweight or malnourished personsInjection drug useThose receiving TNF-α antagonists for treatment of rheumatoid arthritis or Crohn's diseaseCertain medical conditions

Latent TB Infection (LTBI)

Occurs when person breathes in bacteria and it reaches the air sacs (alveoli) of lung Immune system keeps bacilli contained and under control Person is not infectious and has no symptomsPatients should be considered infectious if they:Are undergoing cough-inducing proceduresHave sputum smears positive for acid-fast bacilli (AFB) and:Are not receiving treatmentHave just started treatment, orHave a poor clinical or bacterial response to treatmentHave cavitary diseaseExtrapulmonary TB patients are not infectious

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INFECTIOUSNESS-2

Patients are not considered infectious if they meet all these criteria:Received adequate treatment for 2-3 weeksFavorable clinical response to treatment 3 consecutive negative sputum smears results from sputum collected on different days

TECHNIQUES TO DECREASE TB TRANSMISSION

Instruct patient to:Cover mouth when coughing or sneezingWear mask as instructedOpen windows to assure proper ventilationDo not go to work or school until instructed by physicianAvoid public placesLimit visitorsMaintain home or hospital isolation as ordered

ECALUATION FOR TB

Medical history Physical examination Mantoux tuberculin skin test Chest x-ray Bacteriologic exam (smear and culture)

1.Chest x-Ray

Obtain chest x-ray for patients with positive TST results or with symptoms suggestive of TBAbnormal chest x-ray, by itself, cannot confirm the diagnosis of TB but can be used in conjunction with other diagnostic indicatorsObtain chest x-ray for patients with positive TST results or with symptoms suggestive of TBAbnormal chest x-ray, by itself, cannot confirm the diagnosis of TB but can be used in conjunction with other diagnostic indicatorsObtain chest x-ray for patients with positive TST results or with symptoms suggestive of TBAbnormal chest x-ray, by itself, cannot confirm the diagnosis of TB but can be used in conjunction with other diagnostic indicators

2.SPUTUM COLLECTION

Sputum specimens are essential to confirm TBSpecimens should be from lung secretions, not salivaCollect 3 specimens on 3 different daysSpontaneous morning sputum more desirable than induced specimensCollect sputum before treatment is initiated

3.Smear Examination

Strongly consider TB in patients with smears containing acid-fast bacilli (AFB)Use subsequent smear examinations to assess patient's infectiousness and response to 4.treatment

Used to confirm diagnosis of TBCulture all specimens, even if smear is negativeInitial drug isolate should be used to determine drug susceptibility

CONCLUSION

Tuberculosis concept of the public health care for the treatment of the disease which under the circumstances, ages and other controlled activities that are not common in developing countries and against which the fact was not only using the drug but it definitely proved by research works every patient is coming and taking drugs but if any one thinks only using natural remedies for tuberculosis plants, nutrients, minerals and fruits, exercise. It controlled and prevented

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REFERENCE

[1]Gutierrez, M.C., Brisse, S., Brosch, R., Fabre, M., Omaïs, B., et al. (2005) Ancient Origin and Gene Mosaicism of the Progenitor of Mycobacterium tuberculosis. PLoS Pathogens, 1, e5. http://dx.doi.org/10.1371/journal.ppat.0010005

[2] (2014) Organization WH Global Tuberculosis Report 2014. World Health Organization, Geneva.

[3] Zager, E.M. and McNerney, R. (2008) Multidrug-Resistant Tuberculosis. BMC Infectious Diseases, 8, 10.

http://dx.doi.org/10.1186/1471-2334-8-10

[4] Brothwell, D. and Sandison, A.T. (1967) Diseases in Antiquity. A Survey of the Diseases, Injuries and Surgery of Early Populations. Diseases in Antiquity a Survey of the Diseases, Injuries and Surgery of Early Populations. [5] Herzog, B. (1998) History of Tuberculosis. Respiration, 65, 5-15. http://dx.doi.org/10.1159/000029220

[6] D'Ambrosio, L., Centis, R., Sotgiu, G., Pontali, E., Spanevello, A., et al. (2015) New Anti-Tuberculosis Drugs and Regimens: 2015 Update. ERJ Open Research, 1, 00010-02015. http://dx.doi.org/10.1183/23120541.00010-2015

[7] WHO (2014) Global Tuberculosis Report 2014. World Health Organization, Geneva.

[8] Zignol, M., Hosseini, M.S., Wright, A., Lambregts-van Weezenbeek, C., Nunn, P., et al. (2006) Global Incidence of Multidrug-Resistant Tuberculosis. Journal of Infectious Diseases, 194, 479-485. http://dx.doi.org/10.1086/505877

[9] Control, CfD. and Prevention (2006) Emergence of Mycobacterium tuberculosis with Extensive Resistance to Second- Line Drugs—Worldwide, 2000-2004. MMWR Morbidity and Mortality Weekly Report, 55, 301.

[10] Dooley, S.W., Jarvis, W.R., Marione, W.J. and Snider, D.E. (1992) Multidrug-Resistant Tuberculosis. Annals of Internal Medicine, 117, 257-259. http://dx.doi.org/10.7326/0003-4819-117-3-257

[11] Edlin, B.R., Tokars, J.I., Grieco, M.H., Crawford, J.T., Williams, J., et al. (1992) An Outbreak of Multidrug-Resistant Tuberculosis among Hospitalized Patients with the Acquired Immunodeficiency Syndrome. New England Journal of Medicine, 326, 1514-1521. http://dx.doi.org/10.1056/NEJM199206043262302

[12] Sharma, S. and Mohan, A. (2004) Multidrug-Resistant Tuberculosis. Indian Journal of Medical Research, 120, 354- 376.

[13] India Tuberculosis (2012) Revised National Tuberculosis Control Programme. Annual Status Report.

http://www.tbcindia.nic.in/showfile.php?lid=3141

[14] Ohno, H., Koga, H. and Kohno, S. (1998) Multidrug-Resistant Tuberculosis. 2. Mechanisms of Drug-Resistance in Mycobacterium tuberculosis—Genetic Mechanisms of Drug-Resistance. Kekkaku: [Tuberculosis], 73, 657-663.

[15] Flandrois, J.P., Lina, G. and Dumitrescu, O. (2014) MUBII-TB-DB: A Database of Mutations Associated with Antibiotic Resistance in Mycobacterium tuberculosis. BMC Bioinformatics, 15, 107. http://dx.doi.org/10.1186/1471-2105-15-107

Volume 3 (Issue 12) : December 2016 ISSN: 2394-9414
DOI: 10.5281/zenodo.192489 Impact Factor- 3.109

[16] Diel, R., Rutz, S., Castell, S. and Schaberg, T. (2012) Tuberculosis: Cost of Illness in Germany. European Respiratory Journal, 40, 143-151. http://dx.doi.org/10.1183/09031936.00204611

[17] Alsaad, N., van Altena, R., Pranger, A.D., van Soolingen, D., de Lange, W.C., et al. (2013) Evaluation of Co-Trimoxazole in the Treatment of Multidrug-Resistant Tuberculosis. European Respiratory Journal, 42, 504-512.

http://dx.doi.org/10.1183/09031936.00114812

[18] Skripconoka, V., Danilovits, M., Pehme, L., Tomson, T., Skenders, G., et al. (2013) Delamanid Improves Outcomes and Reduces Mortality in Multidrug-Resistant Tuberculosis. European Respiratory Journal, 41, 1393-1400. http://dx.doi.org/10.1183/09031936.00125812

[19] Diacon, A.H., Pym, A., Grobusch, M.P., de los Rios, J.M., Gotuzzo, E., et al. (2014) MultidTested Drugs. Euro Surveillance, 12, Article ID: E070517.

[21] Udwadia, Z.F., Amale, R.A., Ajbani, K.K. and Rodrigues, C. (2012) Totally Drug-Resistant Tuberculosis in India. Clinical Infectious Diseases, 54, 579-581. http://dx.doi.org/10.1093/cid/cir889

[22] Klopper, M., Warren, R.M., Hayes, C., van Pittius, N.C.G., Streicher, E.M., et al. (2013) Emergence and Spread of Extensively and Totally Drug-Resistant Tuberculosis, South Africa. Emerging Infectious Diseases, 19, 449-455. http://dx.doi.org/10.3201/eid1903.120246

[23] Parida, S., Axelsson-Robertson, R., Rao, M., Singh, N., Master, I., et al. (2015) Totally Drug-Resistant Tuberculosis and Adjunct Therapies. Journal of Internal Medicine, 277, 388-405. http://dx.doi.org/10.1111/joim.12264

[24] Mahajan, G.B. and Balachandran, L. (2011) Antibacterial Agents from Actinomycetes—A Review. Frontiers in Bioscience (Elite Edition), 4, 240-253.

[25] Adegboye, M. and Babalola, O. (2013) Actinomycetes: A Yet Inexhaustive Source of Bioactive Secondary Metabolites. In: Mendez-Vilas, A., Ed., Microbial Pathogens and Strategies for Combating Them: Science, Technology and Education, Formatex, Badajoz, 786-795.

[26] Patel, J.D., Parmar, M., Patel, P., Rohit, P., Taviyad, R., et al. (2014) Dynamism of Antimicrobial Activity of Actinomycetes—A Case Study from Undisturbed Microbial Niche. Advances in Microbiology, 4, 324-334.

http://dx.doi.org/10.4236/aim.2014.46039

[27] Smith, D. and Ryan, M. (2009) Fungal Sources for New Drug Discovery. Access Science, © McGraw-Hill Companies. http://www.accessscience.com

[28] Aly, A.H., Debbab, A. and Proksch, P. (2011) Fifty Years of Drug Discovery from Fungi. Fungal Diversity, 50, 3-19. http://dx.doi.org/10.1007/s13225-011-0116-y

[29] Singh, R.K., Tiwari, S.P., Rai, A.K. and Mohapatra, T.M. (2011) Cyanobacteria: An Emerging Source for Drug Discovery. The Journal of Antibiotics, 64, 401-412. http://dx.doi.org/10.1038/ja.2011.21

[30] Abdallah, E.M. (2011) Plants: An Alternative Source for Antimicrobials. Journal of Applied Pharmaceutilcal Science, 1, 16-20.

[31] Katiyar, C., Gupta, A., Kanjilal, S. and Katiyar, S. (2012) Drug Discovery from Plant Sources: An Integrated Approach. Ayu, 33, 10-19.

[32] Akshata, J., Chakrabarthy, A., Swapna, R., Buggi, S. and Somashekar, M. (2015) Adverse Drug Reactions in Management of Multi Drug Resistant Tuberculosis, in Tertiary Chest Institute. Journal of Tuberculosis Research, 3, 27-33. http://dx.doi.org/10.4236/jtr.2015.32004

[33] Arbex, M.A., Varella Mde, C., Siqueira, H.R. and Mello, F.A. (2010) Antituberculosis Drugs: Drug Interactions, Adverse Effects, and Use in Special Situations-Part 1: First-Line Drugs. Jornal Brasileiro de Pneumologia, 36, 626-640. http://dx.doi.org/10.1590/S1806-37132010000500016

[34] Arbex, M.A., Varella Mde, C., Siqueira, H.R. and Mello, F.A. (2010) Antituberculosis Drugs: Drug Interactions, Adverse Effects, and Use in Special Situations-Part 2: Second Line Drugs. Jornal Brasileiro de Pneumologia, 36, 641- 656. http://dx.doi.org/10.1590/S1806-37132010000500017

[35] Glesinger, L. (1954) Medicine through Centuries. Zora, Zagreb, 21-38. [36] Bottcher, H. (1965) Miracle Drugs. Zora, Zagreb, 23-139.

[37] Castiglioni, A., Krumbhaar, E.B. and Alfred, A. (1947) A History of Medicine. Knopf, New York. [38] Petrovska, B.B. (2012) Historical Review of Medicinal Plants' Usage. Pharmacognosy Reviews, 6, 1-5. http://dx.doi.org/10.4103/0973-7847.95849

[39] Cragg, G.M. and Newman, D.J. (2013) Natural Products: A Continuing Source of Novel Drug Leads. Biochimica et Biophysica Acta (BBA)—General Subjects, 1830, 3670-3695. http://dx.doi.org/10.1016/j.bbagen.2013.02.008

[40] Santhosh, R.S. and Suriyanarayanan, B. (2014) Plants: A Source for New Antimycobacterial Drugs. Planta Medica, 80, 9-21.

[41] Newton, S.M., Lau, C. and Wright, C.W. (2000) A Review of Antimycobacterial Natural Products. Phytotherapy Research, 14, 303-322. http://dx.doi.org/10.1002/1099-1573(200008)14:5<303::AID-PTR712>3.0.CO;2-N

[42] Mohamad, S., Zin, N.M., Wahab, H.A., Ibrahim, P., Sulaiman, S.F., et al. (2011) Antituberculosis Potential of Some Ethnobotanically Selected Malaysian Plants. Journal of Ethnopharmacology, 133, 1021-1026. http://dx.doi.org/10.1016/j.jep.2010.11.037

[43] Babalola, I.T., Adelakun, E.A., Wang, Y. and Shode, F.O. (2012) Anti-TB Activity of Sterculia setigera Del., Leaves (Sterculiaceae). Journal of Pharmacognosy and Phytochemistry, 1, 19-26.

[44] Robles-Zepeda, R.E., Coronado-Aceves, E.W., Velázquez-Contreras, C.A., Ruiz-Bustos, E., NavBalcha, E., Mengiste, B., Gebrelibanos, M., Worku, A. and Ameni, G. (2014) Evaluation of In-Vitro Anti-Mycobacterial Activity of Selected Medicinal Plants in Mekelle, Ethiopia. World Applied Sciences Journal, 31, 1217-1220.

[46] Njeru, S.N., Obonyo, M.A., Ngari, S.M., Nyambati, S., Onsarigo, J.M.N., et al. (2015) Antituberculous, Antimicrobial, Cytotoxicity and Phytochemical Activity Study of Piliostigma thonningii Extract Fractions. Journal of Medicinal Plants Research, 9, 655-663.

[47] Gautam, R., Saklani, A. and Jachak, S.M. (2007) Indian Medicinal Plants as a Source of Antimycobacterial Agents. Journal of Ethnopharmacology, 110, 200-234. http://dx.doi.org/10.1016/j.jep.2006.12.031

[48] Arya, V. (2011) A Review on Anti-Tubercular Plants. International Journal of PharmaTech Research, 3, 872-880. [49] Chattopadhyay, D., Arunachalam, G., Mandal, A.B., Sur, T.K., Mandal, S.C., et al. (2002) Antimicrobial and Anti- Inflammatory Activity of Folklore: Mallotus peltatus Leaf Extract. Journal of Ethnopharmacology, 82, 229-237. http://dx.doi.org/10.1016/S0378-8741(02)00165-4

Volume 3 (Issue 12) : December 2016 ISSN: 2394-9414
DOI: 10.5281/zenodo.192489 Impact Factor- 3.109

[50] Gupta, V., Shukla, C., Bisht, G., Saikia, D., Kumar, S., et al. (2011) Detection of Anti-Tuberculosis Activity in Some Folklore Plants by Radiometric BACTEC Assay. Letters in Applied Microbiology, 52, 33-40. http://dx.doi.org/10.1111/j.1472-765X.2010.02963.x

[51] Saikia, D., Parveen, S., Gupta, V.K. and Luqman, S. (2012) Anti-Tuberculosis Activity of Indian Grass KHUS (Vetiveria zizanioides L. Nash). Complementary Therapies in Medicine, 20, 434-436. http://dx.doi.org/10.1016/j.ctim.2012.07.010

[52] Adaikkappan, P., Kannapiran, M. and Anthonisamy, A. (2012) Anti-Mycobacterial Activity of Withania somnifera and Pueraria tuberosa against Mycobacterium tuberculosis H37Rv. Journal of Academia and Industrial Research, , 153- 156.

[53] Birdi, T., D'souza, D., Tolani, M., Daswani, P., Nair, V., et al. (2012) Assessment of the Activity of Selected Indian Medicinal Plants against Mycobacterium tuberculosis: A Preliminary Screening Using the Microplate Alamar Blue Assay. European Journal of Medicinal Plants, , 308-323. http://dx.doi.org/10.9734/EJMP/2012/1638

[54] Antony, M., James, J., Misra, C.S., Sagadevan, L., Veettil, A.T., et al. (2012) Anti Mycobacterial Activity of the Plant Extracts of Alstonia scholaris. International Journal of Current Pharmaceutical Research, , 40-42.

[55] Mishra, P.K., Singh, R.K., Gupta, A., Chaturvedi, A., Pandey, R., et al. (2013) Antibacterial Activity of Andrographis paniculata (Burm. f.) Wall. ex Nees Leaves against Clinical Pathogens. Journal of Pharmacy Research, 7, 459-462. http://dx.doi.org/10.1016/j.jopr.2013.05.009

[56] Tawde, K., Gacche, R. and Pund, M. (2012) Evaluation of Selected Indian Traditional Folk Medicinal Plants against Mycobacterium tuberculosis with Antioxidant and Cytotoxicity Study. Asian Pacific Journal of Tropical Disease, 2, S685-S691. http://dx.doi.org/10.1016/s2222-1808(12)60244-8

[57] Tiwari, N., Thakur, J., Saikia, D. and Gupta, M.M. (2013) Antitubercular Diterpenoids from Vitex trifolia. Phytomedicine, 20, 605-610. http://dx.doi.org/10.1016/j.phymed.2013.01.003

[58] Viswanathan, V., Phadatare, A. and Mukne, A. (2014) Antimycobacterial and Antibacterial Activity of Allium sativum Bulbs. Indian Journal of Pharmaceutical Sciences, 76, 256-261.

[59] Rajiniraja, M. and Jayaraman, G. (2014) Bioautography Guided Screening of Selected Indian Medicinal Plants Reveals Potent Antimycobacterial Activity of Allium sativum Extracts-Implication of Non-Sulfur Compounds in Inhibition. International Journal of Pharmacy and Pharmaceutical Sciences, 6, 671-676.

[60] Munna, S., Basha, S.C., Reddy, P.R., Pramod, N., Kumar, Y.P., et al. (2014) Antitubercular Activity of Actiniopteris radiata Linn. Journal of Global Trends in Pharmaceutical Sciences, , 1443-1445.

[61] Kaur, R. and Kaur, H. (2015) Antitubercular Activity and Phytochemical Screening of Selected Medicinal Plants. Oriental Journal of Chemistry, 31, 597-600.

[62] Suhitha, S., Devi, S.K., Gunasekaran, K., Carehome Pakyntein, H., Bhattacharjee, A., et al. (2015) Phytochemical Analyses and Activity of Herbal Medicinal Plants of North-East India for Anti-Diabetic, Anti-Cancer and Anti- Tuberculosis and Their Docking Studies. Current Topics in Medicinal Chemistry, 15, 21-36. http://dx.doi.org/10.2174/1568026615666150112104344

[63] Sheeba, D.G., Gomathi, K.S. and Citarasu, D. (2015) Anti-Mycobacterial and Phytochemical Investigation of Methanol Extracts of Few Medicinal Plants. Journal of Chemical and Pharmaceutical Sciences, 8, 480-486.

Volume 3 (Issue 12) : December 2016 ISSN: 2394-9414
DOI: 10.5281/zenodo.192489 Impact Factor- 3.109

[64] Gowrish, A., Vagdevi, H. and Rajashekar, H. (2015) In Vitro Antioxidant and Antitubercular Activity of Leucas marrubioides Desf. Root Extracts. Journal of Applied Pharmaceutical Science, 5, 137-142. http://dx.doi.org/10.7324/JAPS.2015.50220

[65] Channabasappa, H.S., Shrinivas, J.D. and Venkatrao, K.H. (2015) Evaluation of Antibaglabra. Medicinal Chemistry Research, 24, 3494-3503. http://dx.doi.org/10.1007/s00044-015-1401-1

[67] Sureram, S., Senadeera, S.P., Hongmanee, P., Mahidol, C., Ruchirawat, S., et al. (2012) Antimycobacterial Activity of Bisbenzylisoquinoline Alkaloids from Tiliacora triandra against Multidrug-Resistant Isolates of Mycobacterium tuberculosis. Bioorganic & Medicinal Chemistry Letters, 22, 2902-2905. http://dx.doi.org/10.1016/j.bmcl.2012.02.053

[68] Leitão, F., Leitão, S.G., de Almeida, M.Z., Cantos, J., Coelho, T., et al. (2013) Medicinal Plants from Open-Air Markets in the State of Rio de Janeiro, Brazil as a Potential Source of New Antimycobacterial Agents. Journal of Ethnopharmacology, 149, 513-521. http://dx.doi.org/10.1016/j.jep.2013.07.009

[69] Nguta, J.M., Appiah-Opong, R., Nyarko, A.K., Yeboah-Manu, D. and Addo, P.G. (2015) Medicinal Plants Used to Treat TB in Ghana. International Journal of Mycobacteriology, 4, 116-123. http://dx.doi.org/10.1016/j.ijmyco.2015.02.003

[70] Wang, M., Guan, X., Chi, Y., Robinson, N. and Liu, J.P. (2015) Chinese Herbal Medicine as Adjuvant Treatment to Chemotherapy for Multidrug-Resistant Tuberculosis (MDR-TB): A Systematic Review of Randomized Clinical Trials. Tuberculosis, 95, 364-372. http://dx.doi.org/10.1016/j.tube.2015.03.003

[71] Lu, J., Qin, R., Ye, S. and Yang, M. (2011) Prunella vulgaris L. Extract Improves Cellular Immunity in MDR-TB Challenged Rats. Journal of Medical Colleges of PLA, 26, 230-237. http://dx.doi.org/10.1016/S1000-1948(11)60040-3

[72] Torres-Romero, D., Jimenez, I.A., Rojas, R., Gilman, R.H., Lopez, M., et al. (2011) Dihydro-Beta-Agarofuran Sesquiterpenes Isolated from Celastrus vulcanicola as Potential Anti-Mycobacterium tuberculosis Multidrug-Resistant Agents. Bioorganic & Medicinal Chemistry, 19, 2182-2189. http://dx.doi.org/10.1016/j.bmc.2011.02.034

[73] Molina-Salinas, G.M., Pena-Rodriguez, L.M., Mata-Cardenas, B.D., Escalante-Erosa, F., Gonzalez-Hernandez, S., et al. (2011) Flourensia cernua: Hexane Extracts a Very Active Mycobactericidal Fraction from an Inactive Leaf Decoction against Pansensitive and Panresistant Mycobacterium tuberculosis. Evidence-Based Complementary and Alternative Medicine: eCAM, 2011, Article ID: 782503.

[74] Hannan, A., Ikram Ullah, M., Usman, M., Hussain, S., Absar, M., et al. (2011) Anti-Mycobacterial Activity of Garlic (Allium sativum) against Multi-Drug Resistant and Non-Multi-Drug Resistant Mycobacterium tuberculosis. Pakistan Journal of Pharmaceutical Sciences, 24, 81-85.

[75] Dini, C., Fabbri, A. and Geraci, A. (2011) The Potential Role of Garlic (Allium sativum) against the Multi-Drug Resistant Tuberculosis Pandemic: A Review. Annali dell'Istituto Superiore di Sanita, , 465-473.

[76] Navarro-Garcia, V.M., Luna-Herrera, J., Rojas-Bribiesca, M.G., Alvarez-Fitz, P. and Rios, M.Y. (2011) Antibacterial Activity of Aristolochia brevipes against Multidrug-Resistant Mycobacterium tuberculosis. Molecules, 16, 7357-7364. http://dx.doi.org/10.3390/molecules16097357

[77] Patra, A., Ghosh, S. and Mukherjee, B. (2010) Structure Elucidation of Two New Bisbenzylisoquinoline Alkaloids and NMR Assignments of the Alkaloids from the Fruits of Tiliacora racemosa. Magnetic Resonance in Chemistry, 48, 823-828. http://dx.doi.org/10.1002/mrc.2670

[78] Serkani, J.E., Isfahani, B.N., Safaei, H.G., Kermanshahi, R.K. and Asghari, G. (2012) Evaluation of the Effect of Humulus lupulus Alcoholic Extract on Rifampin-Sensitive and Resistant Isolates of Mycobacterium tuberculosis. Research in Pharmaceutical Sciences, 7, 235-242.

[79] Crandall, P.G., Ricke, S.C., O'Bryan, C.A. and Parrish, N.M. (2012) In Vitro Effects of Citrus Oils against Mycobacterium tuberculosis and Non-Tuberculous Mycobacteria of Clinical Importance. Journal of Environmental Science and Health Part B, Pesticides, Food Contaminants, and Agricultural Wastes, 47, 736-741. http://dx.doi.org/10.1080/03601234.2012.669331

[80] Leon-Diaz, R., Meckes-Fischer, M., Valdovinos-Martinez, L., Campos, M.G., Hernandez-Pando, R., et al. (2013) Antitubercular Activity and the Subacute Toxicity of (-)-Licarin A in BALB/c Mice: A Neolignan Isolated from Aristolochia taliscana. Archives of Medical Research, 44, 99-104. http://dx.doi.org/10.1016/j.arcmed.2012.12.006

[81] Nogueira, T., Medeiros, M.A., Marcelo-Curto, M.J., García-Pérez, B., Luna-Herrera, J., et al. (2013) Profile of Antimicrobial Potential of Fifteen Hypericum Species from Portugal. Industrial Crops and Products, 47, 126-131. http://dx.doi.org/10.1016/j.indcrop.2013.03.005

[82] Jimenez-Arellanes, A., Luna-Herrera, J., Cornejo-Garrido, J., Lopez-Garcia, S., Castro-Mussot, M.E., et al. (2013) Ursolic and Oleanolic Acids as Antimicrobial and Immunomodulatory Compounds for Tuberculosis Treatment. BMC Complementory and Alternative Medicines, 13, 258. http://dx.doi.org/10.1186/1472-6882-13-258

[83] Uc-Cachon, A.H., Borges-Argaez, R., Said-Fernandez, S., Vargas-Villarreal, J., Gonzalez-Salazar, F., et al. (2014) Naphthoquinones Isolated from Diospyros anisandra Exhibit Potent Activity against Pan-Resistant First-Line Drugscterial and Antitubercular AcarIsolated from Ranunculi Ternati Radix. Sarcoidosis Vasculitis and Diffuse Lung Diseases. Official Journal of WASOG/ World Association of Sarcoidosis and Other Granulomatous Disorders, 31, 336-342.

[85] Radji, M., Kurniati, M. and Kiranasari, A. (2015) Comparative Antimycobacterial Activity of Some Indonesian Medicinal Plants against Multi-Drug Resistant Mycobacterium tuberculosis. Journal of Applied Pharmaceutical Science, 5, 19-22.

[86] Jang, W.S., Jyoti, M.A., Kim, S., Nam, K.W., Ha, T.K., et al. (2015) In Vitro Antituberculosis Activity of Diterpenoids from the Vietnamese Medicinal Plant Croton tonkinensis. Journal of Natural Medicines, 70, 127-132.

[87] Gupta, R., Thakur, B., Singh, P., Singh, H., Sharma, V., et al. (2010) Anti-Tuberculosis Activity of Selected Medicinal Plants against Multi-Drug Resistant Mycobacterium tuberculosis Isolates. Indian Journal of Medical Research, 131, 809-813.

[88] Lakshmanan, D., Werngren, J., Jose, L., Suja, K., Nair, M.S., et al. (2011) Ethyl p-Methoxycinnamate Isolated from a Traditional Anti-Tuberculosis Medicinal Herb Inhibits Drug Resistant Strains of Mycobacterium tuberculosis in Vitro. Fitoterapia, 82, 757-761. http://dx.doi.org/10.1016/j.fitote.2011.03.006

[89] Gupta, S., Dwivedi, G.R., Darokar, M.P. and Srivastava, S.K. (2012) Antimycobacterial Activity of Fractions and Isolated Compounds from Vetiveria zizanioides. Medicinal Chemistry Research, 21, 1283-1289. http://dx.doi.org/10.1007/s00044-011-9639-8

[90] Singh, R., Hussain, S., Verma, R. and Sharma, P. (2013) Anti-Mycobacterial Screening of Five Indian Medicinal Plants and Partial Purification of Active Extracts of Cassia sophera and Urtica dioica. Asian Pacific Journal of Tropical Medicine, , 366-371. http://dx.doi.org/10.1016/S1995-7645(13)60040-1

Volume 3 (Issue 12) : December 2016 ISSN: 2394-9414
DOI: 10.5281/zenodo.192489 Impact Factor- 3.109

[91] Kumar, P., Singh, A., Sharma, U., Singh, D., Dobhal, M., et al. (2013) Anti-Mycobacterial Activity of Plumericin and Isoplumericin against MDR Mycobacterium tuberculosis. Pulmonary Pharmacology & Therapeutics, 26, 332-335. http://dx.doi.org/10.1016/j.pupt.2013.01.003

[92] Basu, S., Ghosh, A. and Hazra, B. (2005) Evaluation of the Antibacterial Activity of Ventilago madraspatana Gaertn., Rubia cordifolia Linn. and Lantana camara Linn.: Isolation of Emodin and Physcion as Active Antibacterial Agents. Phytotherapy Research, 19, 888-894. http://dx.doi.org/10.1002/ptr.1752

[93] Dey, D., Ray, R. and Hazra, B. (2014) Antitubercular and Antibacterial Activity of Quinonoid Natural Products against Multi-Drug Resistant Clinical Isolates. Phytotherapy Research, 28, 1014-1021. http://dx.doi.org/10.1002/ptr.5090

[94] Hazra, B., Sarkar, R., Bhattacharyya, S., Ghosh, P.K., Chel, G., et al. (2002) Synthesis of Plumbagin Derivatives and Their Inhibitory Activities against Ehrlich ascites Carcinoma in Vivo and Leishmania donovani Promastigotes in Vitro. Phytotherapy Research, 16, 133-137. http://dx.doi.org/10.1002/ptr.867

[95] Prabu, A., Hassan, S., Prabuseenivasan Shainaba, A.S., Hanna, L.E., et al. (2015) Andrographolide: A Potent Antituberculosis Compound That Targets Aminoglycoside 2'-N-Acetyltransferase in Mycobacterium tuberculosis. Journal of Molecular Graphics & Modelling, 61, 133-140. http://dx.doi.org/10.1016/j.jmgm.2015.07.001

[96] Dey, D., Ray, R. and Hazra, B. (2015) Antimicrobial Activity of Pomegranate Fruit Constituents against Drug-Resistant Mycobacterium tuberculosis and β-Lactamase Producing Klebsiella pneumoniae. Pharmaceutical Biology, 53, 1474- ro-Navarro, M.rug-Resistant Tuberculosis